Introduction to C+8 Technology

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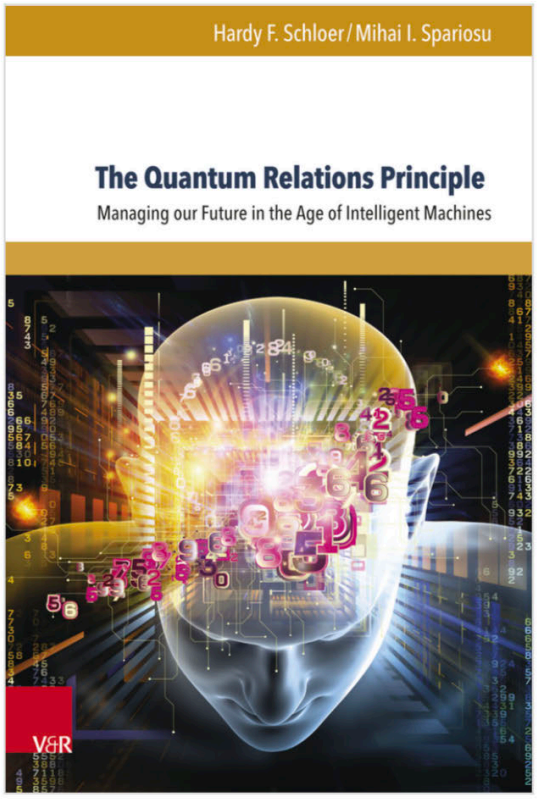
For Background Reading on the C+8 technology, please read:



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The Quantum Relations Principle

Managing our Future in the Age of Intelligent Machines

A vision for the sustainable future of our planet Drawing extensively on the current critical state of affairs at the global level, this book highlights the vital importance of systemic thinking and integrated, transformative knowledge in bringing about a paradigm shift from fragmented, linear ways of thinking to holistic ones, based on the interconnectedness of the web of life. It offers a comprehensive vision and innovative solutions for a sustainable future of our planet, combining traditional wisdom with advanced scientific knowledge and high-end, state-of-the-art information technology. This integration of resources is the premise for the planetary wisdom we so deeply need in order to transform the present global crisis into an opportunity for further human development.

EXECUTIVE SUMMARY

Until today, there was no scientific model or technology in existence, which holistically and effectively combined the realm of big-data science with that of social, environmental and natural sciences, general systemic behaviors in politics, finance, commerce, , as well as such subjective but persistent influential inputs such as belief systems or unconfirmed or asserted facts and news.

Until today it was therefore nearly impossible to provide effective, real-time solutions to the most pressing challenges encountered in multi-disciplinary analytics, especially when processing data within very large-scale interactive systems; problems that include the lack of clinical data management[1], confirmation or operator bias[2], or systemic built-in blind spots.[3]

Thus, C+8[4] Technology is the first of its kind; a holistic knowledge system that addresses all the most serious issues faced (not only) in analytics through its very structure and method of functionality. C+8 automatically creates a real-time, dynamic sandbox[5] - a digital representation of the real world – capturing its continuous dynamics and evolution and providing deep insight into the consequences of the decisions made by its real-world operators, but without allowing these real-world operators to contaminate or influence the answers provided by C+8.

[1] Clinical data management is a critical process in research which leads to the generation of high-quality, reliable, and statistically sound data. Clinical data management ensures the collection, integration, and availability of data at an appropriate quality and cost. It also supports the creation, management, and analysis of studies across the research spectrum. The ultimate goal is to ensure that conclusions drawn from research are well supported by the data.
[2] Confirmation bias is the tendency to search for, interpret, favor, and recall information in a way that affirms one's prior beliefs or hypotheses. It is a type of cognitive bias and a systematic error of inductive reasoning. People display this bias when they gather or remember information selectively, or when they interpret it in a biased way. The effect is stronger for desired outcomes, emotionally charged issues, and for deeply entrenched-beliefs.
[3] Systemic Blind spot bias is the often-encountered and dangerous failure to notice system-cognitive biases. A system or data model may be unintentionally designed to work in a particular style or contain some sort of biased filtering. For instance, human resources employees tend to hire people who share their own world view, but this is done unawares. In the same way, data may be systemically included or excluded in a particular analysis, creating a misleading information density or a dangerous information vacuum, this also being done unawares.
[4] C+8 is a registered trademark of Prisma Analytics GmbH and stands for Causality plus 8 prime object categories that break down the entire universe into its knowledge building blocks, effectively organizing it into a logical and understandable mirror of the real world.
[5] In software development, a sandbox is a testing environment that isolates untested code changes and outright experimentation from the production environment or repository. In C+8, we extrapolate this principle and apply it in our mirrored real world, in which we can test actions, predict outcomes, and so on, in order for real-world decisions to be made wisely, using all available information regarding outcomes and consequences.

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INTRODUCTION

> *"It will, of course, be said that such a scheme as is set forth here is quite unpractical, and goes against human nature. This is perfectly true. It is unpractical, and it goes against human nature. This is why it is worth carrying out, and that is why one proposes it. For what is a practical scheme? A practical scheme is either a scheme that is already in existence, or a scheme that could be carried out under existing conditions. But it is exactly the existing conditions that one objects to; and any scheme that could accept these conditions is wrong and foolish. The conditions will be done away with, and human nature will change."*
>
> – Oscar Wilde

Our world has evolved into a digital place that constantly generates data. Everything we do and everything we create produces inconceivable amounts of data that grow exponentially. With the rapid adoption of connected sensors and Internet of Things (IoT) devices, we will soon reach a point where we will generate as much data in a single day as we have in our entire history.

Humans are grappling with the challenge of organizing these vast amounts of data into databases for the purpose of creating analyses and analytical and transactional applications. Increasing requirement for storage is a challenge, but since capacity is linearly correlated with quantity, data storage is a minor issue.

The real challenge is data retrieval within a specific context and purpose. Using search mechanisms, AI-based software accesses big-data[6] pools and processes them – the larger the data volume, the greater the computational horsepower required. Unlike storage, the computational horsepower is exponentially correlated with the amount of data and by continuing on this path, we are quickly reaching a point where we may never be able to understand and realize the full potential of this data. This is the fundamental reason we must find new approaches and rethink digitalization and "big data" processing.

The human brain links and processes huge amounts of data every second of every day. To do this, it uses neurons that learn, calculate, and communicate independently, but are in constant interaction with each other, basically creating intelligent information. Based on this, we have developed the C+8 data model; a method in which data organizes itself completely autonomously. Through it, thousands of terabytes of unstructured data are processed and immediately stored as intelligent data. This results in continuously growing amounts of natively arranged dynamic data records that digitally map the real world, its behavior, and its correlations. Over time, this produces a

[6] "Big data" is a field that treats methods of analysis, systematical information extraction, or any other dealings with data sets that are too large or complex to be dealt with by traditional data-processing application software. Data with many cases (rows) offer greater statistical power, while data with higher complexity (more attributes or columns) may lead to a higher false discovery rate. The field's challenges include data capture, storage, analysis, source, search, sharing, transfer, visualization, query, update, and information privacy. Big data was originally associated with three key concepts: volume, variety, and velocity. When handling, we cannot sample it, we simply observe and track what happens. Therefore, it often includes data with sizes that exceed the capacity of traditional software to process within an acceptable time and cost limit.

continually evolving model of intelligent data that is mutually and autonomously associated through joint connections creating a 45-dimensional knowledge network. By opening up new perspectives, unknown correlations, and unbiased analyses, we gain new insights, forecasts, and aids to enable evidence-based decision-making at an unprecedented level.

With the advent and continual evolution of AI, the data science and information technology industries are facing more and more complications due to various foreseen and unforeseen factors that influence the outcome, success, and quality of their products.

THE PROBLEM

These complications are partly due to the fact that, so far, the emphasis has been on replicating the function of the real world through technology. As technology mimics the mechanism through which humanity functions and evolves, the nuances of language, culture, religion, etc. have been observed and processed, however, the emergent, high-order interactions which define the societal dynamics have been largely ignored. We live in one world with a single network of objective truths, but in this one world and single network of objective truths there are billions of contradictory views, opinions, agendas, realities, strategies and preferred futures which can trace their origins to a multiplicity of agents with misaligned incentives.

Issues such as operator bias, problems with validating AI processes in big-data, systemic built-in blind spots, clinical data handling, limitations in current big-data information models, unrecognized information vacuums, sub-optimal weak signal detection, problematic handling of contradictive outputs, and the lack of data standards in the handling of unstructured data, all of which contribute to sub-par analytical solutions.

C+8 Technology is a new data standard and AI technology invented and designed by Dr. Hardy F. Schloer, System Architect and Lead Scientist at Prisma Analytics, that in its very nature of operation, addresses all of the above-mentioned problems.

BACKGROUND

> *"In my opinion, the fourth Industrial Revolution will hinge on our human cognitive abilities to derive and contextualize meaning from incredibly large data sets. In both my academic and professional careers to date, I have never witnessed a system so capable of augmenting human strategic decision-making under high opacity. It would appear that Dr. Schloer has solved the Semantic Web as a specific use case of his C+8 algorithm, without even aiming to do so, as an unintended consequence of far greater goals.*
>
> *"In a previous life as a quantum physicist, my colleagues and I often discussed 'Laplace's Demon', the idea that if we fully understood the present state of the universe as the effect of its past and the cause of its future, then we might be able to extrapolate into the future. Dr. Schloer's C+8 system, in its most fundamental form, may yet already reveal its most exciting use case; allowing us, through causality, to peer reliably into the*

future, and in this way, to make decisions today that will result in a more sustainable future. There may be no upper limit in what this technology can accomplish once it becomes fully realized."

- Dr. Petar Stojanov, April 2019

Dr. Petar Stojanov advises governments and global organizations on disruptive innovation and technology, lecturing on Innovation and Entrepreneurship at New York University Abu Dhabi and London Business School Dubai.

THE SOLUTION – C+8 TECHNOLOGY

C+8 Technology provides the solution to the above-mentioned issues through its very structure and method of functionality. It is a knowledge system that is fully generalized, self-evolving, and machine-to-machine standardized. It is self-organizing, operator bias-free, and functions fully while completely unsupervised. It is auto-analytical and provides complete, transparent access to all of its available knowledge.

To answer complex questions correctly and to make the right decisions without missing any information or contextual preconditions using AI as a decision support system, one must develop a continuous, intelligent, dynamic, and real-time decision-making environment which builds the processing and problem-solving fabric using ALL information, ALL behavior, ALL functions, and ALL shapes and appearances that become accessible in our known world.

C+8 does precisely this. By analogy, just as the smallest compositional element of our universe is the atom, C+8 captures and deconstructs the atomistic elements of data that build the world we live in, and builds a parallel, digital representation of our universe based on 8 fundamental elements:

1. abstract concepts,
2. time references,
3. persons,
4. events,
5. physical objects,
6. groups,
7. technology, and;
8. geography,

and all bound together by the 9th element; causality.

At Prisma Analytics we use this knowledge framework to study causality phenomena in our sustained, highly qualified, and successful effort to understand the evolution of the world in our times. Since the system is abstracted to the degree of the 'information atom,' the generalized framework of tools we have built to use the knowledge generated by C+8 can be applied to any subject domain. The user has free rein to select time intervals and any or all of the C+8 atomic elements that need to be observed using each tool, in order to define the elemental properties of a problem, and to create a corresponding solution.

How it Works

The standards

In the herein described technology, the real world is observed[7], recorded, and streamed in real time into the dynamic global C+8 sandbox. The most important aspects of this sandbox are that it is generalized, auto-associative, standardized, unsupervised, completely self-organizing, and operator and confirmation bias-free. It captures evolving facts, realities, interactions, and associations together with all the other dynamic changes of the real world, and it does so 24/7/365.

Generalized

A generalization is the formulation of general concepts from specific instances by abstracting common properties. Generalizations posit the existence of a domain or set of elements, as well as one or more common characteristics shared by those elements (thus creating a conceptual model). As such, they are essentially the basis of all valid deductive inferences. Generalization within the C+8 context is the process of identifying the parts of a whole as belonging to the whole. The completely unrelated parts may be brought together as a group (belonging to the whole) by establishing the existence of a common relationship among them through layers of frames of reference.

Auto-associative

Traditional applications store data at a unique address and can recall the data upon presentation of the complete unique address. Auto-associative applications in C+8 Technology are capable of retrieving a piece of data upon presentation of only partial information from that piece of data. For example, Hopfield networks[8] have been shown to act as auto-associative memory since they are capable of remembering data by observing a portion of that data. C+8 moves well beyond the functionality of Hopfield networks and solves this problem on a systemic level. Association in C+8 is recalled and processed through recorded memberships of instances of events[9] and causality within these events, however discreet. Being observed as any real or abstract object within the context of an observed Event is the minimum requirement to become associated with such event

Standardized

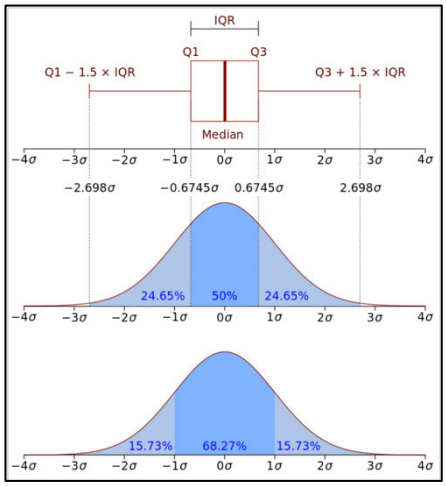
Standardization is the process of implementing and developing technical standards based on the consensus of different parties that include firms, users, interest groups, standards organizations, and governments. It maximizes the compatibility, interoperability, safety, repeatability, and quality of a systemic data operation between computers. Beyond the ability of two or more computer

[7] Observation in this context means absolutely any form of digital information harvesting, such as web crawling, text mining from digital sources, measuring through sensors (for example using a thermometer to obtain a digital temperature reading *Celsius* at time *y* at location *x*), taking digital pictures and video, recording sound and speech, or measuring radioactivity with a Geiger counter at a specific time and location.
[8] A Hopfield network is a type of artificial neural network invented by John Hopfield in 1982. It usually works by first learning a number of binary patterns and then returning the one that is the most similar to a given output.
[9] events are objects in time or instantiations of properties in one or more objects within a observed instance.

systems to exchange information, the semantic interoperability[10] of C+8 is the ability to automatically, meaningfully, and accurately interpret the information exchanged in order to produce useful results as defined by the end users of both systems. To achieve semantic interoperability, both sides refer to a common information exchange reference model. The C+8 system provides such an associative and interpretative environment.

Unsupervised and self-organizing

An unsupervised and self-organized storing of information and its associative structures imposed through the C+8 tools aids in finding previously unknown patterns in data sets without using pre-existing labels. It allows the modeling of probability densities of given inputs. In this way, C+8 provides cluster analysis which causes unsupervised learning to group or segment datasets with shared attributes in order to extrapolate discreet causal relationships. Cluster analysis is a branch of machine learning that groups the data that has not been labelled, classified, or categorized. Instead of responding to feedback, C+8 cluster analysis identifies commonalities in the data and reacts based on the presence or absence of such commonalities in each new piece of data. This approach helps detect anomalous data points that do not fit into either group. A central application of C+8 unsupervised learning is in the field of density estimation[11] through quantitative statistics[12].



Operator bias-free

The observer-expectancy effect (also called the experimenter-expectancy effect, or expectancy bias, observer effect, or experimenter effect) is a form of reactivity in which a data operator's cognitive bias subconsciously influences the results of analysis. Such confirmation bias will always lead to an incorrect interpretation of results, due to the tendency to look for information that conforms to a previous hypothesis, therefore, overlooking information that argues against this

[10] Semantic interoperability is the ability of computer systems to exchange data with unambiguous, shared meaning. It is a requirement to enable machine computable logic, inferencing, knowledge discovery, and data federation between information systems.

[11] Density Estimation is the construction of an estimate, based on observed data, of an unobservable underlying probability density function. The unobservable density function is thought of as the density according to which a large population is distributed; the data are usually thought of as a random sample from that population. A variety of approaches to density estimation are used, including Parzen windows and a range of data clustering techniques, including vector quantization. The most basic form of density estimation is a rescaled histogram.

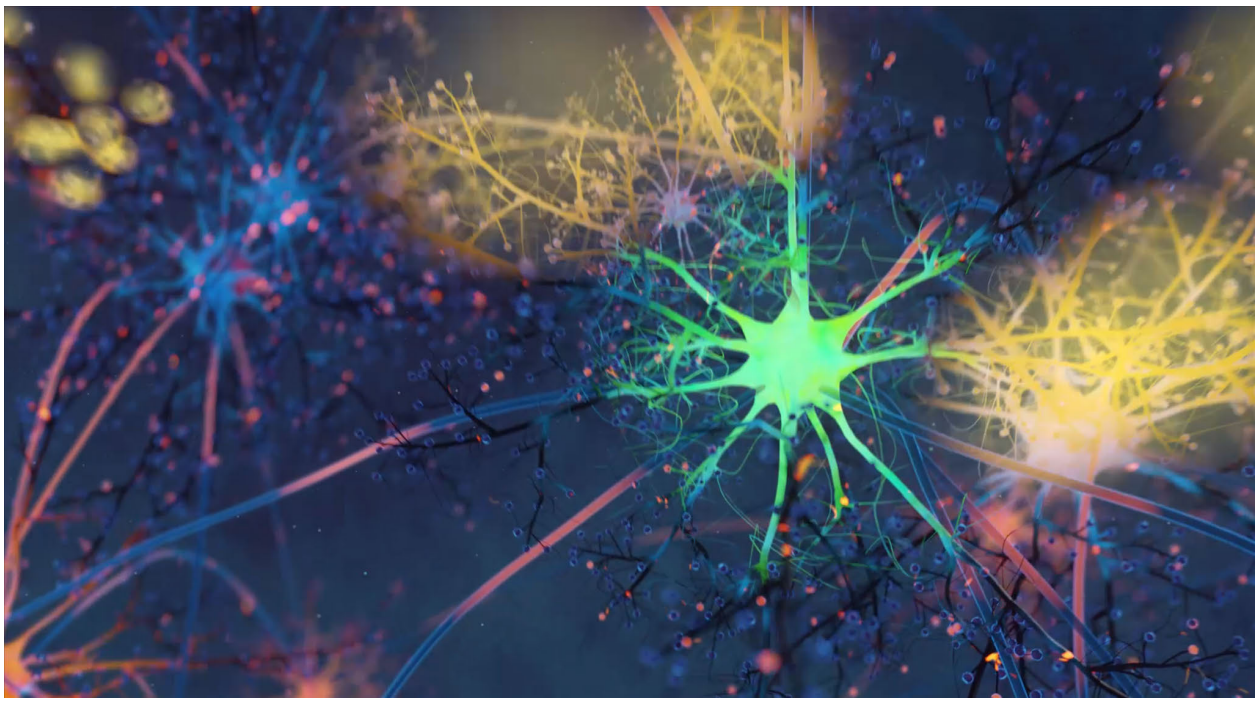
[12] Whenever we talk about probability density function (PDF) in C+8, or density of a continuous random variable, we mean a function whose value at any given sample (or point) in the sample space (the set of possible values taken by the random variable) can be interpreted as providing a relative likelihood that the value of the random variable would equal that sample. In other words, while the absolute likelihood for a continuous random variable to take on any particular value is 0 (since there are an infinite set of possible values to begin with), the value of the PDF at two different samples can be used to infer, in any particular draw of the random variable, how much more likely it is that the random variable would equal one sample compared to the other sample. In a more precise sense, the PDF is used to specify the probability of the random variable falling within a particular range of values, as opposed to taking on any one value. This probability is given by the integral of this variable's PDF over that range—that is, it is given by the area under the density function but above the horizontal axis and between the lowest and greatest values of the range. The probability density function is nonnegative everywhere, and its integral over the entire space is equal to one.

previous hypothesis. The internal validity of any analysis is significantly threatened by this bias. C+8 tools shield the system from it completely by disallowing any human operator to identify, classify, or special-case any part of the data. C+8 uses the same methods and generalized analysis tools across all data and has no expectations built into its analytics processes, except those which the system itself learns through general statistics.

Building A Dynamic Electronic Sandbox of the Real World

In order to build a dynamic electronic sandbox[13] of the world, we must replicate the processes of the human brain, because it is the most efficiant way to contextulize large amounts of information, and, it is native to our own way of thinking and understanding. At its core, the principal activity of the human brain – and the source of its intelligence - is its ability to detect patterns; and it is amazingly efficient at this. The tools our brain uses are neurons and receptors through which sensations are felt and stored – the brain can only perceive things through senses (touch, smell, taste, etc.).

The complexity (and wonder) of the brain arises as an emergent property of the interaction of simple pattern detection operations. With time, the brain stores more and more seemingly sophisticated knowledge, but when we break it down, the architecture is actually rather simple and very logical.



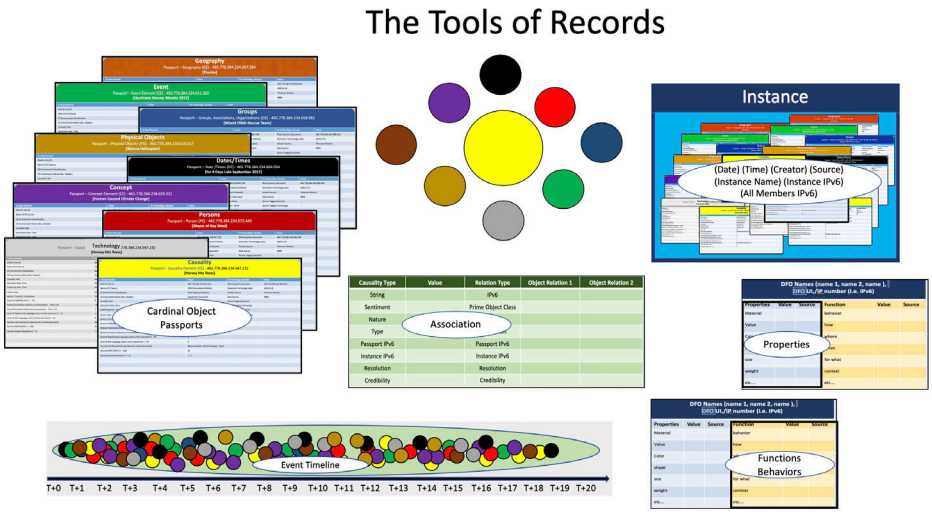
[13] Within the context of C+8 a sandbox is a testing environment that provides a digital real-world copy inside a computational environment to explore the real world together with tests of new ideas and outright experimentation from the real-world environment or C+8 data in the context of strategy development including implementation development and revision control.

A Lesson in Causality

Let us say, for instance, that a 2-year-old is feeling this sensation in her stomach that she later learns is hunger, but for now she just recognizes that it is a need that needs to be addressed. She smells what she later learns is called food, but now just knows that it is what will make this feeling in her stomach disappear, and goes in the direction of the smell. She enters the kitchen and follows the smell to this white thing with buttons, the aroma of food is coming from the top of this object. She reaches up and puts her hand on top of what she later learns is the stove and gets burned. Thus, she learns that the white thing is hot and will hurt you if you touch it, but also that food comes from the hot object.

Humans learn through their senses (data gathering) and associations (data processing), and this is exactly what Prisma Analytics has built within C+8. The human brain includes a sandbox of the universe[14], functionally equivalent to a human brain, except that instead of only containing the data found in one human brain, C+8 operates a system that imports the collective data found in billions of people's brains. C+8 borrows the methods that the brain uses to function, it builds a sandbox exactly like the human brain does – through observation and association – but it relies on the brains of all of humanity. In our system, we ask in the end only four basic questions; what *was*, what *is*, what *will be*, and what *would be if we change x for y*. These questions and their subsequent answers, bound by the Arrow of Time, encompass all the needs and desires of humanity.

Building Knowledge Objects



The building block tools of C+8 are nine cardinal objects (knowledge objects – in the image above they are represented by the circles in the middle) and their passports (upper left), instances (upper

[14] We must always remember, that all a human (and therefore its brain) knows about the Universe and all things contained within, is the human's genetic structure as modified by the cumulative effect of all observations over time. Nothing else is part of such imagined or observed reality of our universe. Therefore, if it is not inborn, or observed or learned then it is non-existent for this particular brain. This is a major flaw for the individual brain (human) and leads to knowledge blind-spots.

right), properties (right of center), functions and behaviors (lower right), associations (center), and event timeline (lower left).

The entire universe together with its contents can be rebuilt in the sandbox using these basic elements. The objects (Causality + 8) are as follows:

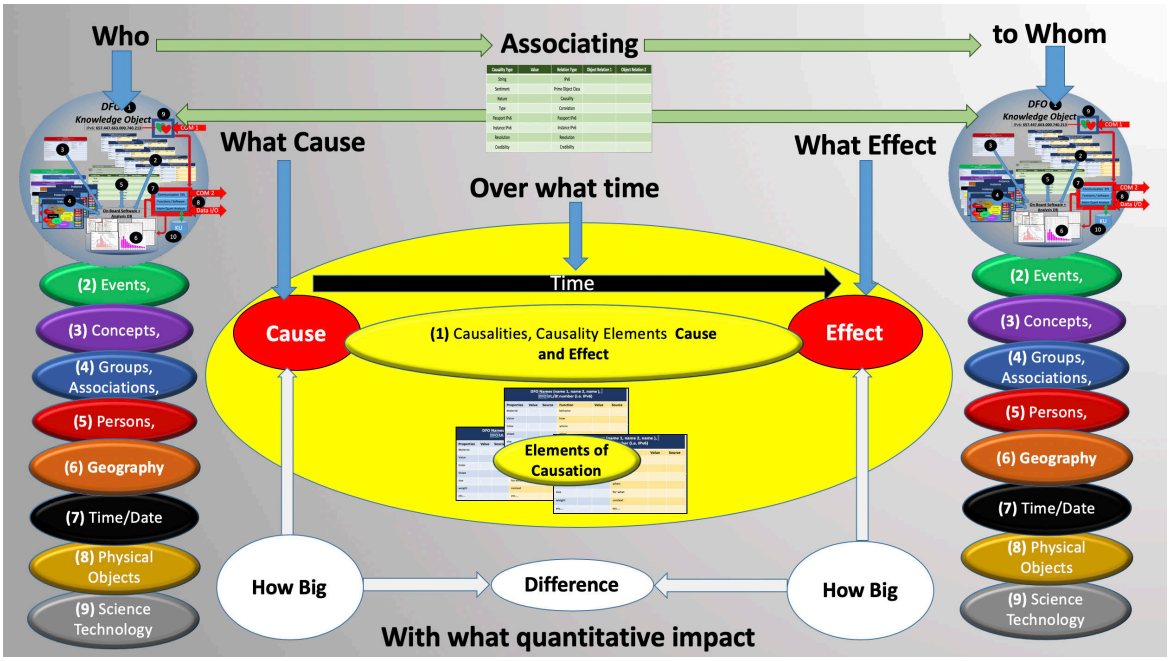
1. **Causality**
   The object Causality[15] is understood as the relation between an event and a second event, where the second event is understood to be a consequence of the first. Causality is also the relation between a set of factors (properties, behaviors, functions) and other such phenomena. Causality is a prime feature of C+8 and cannot be substituted.
2. **Event**
   An event is the fundamental entity of observed physical reality represented by a point designated by three coordinates – an action, a place, and a time within the space-time continuum.
3. **Concept**
   A concept is an abstract or generic idea which becomes defined through specific instances and generalized through associating multiple instances[16].
4. **Group**
   A group is zero or more elements forming a complete unit in a composition, or a number of individuals, objects, or abstract units which are either assembled together or have some internal unifying relationship, including being regarded by an external observer as a unit through a defined concept. The membership of any object to become belong to a Group is often determinate by the organizing concept of the group, for example a theme of membership or a commercial organization such as a Corporation or Association.
5. **Person**
   A person as a cardinal object in C+8 is a real human individual, but also includes the projection of a technological element designed to resemble a human with all its functions and properties, for as long as it stays undetected as technology. Imaginary persons are either Concepts (if virtual) or simply objects (if physical).
6. **Geography**
   A geographical object constitutes the description, distribution, or interaction of any location, whether it be definite, abstract, or metaphorical.
7. **Time**
   As a cardinal object, time is the measured or measurable moment or period during which an action, process, or condition begins, exists, continues, or ends; a nonspatial continuum that is measured in terms of events that succeed one another from past through present to future. Time can be referred to as either a hard and precise measurement by using a clock, for example, or as a soft measurement through a general description of one or more time periods.

[15] English historian Norman Davies writes: “I have come to hold that Causality is not composed exclusively of determinist, individualist, or random elements, but from a combination of all three.”

[16] In object-oriented context of C+8 definitions, an instance is created by a concrete occurrence and recording of any event-object, existing usually during the observation (processing, handling, updating) of instance related data. Formally, "instance" is synonymous with "object" as they are each a particular value (realization), and these may be called an instance object; "instance" emphasizes the distinct identity of the object, including all objects of lower level hierarchy (see Quantum Relations). The creation of an instance in computational terms is called instantiation.

8. **Physical Object/Thing**
   A physical object is a material thing, real or perceived through abstract understanding, that includes all living things except what is defined above as a "Person"
9. **Technology**
   A technology object is any object, its system, or behavior which came into existence willfully and purposefully through the application of individual or systemic intelligence by a natural or artificial agent with the specific goal of providing a solution to a problem or increasing the efficiency of a particular process.

Any object of the real world can, and often is defined as more than one Cardinal Object and is dependent on the definitions within a given instance of the C+8 recorded universe. These 9 objects (Causality + 8 Elements) are recorded in passports (one passport for each unique object) in combination with instances, properties, functions, behaviors, associations, and event timelines which are relational databases that describe how objects/entities live inside the C+8 environment. (A unique object would be, for example, Abraham Lincoln's first dining room table, and its passport would contain all available information about that particular table – when it was acquired, where it came from, the locations it was placed in, etc.) A knowledge object is defined by its instances, properties, functions, behaviors, and associations.



- An instance is a concrete occurrence of any object/entity in our system. Each instance emphasizes the distinct identity of the object/entity in the context where it occurred. Each instance is assigned its own IPv6[17] number and is recorded in the global register.

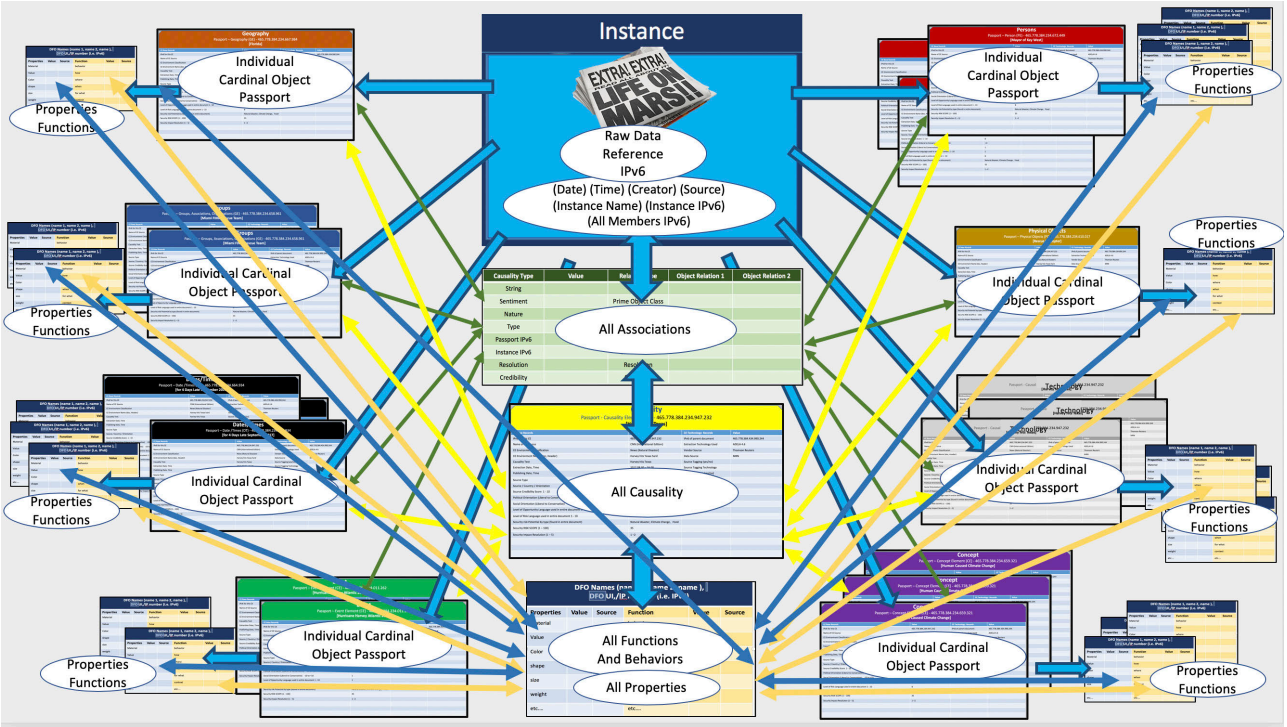
[17] The Internet Protocol Version 6 address (IPv6 address) is a numerical label that is used to identify a network interface of a computer or a network node participating in an IPv6 computer network. In C+8, every data unit is a network nod, and can be reached and found through its IPv6 number. Generally, IP address serve the purpose of identifying an individual network interface of a host, locating it on the network, and thus permitting the routing of IP packets between hosts. For routing, IP addresses are present in fields of the packet header where they indicate the source and destination of the packet. Note, that the IPv6 is the successor to the first addressing infrastructure of the

- A property of an object in our system is an intrinsic or circumstantial characteristic of said object/entity. Each property describes the object/entity, so as to make it definable and identifiable across any environment. The combined set of properties describe the features, in how the object was observed by all observers, which may be different from how a object actually is. Typically, one should assume, that the more independently recorded observations exist, the more accurate the description of the object over time generally should become. This also alowes for implementation of a generalized scoring system of observer, and the observed: Firstly, the more independently observed features of the same type or value are recorded from a increasing number of different observers increase the probability of objective truth about the underlying object, and Secondly, the more observers observe properties or values within the highest density of ploting of all observations, the more a observer can be trusted, that its observations are near the truth; especially for all such cases, where only a limited amount of observational data exists.
- Functions are roles or purposes that have been observed in relation to an object by the C+8 system. Functions are what the underlying object/entity does, or how it is changed or what effect to other objects it produces in the context where it was observed or in which the function is produced.
- Behavior describes how the object/entity acts in its original environment and how its actions change when the environment changes. For example, when a new behavior is detected, such as "kill," it gets an IPv6 number, and whenever "kill" is detected again, all the information is recorded under the original IPv6 number. When the system is asked when has the behavior "kill" been associated with some Person (x), for instance, it will return all the data it has for this combination. (This is the way the brain functions, and there is presently outside of C+8 no other system that can reproduce such results instantly and efficiently).
- By using observations (new data) to link an object/entity to other objects/entities through shared descriptors (behavior, functions, properties, instances and time), the C+8 system acquires more descriptive and more in-depth knowledge about both the entities and the world generally. By using the structures of time relations in C+8, the system and its users gain understanding of the sequential occurrence of observed reality. This is critical to making accurate predictions.

The Event View

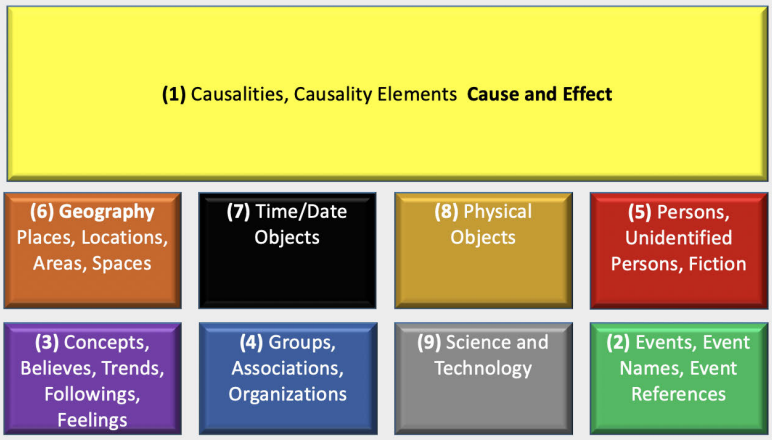
The following image shows the information web that ties all the pieces together. In this example there is a single instance (a news article, a book, a scientific journal, a radio/television broadcast, etc.) together with all the elements contained in that instance: one or more of each cardinal object, each with its own passport. If C+8 recognizes an object as having been previously mentioned, the passport for that object is retrieved. All the C+8 objects are always related to each other by instance, but they can also become related through vertical object views cross multiple instances. For example, a object 'Person' observed at the same object 'Geography' a conference room, at the same object 'time' sharing the same object 'Concept' annual board-meeting, and object 'Group' Acme Corporation, become related with another person, sharing the same other objects, but retrieved from different instances.

Internet, Internet Protocol version 4 (IPv4). In contrast to IPv4, which defined an IP address as a 32-bit value, IPv6 addresses have a size of 128 bits. Therefore, IPv6 has a vastly enlarged address space compared to IPv4.



The Vertical Multi World Representation

The World of Geography X
The World of Time X
The World of Object X
The World of Person X
The World of Concept X
The World of Group X
The World of Technology X
The World of Event X
The World of Causality X

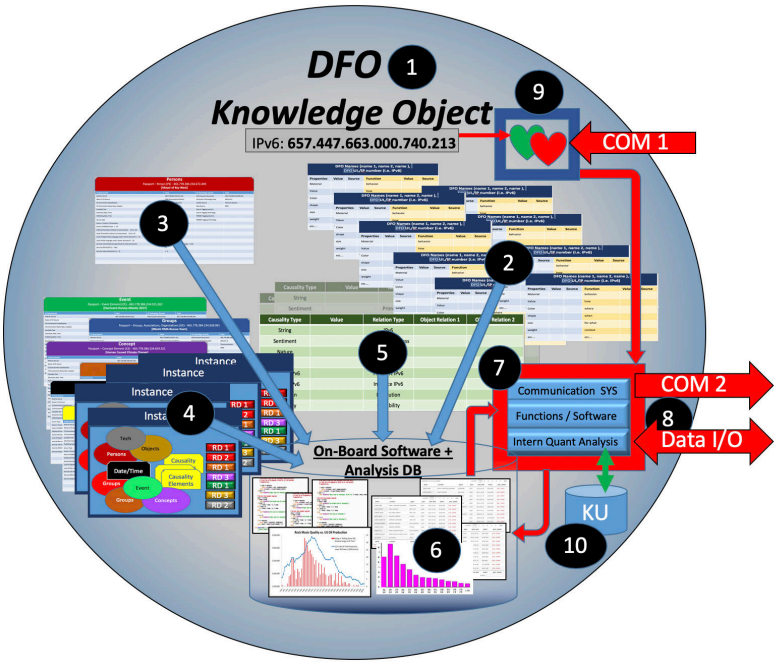


An additional aspect of the nine cardinal objects is the fact that each can be viewed vertically. This means that you can take any object and see all the data that is available about that particular object – its associations, the events it took part it, where it was, when it was there, what it did or what was done to it, and so on. This is called the vertical multi-world representation.

The Data Fusion Object (DFO)

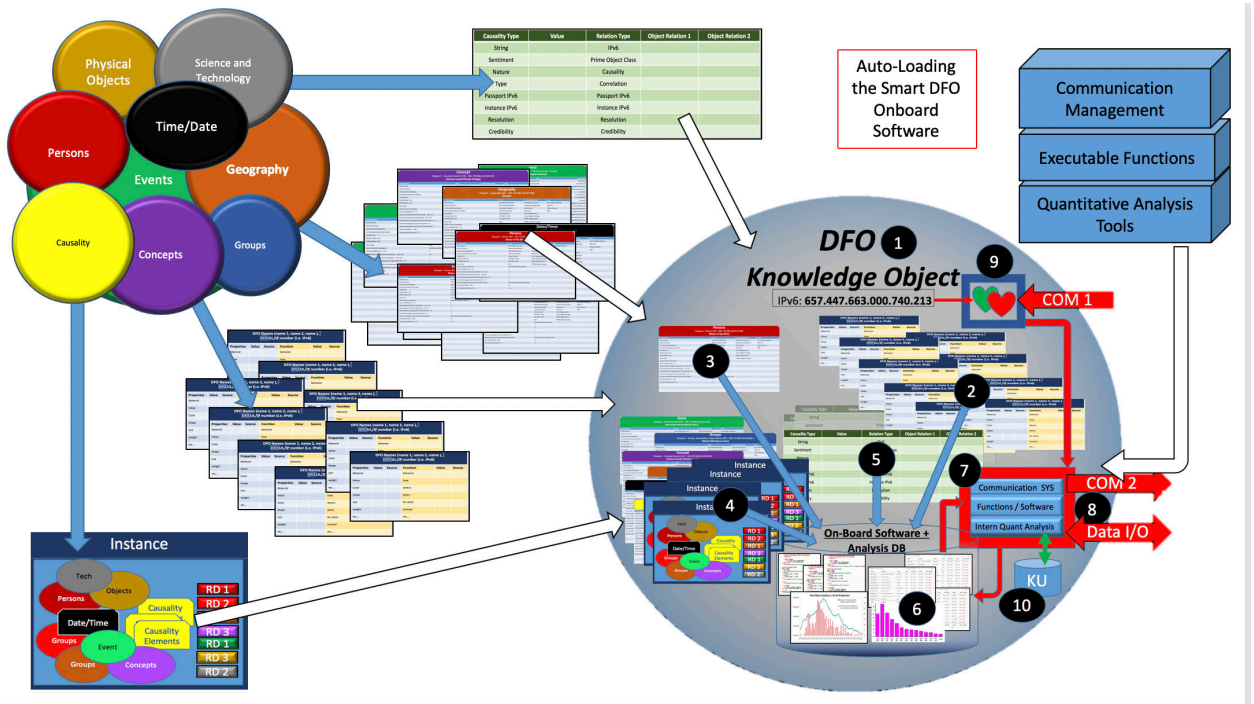
A DFO is everything from a single cardinal object that lives in our system to the entire system itself, encompassing all the other DFOs living inside it. It holds various onboard databases (5),

software containers, communication ports, and a system API. In the current implementation of C+8, a DFO is addressed through its IPv6 numbe[18].



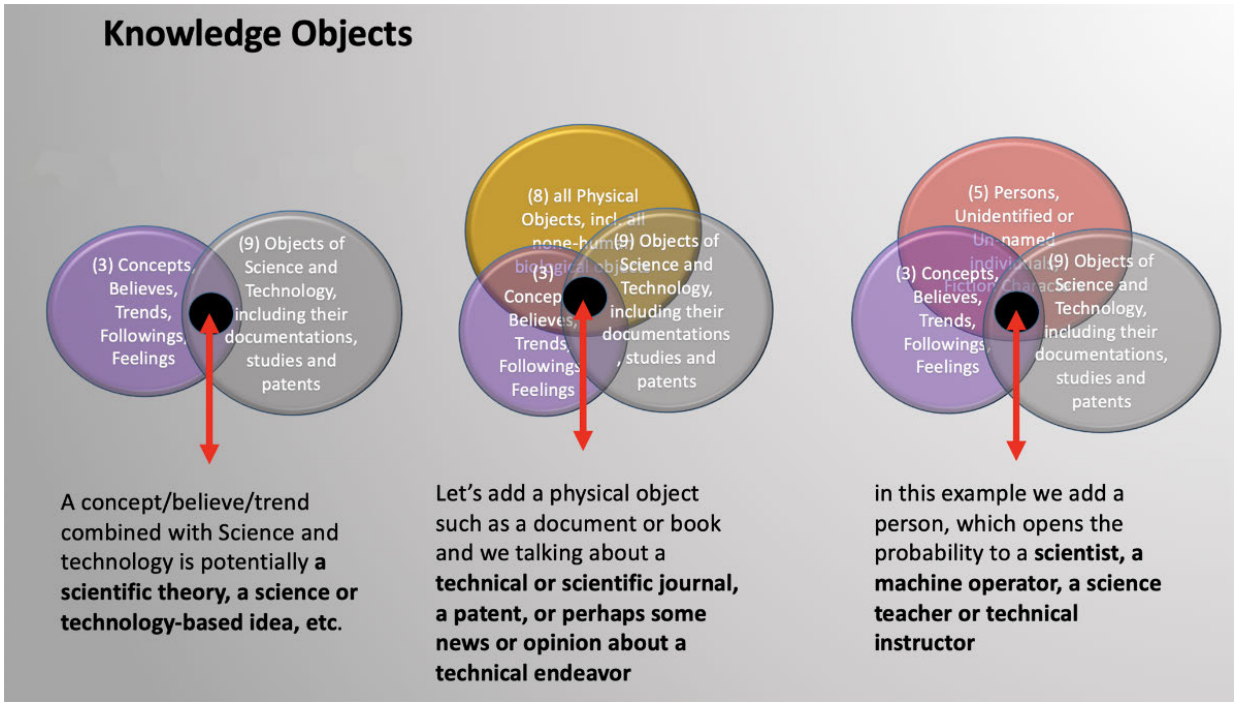
The DFO Knowledge Object

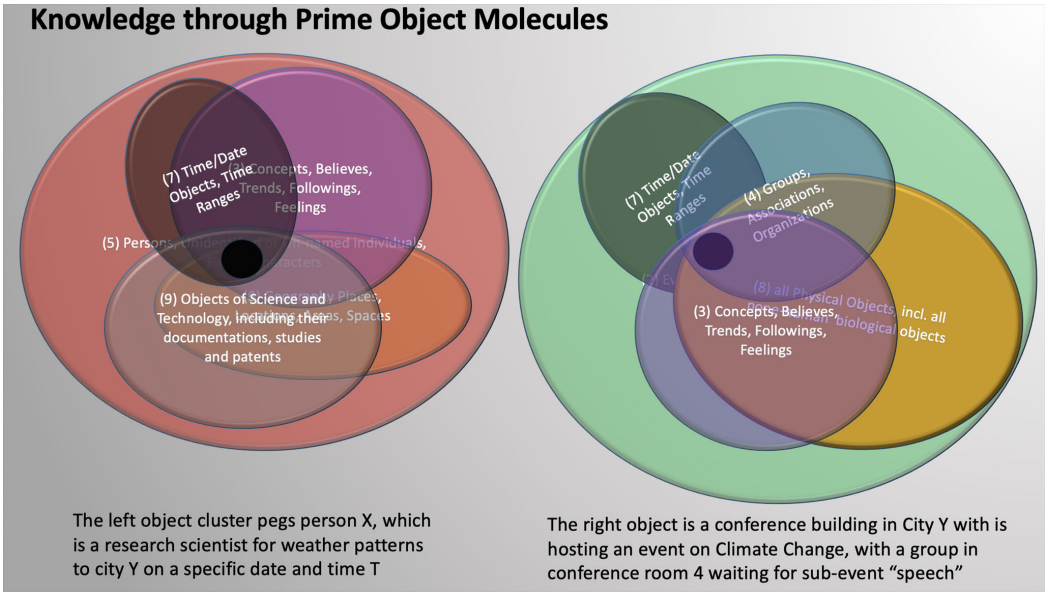
(1) The DFO Object, which holds various onboard data bases, software containers, communication ports, a system API and is addressed through a IPv6 number.
(2) The Property and Function Records (1 per external view)
(3) The Object Passport Record
(4) The Instance records (1 for each view event) including all passports of all members per event
(5) The Relationship records (one for each active relationship)
(6) The Onboard Database(Data / Scripts)
(7) The Communication and onboard Software/Function Terminal
(8) Dedicated Call port and Data I/O
(9) Heartbeat Wake-Up Switch
(10) Knowledge Unit Counter

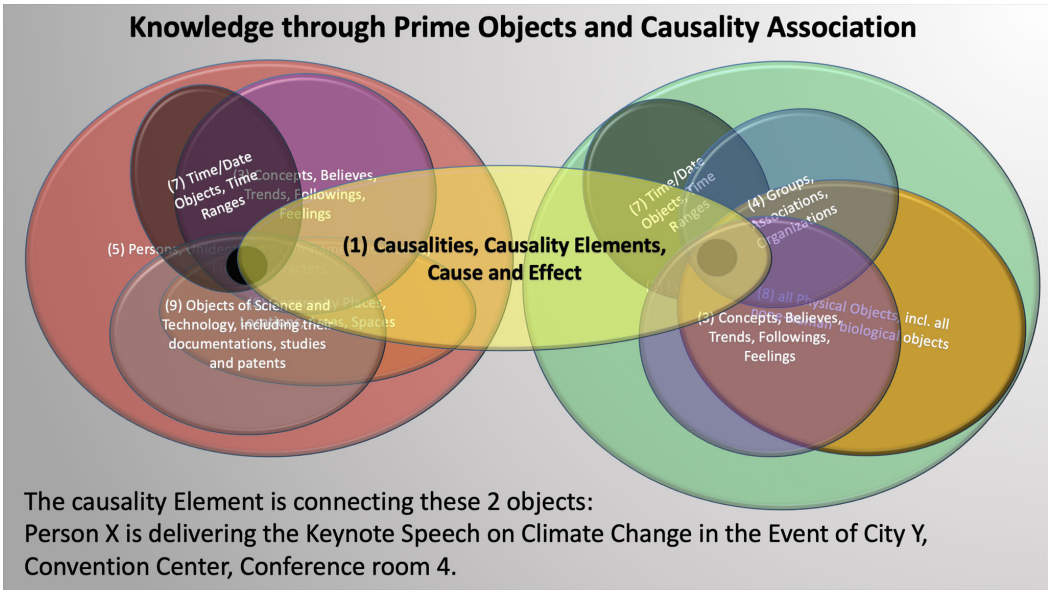


[18] There are 3.4 x 10^{38} or 340 billion billion billion billion unique IPv6 addresses. IPv6 addresses inside C+8 may (or may not) correspond to IPv6 addresses assigned by standards bodies or defined in standards documents. The method by which C+8 IPv6 objects communicate with IPv6 objects outside of C+8 is outside the scope of this document.

Each knowledge object can be viewed as an atom that when combined with other atoms form molecules. For instance:



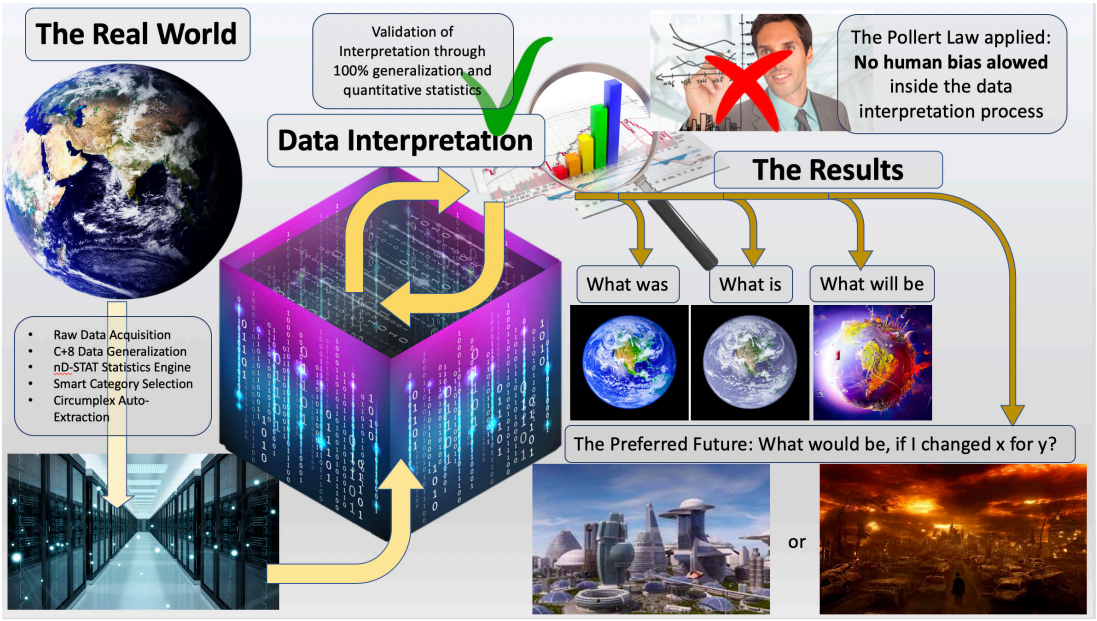




Building upon this, each cardinal object category is an individual universe that interacts with the other such universes through associations, behaviors, and so on.

Creating Bias-Free Self-Predictive Smart Data

In order to create bias-free self-predictive smart data, there are 11 steps that must be followed. The first 6 steps are the constructive process – when building the sandbox, we first construct the associative data model based on the real world. The next 5 steps are the observational process, which are necessary in order to understand what is happening on all possible levels. All these steps contribute to creating real-time predictions from continuously incoming data, predictions that can be viewed using our specially designed tools.



I. Import data

First, we import raw, unstructured data files (video, images, text, etc.) also known as instance. Metadata is created and time-stamped, instance records are generated, and an IPv6 number is assigned to the newly created objects.

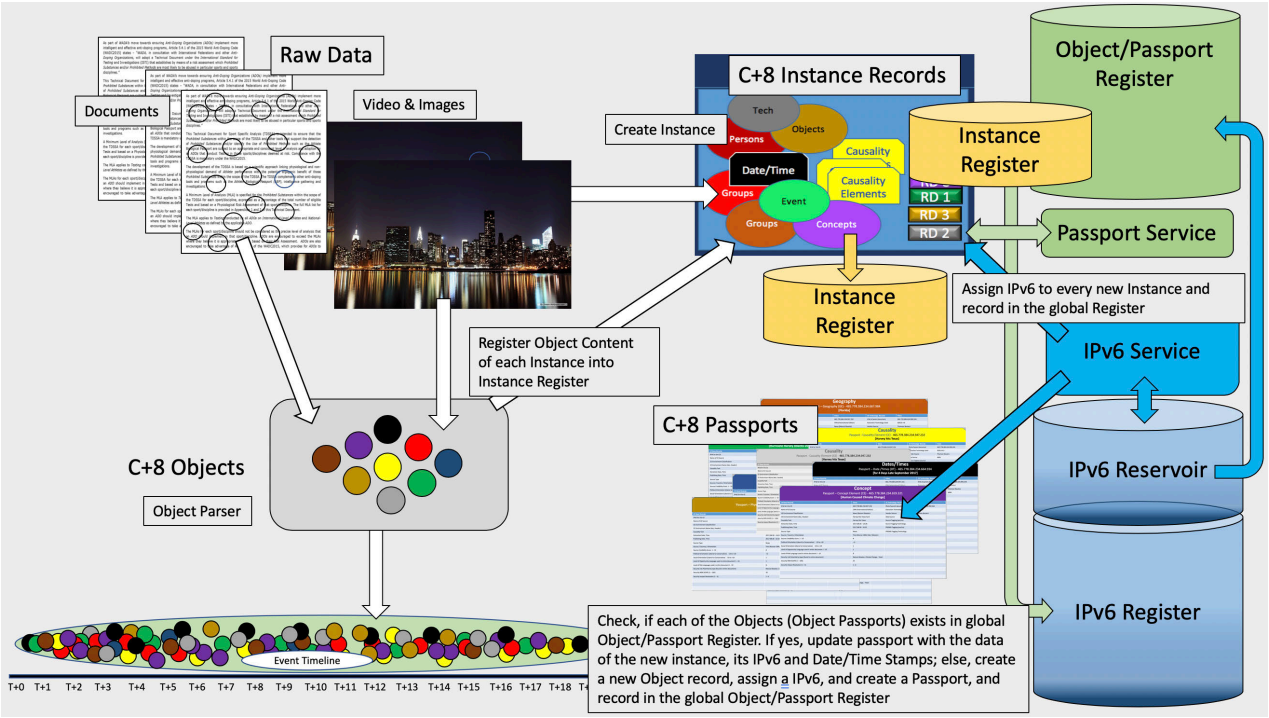
In this way we record everything we can hear, see, read, touch, sense, or otherwise observe in the real world in any possible but reliable way (by humans or machines) and store it in a raw data depository. The Prisma Analytics C+8 system is doing this 24/7/365 and as completely as possible.

Currently Prisma Analytics collects data from over 42,300 major aggregation sources. Some examples of these sources are Reuters News, AP, DPA, CNN, FOX, Google, Science and Technology, News, The American Scientist, Financial Times, New York Stock Exchange, IMDB, Library of Congress, RT, China News, Twitter, Global Research, and over 42,000 more.

II. Entity parsing

The next step is entity parsing[19]. The C+8 system parses the raw data into triples with a subject-verb-object format. This step retrieves initial information elements and structures from raw data. The specific entities or objects which become preserved from these information elements in the C+8 System are Events, Persons, Groups, Geography, Concepts, Objects of Time, physical Objects and Objects of Technology. Each extracted object is subject to disambiguation by the system using natural language processing in order to ensure best possible identification. Extracting these objects from the raw data later allows us to reconstruct a chronological time-line of their appearance using each recorded instance.

[19] Named-entity recognition (NER) (also known as entity identification, entity parsing or entity extraction) is a subtask of information extraction that seeks to locate and classify named entity mentions in unstructured text into pre-defined categories such as the person, behavior, names, organizations, locations, medical codes, time expressions, quantities, monetary values, percentages, etc.
C+8 parsing systems have been structured as taking an unannotated block of text, such as this one:
Jim bought 300 shares of Acme Corp. in 2006.
And producing an annotated block of text that highlights the names of entities:
[Jim]Person [bought 300 shares] Causation [of] [Acme Corp.] Organization [in] [2006] Time.
In this example, a person a causality, a company name and a temporal expression have been detected, associated and classified.



Once parsed, each unique cardinal entity receives a passport. Whenever a new entity is parsed, the global object passport register is checked in order to see if that entity already exists and has a passport; if it does, the passport is updated with the data of the new instance together with the Instance record, its IPv6 and date/time stamps; if it doesn't, a new passport is created with an assigned IPv6 and is recorded in the global passport register.

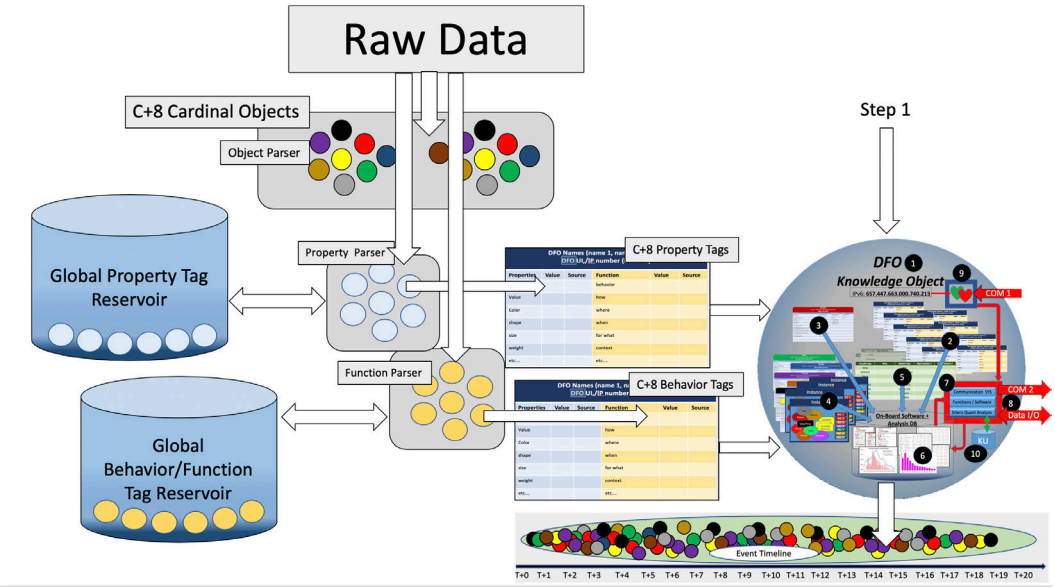
III. Causality parsing

Step three is causality object parsing. Causality in C+8 is defined as the relation between an event and a second event, where the second event is understood to be a consequence of the first. In common logic, causality is also the relation between a set of factors and a phenomenon. It is a prime feature of all knowledge and cannot be substituted. Extracting causality from data is the single most important and most rewarding task in the pursuit of Intelligence.

In this step, the C+8 system extracts any knowledge object that either fully or partly establishes the existence of cause and effect within the behavior of any C+8 object in any instance of observation. We read causality out of raw data by identifying individual units of causation through Triples (subject, verb, object), which are connected through association to each other and to the objects identified in step II (which are contained within the causation units).

IV. Property, function, and behavior parsing

Objects typically have properties, and they behave or function in some observable way. Each property, function and behavior are parsed from raw data, and recorded; through them we are able to understand how the cardinal objects have been observed, how they behave, how they function, and what their place and transformative influence is in the underlying event timeline.



Each time, a cardinal C+8 object appears in any instance with respect to an observation of a property or behavior, a new record set is created inside the object database, to preserve, who or what perceived what, when and in what instance. This allows over time, to capture even contradictory observations, and therefore a more unbiased and more objective picture begins to emerge as the next diagram shows.

V. Associative network creation

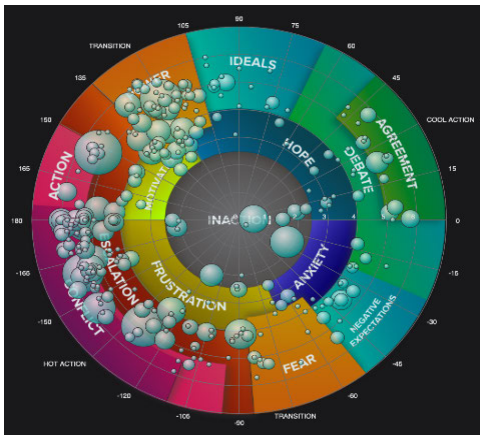
The associative network is created by linking every object to its native instance, to other objects found in the same instance, to the relevant time stamps, to all its respective causations, properties,

function, and behavior records through pairs of IPv6 numbers and corresponding time stamps. This create a mesh of network-clusters which recreate the memberships, time-lines, and sub-time-lines of every instance, and every event timeline within.

VI. Visualization of data through special tools

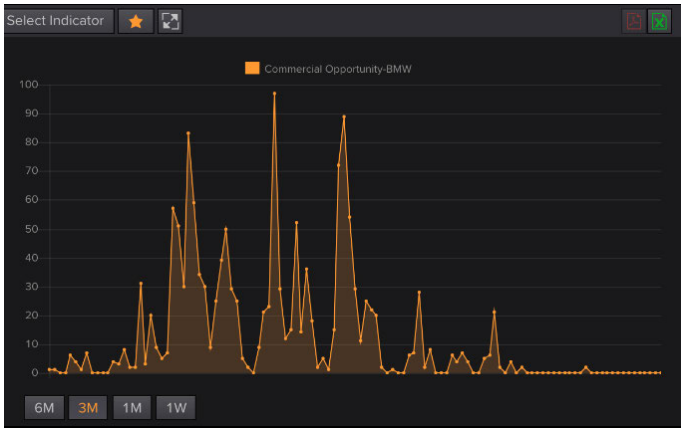
All recorded instances and extracted C+8 objects can be viewed through our quantitative and qualitative tools to establish fully quality-quantified objects. These objects are measured continually, creating the multi-cube matrix which we will explain shortly in this document.

The Social Energy Diagram shown here below, (hereinafter the circumplex) offers a method of viewing and measuring C+8 data through natural language processing, while our Indicators (shown further below) offers quantitative measurements of occurrence or specific behaviors. The numeric output from both these quantitative measurements is then inserted into the Cube Library, where they feed the statistical models to extract signal information.



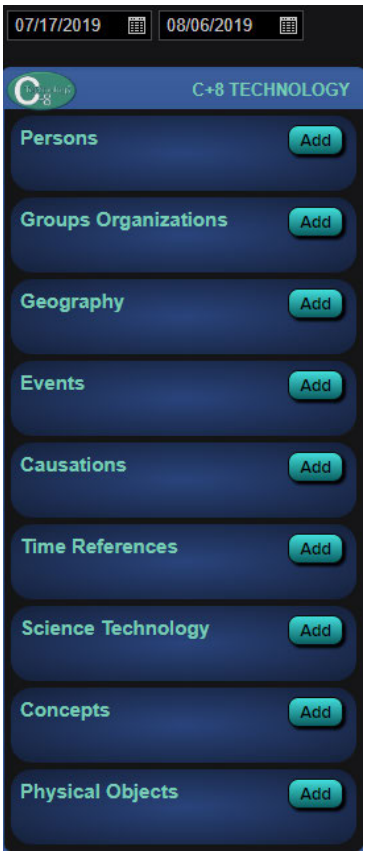
The Diagram on the left illustrates the trends of collective moods on a circumplex, combining sectional measures with longitudinal measures displayed in a panel format. This data processing, visualization, and analysis tool displays polar data combined with trigonometric functions on a geometric space, thus allowing for more than two measurements on the same observation at a single point in time.

Using radii, theta, and a circumference, the diagram is a geometric space on which data about collective moods, affects, and emotions is plotted, thus creating a dynamic and complex image of the way an object is perceived by collectives and to what intensity. It goes without saying, that this method of visualization allows one to discover trends and shifts in social energies using very large data sets.



The circumplex uses a glossary-based approach: computers run a Social Energy Glossary and adjacent Specialized Glossaries against empirical data, identifying, counting, and extracting glossary entries. These entries are then plotted on the geometrical space.[20]

[20] Please see Annex 2 for more information about the Social Energy Diagram.

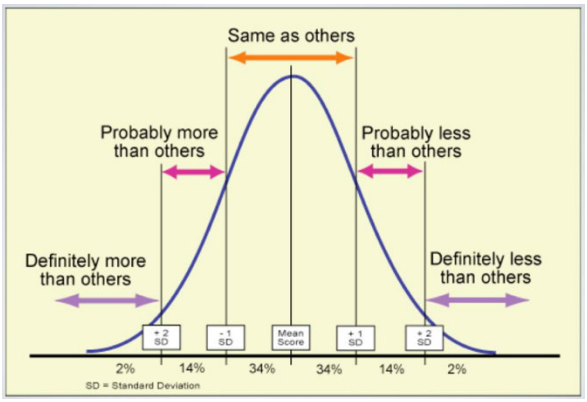


The Indicators tool is a simple counting mechanism combined with the C+8 query fields (shown on the page above, and to the left), making this simple function a formidable analysis tool. The user introduces what element he wishes to track over what period of time and then refines the search with additional elements such as behaviors or associations, etc. The output is an accurate on-point time series that shows the evolution of the element over the selected time period. This evolution is simply the number of times that element is found in the C+8 data pool over a specific time period in combination with the additional filters the user has specified. For example, a user could specify an <***Event***>, occurring in all <***Geographies***>, where conferences are hosted, which have as <***Concept***> subject Climate Change, and a particular <***Group***>, which appears as <**conference sponsor**> (a function/behavior sub-set).

What both these tools have in common, besides the C+8 data behind them, is a highly intuitive query field in which the user introduces the elements they wish to observe over whatever period of time it may be required. This also allows researchers to carry out extraordinarily complex queries, which can be done inside C+8 in seconds and which return a volume measurement whereby each occurrence can reveal the underlying data for details.

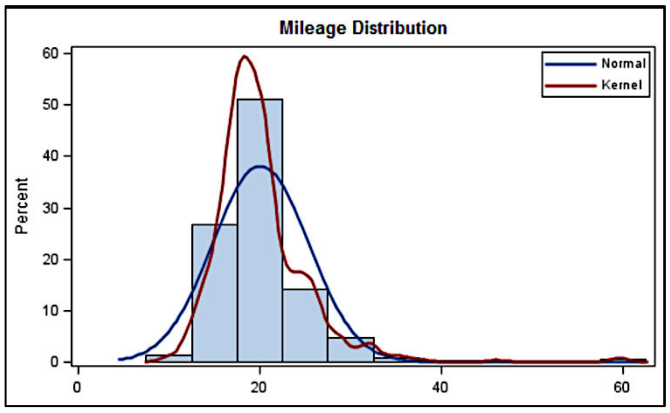
VII. Statistical calculations

The upper layers of C+8 use fully automated statistics engines, which are applied continuously onto all system-generated numerical information. Its purpose is to detect notable asymmetric shifts in its parallel streams of analysis data. To establish various reference points of 'normal' in the continuous quantitative measurements (time-series), the system uses bell curves. These establish baselines over various time lengths, generating normalization histories. Baselines could be established, for example, over 90 days, 180 days or even over years. This baseline is used as a 'zero point' from which with observed ranges of data fluctuation can be measured. In this way, the system can establish and maintain for comparable objects a generalized definition of 'normal' behaviors within and without expected ranges of variation over some typical lengths of time. By keeping history of change ranges, we can find larger fluctuation trends and correlate them with events and event clusters over various timelines. In this way, we can establish a mesh network of billions of statistical change/time elements, each connected through IPv6 numbers to these dynamic measurements, belonging to a specific object cluster, to determine if it is still functioning within a range of expected 'normal' or has moved away from the 'normal' ranges within the bell curve or histogram, and creates a unusual or asymmetric footprint in the data, however discreet.



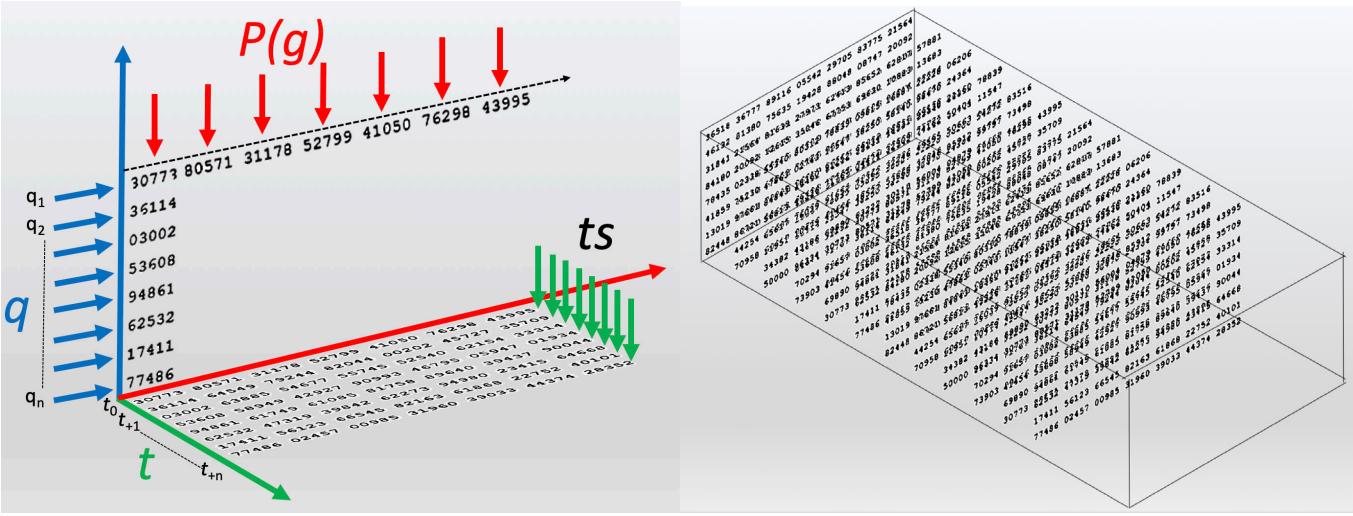
VIII. Extract asymmetric values detected in circumplex data

Once we have established a baseline of "normal" and a mechanism to measure departures from "normal,"we use them to create cut-off values for weak signals, similar to those used in asymmetric signal detection, for example. All the asymmetric values and value ranges (asymmetric meaning, in this case, deviating from the expected or "normal" ranges of quantified behavior and properties) are then extracted from the circumplex and analyzed in comparison to the established "normal" range for each object or set of objects. It is important to note that all ranges, whether they be normal or asymmetrical, are subject to evolution according to their contextual conditions (this being one of the principles of Quantum Relations).[21]



The C+8 data model makes possible the generalization of time series, something that has not been done before. And this generalized time series model is what, in turn, makes the Cube possible.

The Cube is a set of tools and a strategy that can be used to visualize and understand enormous amounts of data in a concise and understandable form. Below is a brief explanation of how a Data Cube is constructed, with all its general elements combined:

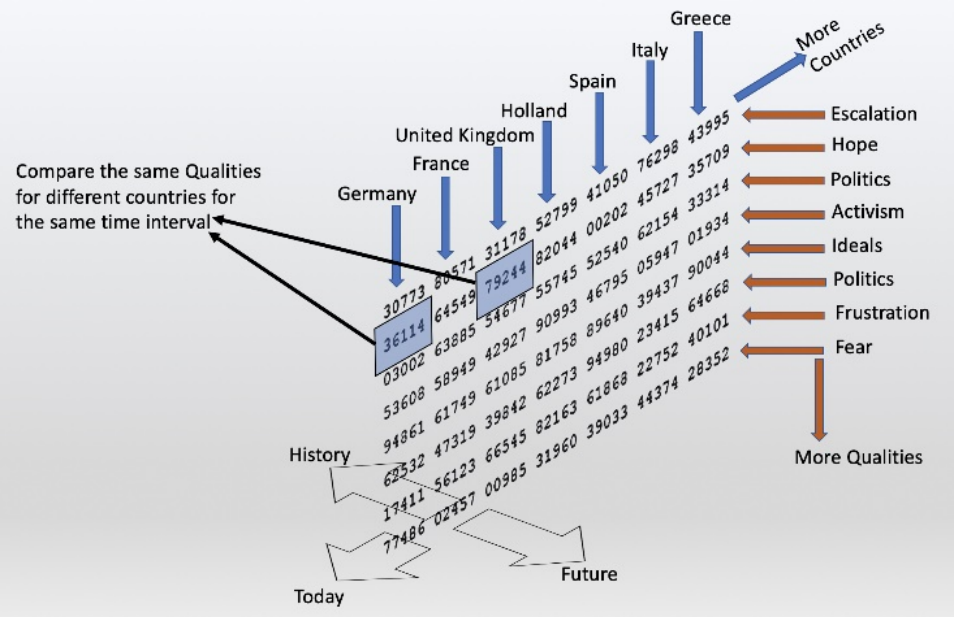


In order to break it down, we must first define the dimensions: P(g) = measurements/queries of the same type (for example, multiple countries, or cities, or companies, or other such similar

[21] Important to note here is that 'weak signals' are disambiguated by their causal relationships ("even though they are small, doesn't mean they are unimportant"). It is their origin, not their relative size, which is worth noting.

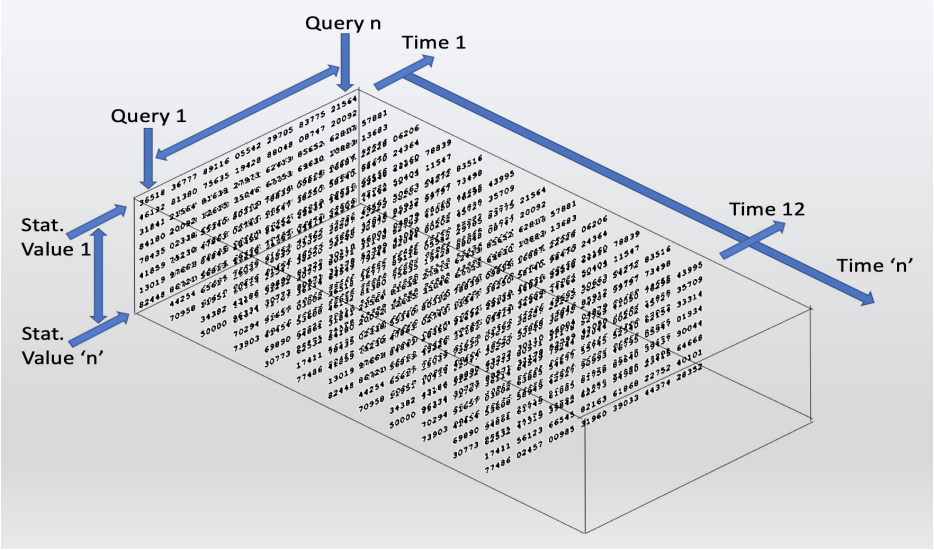
observations); q = different qualities (in C+8, a quality is a piece of qualitative information), which can be any number of things – behaviors, energies, concepts, events, and so on, which become quantified within the analytical process; and t = time (years, seconds, days, whichever is desired to measure the data history).

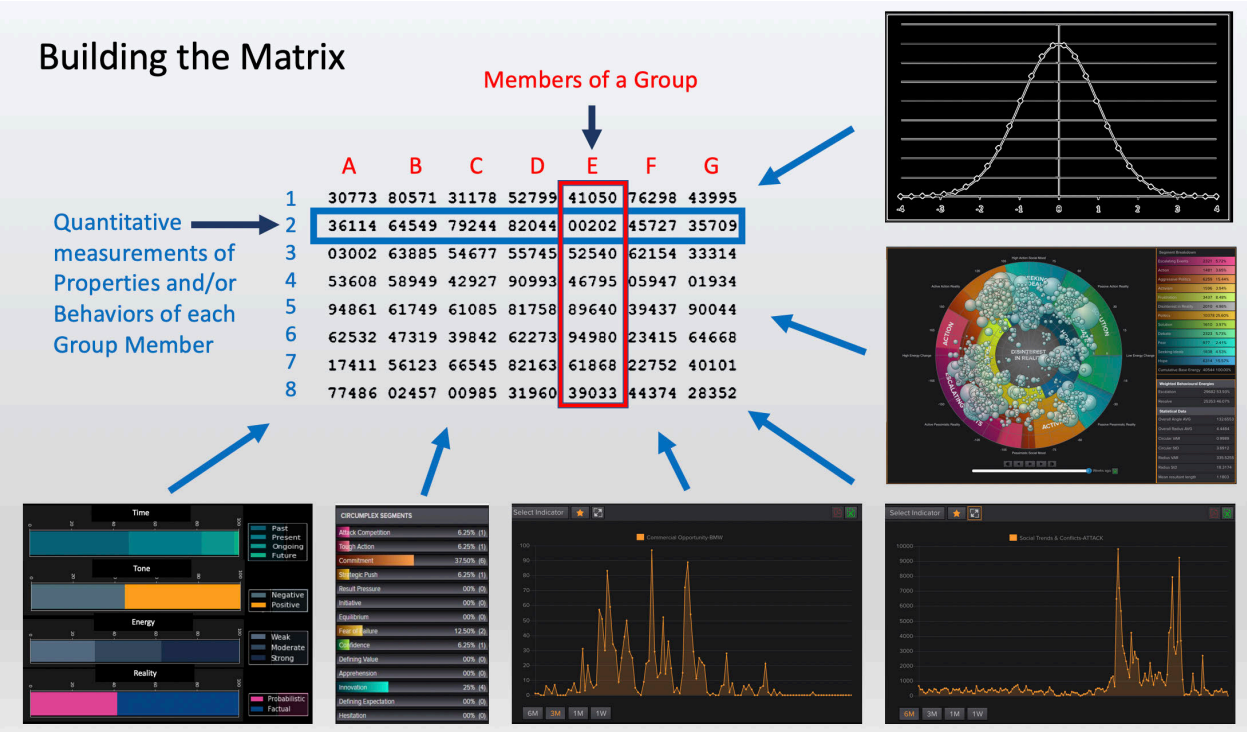
The example below shows combined sets of circumplex data, using as P(g) value Nations, and as q value social measurements within each of these nations:



Queries are run through the Social Energy Diagram for each country and the resulting data (q here equals the 14 energy layers) is viewed for the desired time period. The quality "hope," for instance, can be compared among any countries desired.

The Cube has no predefined size, any of the dimensions can contain theoretically an unlimited number of variables, only limited by the memory and processing power of the computer.

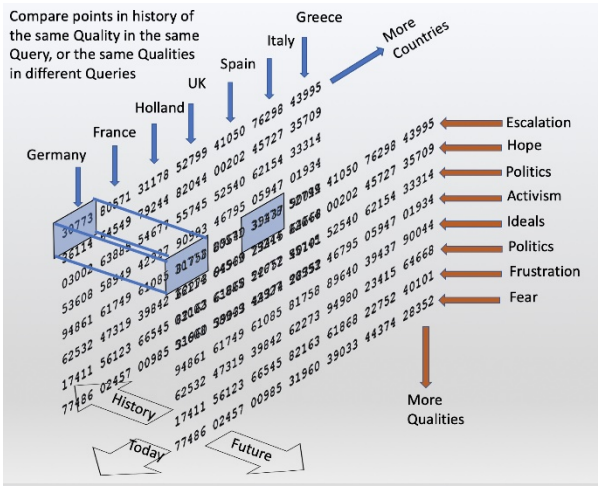


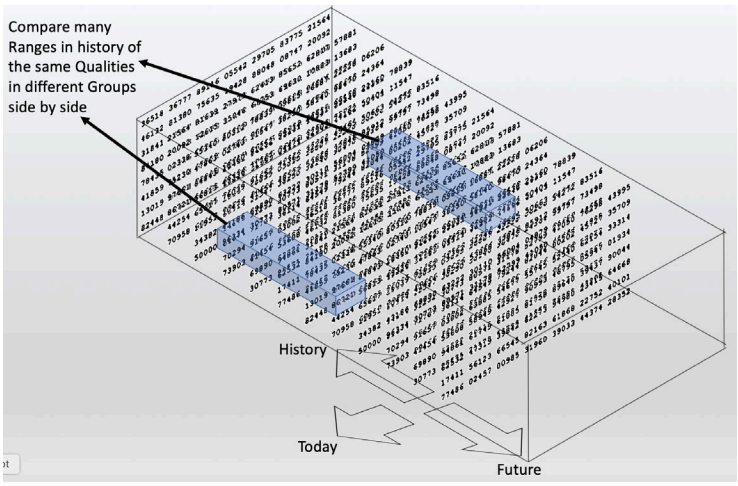


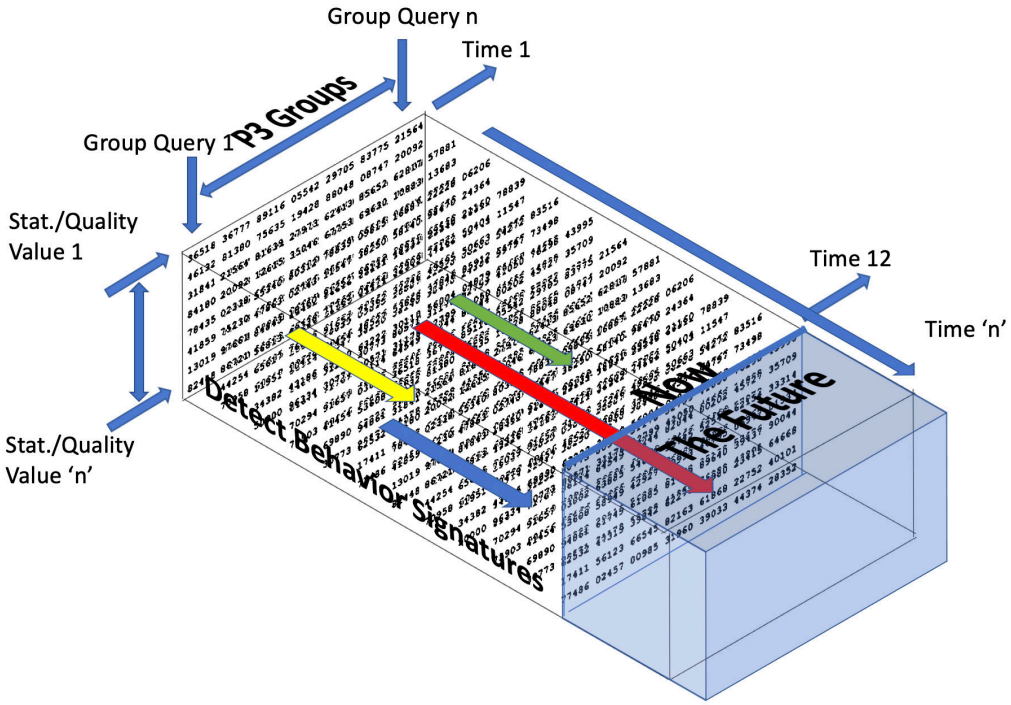
IX. Extract asymmetric patterns

Using the Cube, we now extract the patterns and signatures of the previously loaded circumplex asymmetric values and value ranges (weak signals) which reoccur within the observed cube data sets. The associative context must be preserved and understood as an integral contextual element part of the pattern itself.

The same quality can be compared in the same query (environment) or in different ones at different points in time (in the first option we can look at Germany's GDP over 20 years and compare one year to another, but in the second we can also compare Germany's GDP with France's and Spain's also over 20 years).

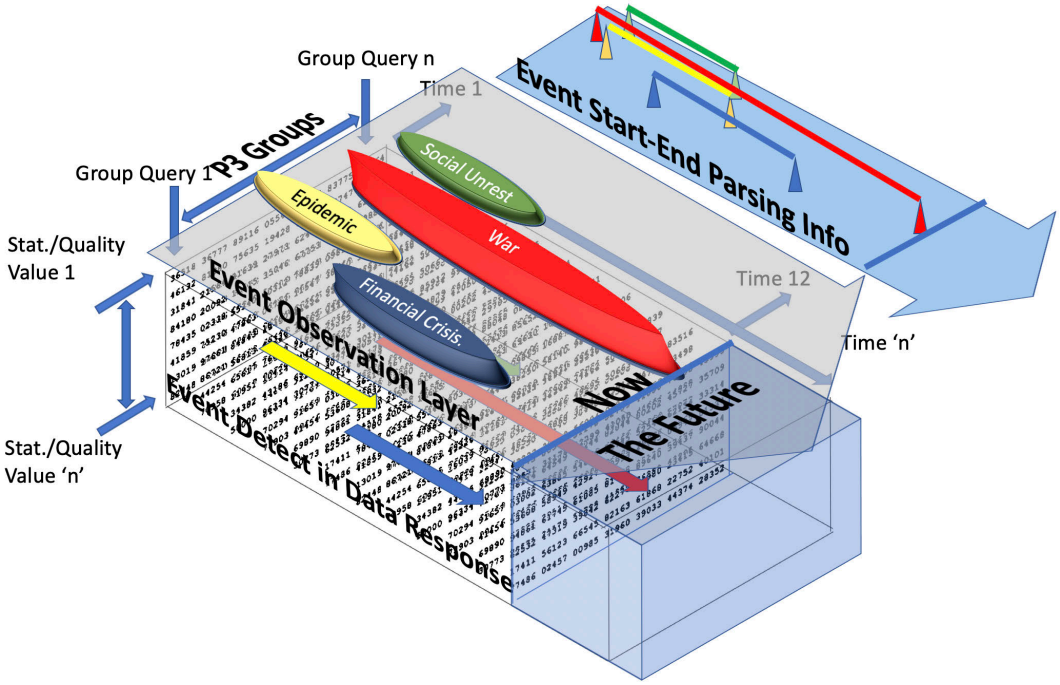


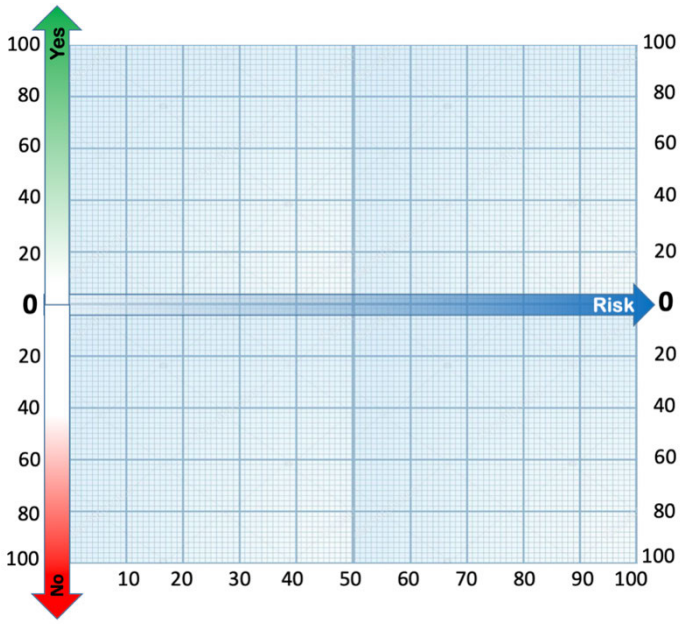




X. Create event overlay

In the next step we create qualified and quantified event overlays for the cube, and coordinate weak signals with pre- during- and post-event statistical data to establish event signatures.





Various Decision Support Tools using inputs from all available data analysis models, such as the circumplex of collective moods, or the Indicators, than calculate a assumed action or event against all obtainable analysis output and places its viability on a vertical axis, along with scores across a horizontal axis of Risk or Impact Potential. The signals that our data models – the circumplex, the cube, the indicators – computed from the complex C+8 network of entities are, thus, placed in an interpretive context, and can be understood better, as they are oriented towards a specific action.

Finding the Evidence and Influence we don't Know

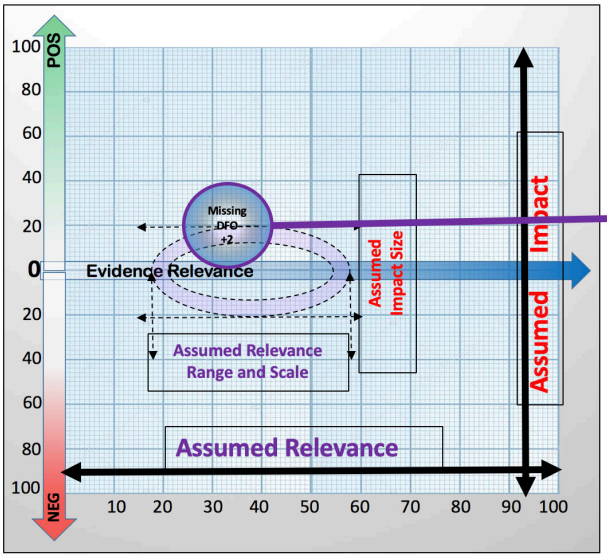
We express:
With Respect to EVD (1..n):

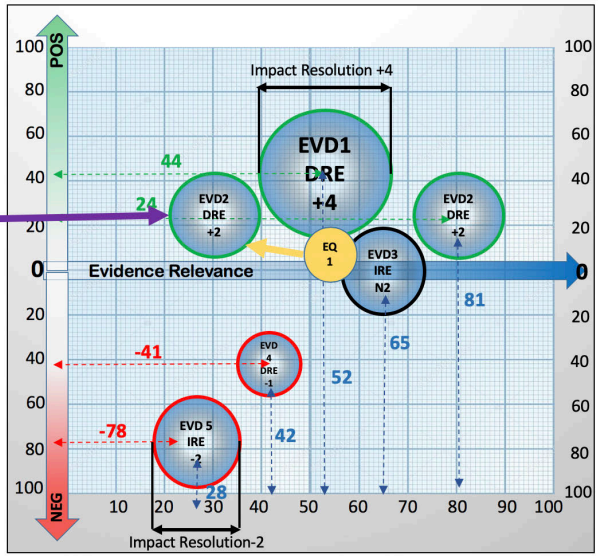
$$\sum (EVD(1)\ (DRE)) = ((DPS \times DRE \times IRS) \times 1.5))$$

With Respect to DFO (DP(1..n)):
EISOD: $(D^{Z\ NEG}) = \sum EVD(1..n)Z > 0$
EICOD: $(D^{Z\ POS}) = \sum EVD(1..n)Z < 0$

EVD (1..n) = $\int \sum$ ((DFO,1) ⨯ (DFO,2 (CON,1..n)(IR,1..5))

Evidence DFO (1..n)

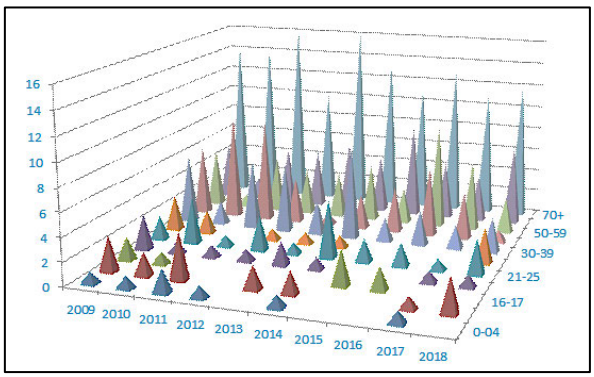




XI. Automatically extract predictive patterns

The final step is the automatic extraction of predictive patterns (stochastic signatures and event markers) from real-time data to create probable forward scenarios for all the observed data, reporting, visualizing, and describing unfolding events, trends, and their probable consequences.

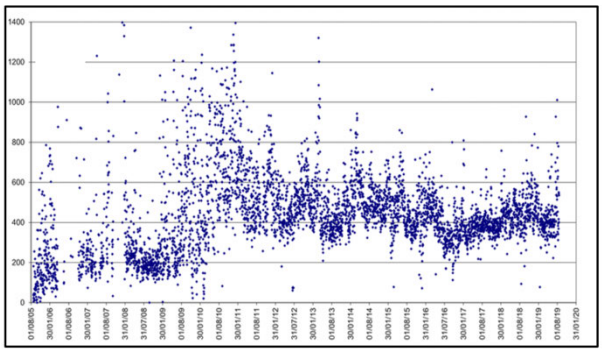
In other words, we automatically communicate early signals which may indicate asymmetric events to clients via push apps and visualization monitors.



In C+8 enabled analysis it is of critical importance to perform quantitative analysis not only between two or three nodes of the system, but the entire system, which is context to the studied problem. Only in this way we can understand and predict its evolution into the future with any reasonable validity. Quantitative analysis of system behavior is in the context of C+8 analysis the application of mathematical models, conceptualized from a robust corpus of environment-behavior-consequence interactions in the experimental analysis of systemic behavior, with the aim to describe and/or predict relations between a dependent variable and all possible levels of an independent variable.

Most importantly, the parameters in the models must gain clear mathematical meaning (through generalized built-in thresholds) well beyond the fitting of models to data, to cut off all attempts to introduce operator bias into the analytics process. The field of this type of study was founded originally already by Richard Herrnstein in 1961, when he introduced the matching law to quantify the behavior of organisms working on concurrent schedules of reinforcement.

In case of C+8 general system analysis, the mathematical tools used have integrated models from economics, zoology, philosophy, and other branches of psychology, especially mathematical psychology of which it is a branch. Quantitative analysis of systemic behavior addresses in the context of C+8 quantitative analysis of systems with human participation the following topics among others: behavioral economics[22], behavioral momentum[23], connectionist systems or neural



[22] Behavioral economics studies the effects of psychological, cognitive, emotional, cultural and social factors on the economic decisions of individuals and institutions and how those decisions vary from those implied by classical theory

[23] Behavioral momentum is in C+8 a continuous method and quantitative analysis of systemic behavior, its probability to change, and is a behavioral concept largely based on physical momentum. It tracks and compares with similar systems the general relations between resistance to change (persistence of behavior) and the rate of reinforcement obtained in a given situation, based either on threats to change or incentives to change. Given continuous observation and tracking of such discovered processes in systems will give opportunities to build over time increasingly accurate probability models, which then become applied as output in analytics visualizations.

networks[24], integration, hyperbolic discounting including delay reduction[25], foraging[26], hunting (systemic predatorial hunting), creativity, learning, matching law[27], scalar expectancy[28], signal

[24] Connectionist systems are artificial neural networks based expert systems where the network generates inferencing rules e.g., fuzzy-multi layer perceptron where linguistic and natural form of inputs are used. In C+8 these tools are used only on very targeted and specific problem types, to maintain maximum transparency in the overall analytics process.

[25] In economic systems analysis of C+8, hyperbolic discounting is a time-inconsistent model of delay discounting. It is one of the cornerstones of behavioral economics, and in C+8 implemented as automated monitoring function, to gain statistically significant predictability in economic systemic behavior in groups of different demographics and background. The discounted utility approach of this type of analysis states that intertemporal choices are no different from other choices, except that some consequences are delayed and hence must be anticipated and discounted (i.e., re-weighted to take into account the delay). Given two similar rewards, humans generally show a preference for one that arrives sooner rather than later. Humans are said to discount the value of the later reward, by a factor that increases with the length of the delay. This process is traditionally modeled in the form of exponential discounting, a time-consistent model of discounting. Analysis in C+8 data has demonstrated deviations from the constant discount rate assumed in exponential discounting. Hyperbolic discounting is an alternative mathematical model that accounts for these deviations, which derive from composition differences in analyzed groups, such as age, economic status, or ethnic background. According to hyperbolic discounting, valuations fall in general relatively rapidly for earlier delay periods (as in, from now to one week), but then fall more slowly for longer delay periods (for instance, more than a few days). For example, in independent studies on this subject, humans would be indifferent between receiving 15 Euro immediately or 30 Euro after 3 months, 60 Euro after 1 year, or 100 Euro after 3 years. These indifferences reflect annual discount rates that declined from 277% to 139% to 63% as delays got longer. This contrasts with exponential discounting, in which valuation falls by a constant factor per unit delay and the discount rate stays the same. The standard used to reveal a systems's hyperbolic discounting curve is to compare short-term preferences with long-term preferences. Typically, a significant fraction of decisions are made in favor of the lesser amount today, but wait one extra day in a year in order to receive the higher amount instead. Individuals or groups with such preferences are typically classified as "present-biased". The most important consequence of hyperbolic discounting is that it creates temporary preferences for small rewards that occur sooner over larger, later ones. Individuals and groups using hyperbolic discounting reveal a strong tendency to make choices that are inconsistent over time – they make choices today that their future self would prefer not to have made, despite knowing the same information. This dynamic inconsistency happens because hyperbolas distort the relative value of options with a fixed difference in delays in proportion to how far the choice-maker is from those options. By tracking in C+8 continuously these tendencies in various observable groups gives not only insight on their economic behavior patterns, but they translates also into social and political decision making. They are therefore important input factors amongst others, into the matrix of forces and tendencies/choices in social systems.

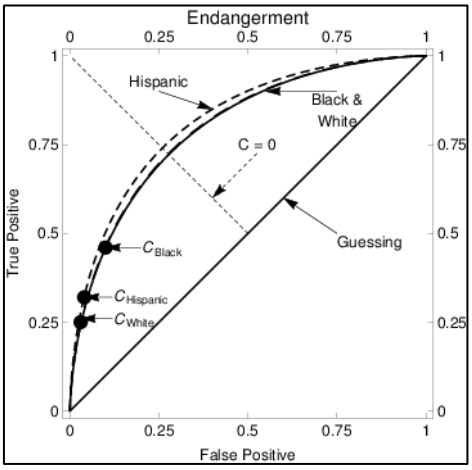
[26] Foraging under C+8 is a branch of behavioral systems ecology analysis that quantitatively tracks the foraging behavior of observed systems in response to the environment in which the system functions. The observational tools of C+8 are typically applied to economic systems to understand foraging; Systems studied by the automated processes of C+8 are initially a type of optimal model. foraging technics are applied in terms of optimizing the insight into the payoff from a foraging decision. The payoff for many of these models is the amount of energy system receives per unit time, more specifically, the highest ratio of energetic gain to cost while foraging. Foraging in this way typically predicts that the decisions that maximize energy per unit time and thus deliver the highest payoff will be selected and mostly persist. Key words used to describe foraging behavior include resources, the elements necessary for system survival and sustainability which have a limited supply, adverse environmental conditions, any enemy that consumes a systems resources, and act predatorily, will end the system, wholly or in part, over time, depending on a equation of energy, time, adversarial forces and quantitative evaluation of each. This analysis also accounts for adversarial forces generated as a consequence of the system itself, in much the way, in which a yeast colony will suffocate eventually in its own waste.

[27] In C+8 the matching law is used and continuously tested and adjusted as a quantitative relationship that holds between the relative rates of response and the relative rates of reinforcement in concurrent schedules of reinforcement. For example, if two response alternatives A and B are offered to a system, the ratio of response rates to A and B equals the ratio of reinforcements yielded by each response. This law applies fairly well when systems become exposed to concurrent variable interval schedules

detection, neural hysteresis[29], and reinforcement control[30]. Under C+8, these tools are automated, and its applications are generalized across the entire statistics layer.

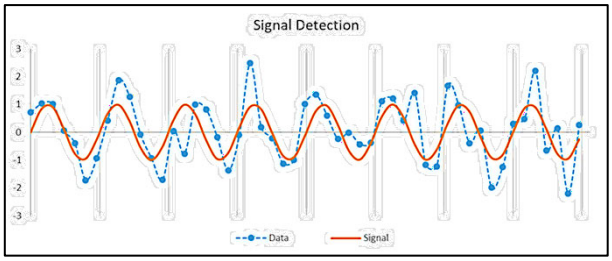
XII Signal Detection

Signal Detection is a key standard in the C+8 analytics library of statistical tools. It gives means to measure the ability to differentiate between information-bearing patterns (stimulus in living systems, signal in machines) and random patterns that distract from the information (called noise, consisting of background stimuli and random activity of the detection machine and of the nervous system of the operator).



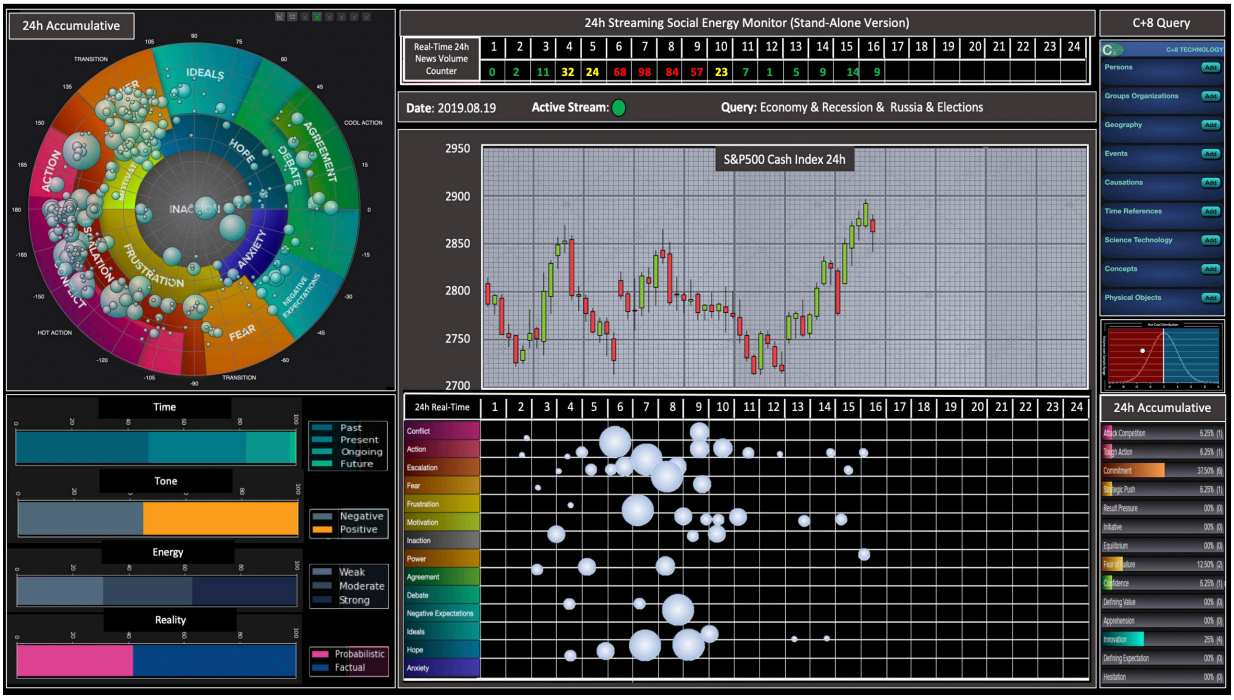
There are a number of methods used by C+8 to detect signals, and to determine signal threshold levels. These will, of course, be different for different methods. Changing the threshold will affect the ability to discern, often exposing how adapted the system is to the task, purpose or goal at which it is aimed. When the detecting system is a human being, or a group of humans, organized by a set of filter factors, characteristics such as experience, expectations, physiological state (e.g., fatigue) and other factors can affect the threshold applied. For instance, a sentry in wartime might be likely to detect fainter stimuli then the same sentry in peacetime due to a lower criterion, however they might also be more likely to treat innocuous stimuli as a threat. Therefore, all signal detection tasks in C+8 are generalized, alone with the filter definitions of the data selection, to repeat the process of detection continuously and under structures selection conditions.

In C+8 , the process of selecting detection methods and setting thresholds becomes a automated strategy, continuously refined as more data arrive. C+8 can, and does, also devise new detection methods and new ways of refining thresholds. This makes the system evolve naturally. The analytics matrix is adjusted to fit the object data pool. New data are added, data that may become critical to know later, without a user having specifically instructed the analytics layer to collect specific signal for a specific system and condition. By growing a dynamic system signal library, and by tuning thresholds based on increased data

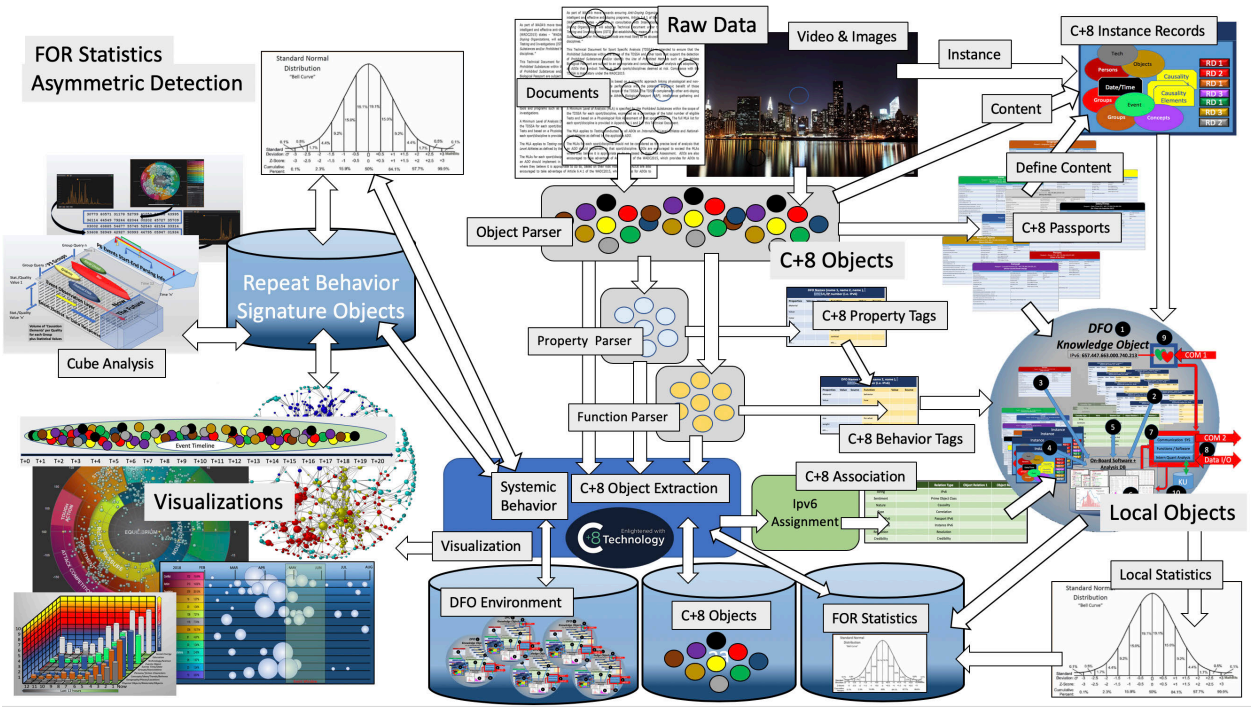


[28] The scalar timing or scalar expectancy theory (SET) is a model of the processes that govern systems behavior controlled by time. The model posits an internal clock, and particular memory and decision processes. in C+8 analysis, SET is one of the more important models of mixed-system timing behavior, including conflicts.
[29] Hysteresis in C+8 analysis is in general terms the observation and recording of the dependence of the state of a system on its history. Plots of a single component of the moment often form a loop or hysteresis curve, where there are different values of one variable depending on the direction of change of another variable.
[30] Reinforcement learning (RL) is an area of machine learning concerned with how software agents ought to take actions in an environment so as to maximize some notion of cumulative reward. Reinforcement learning is one of three basic machine learning paradigms, alongside supervised learning and unsupervised learning. RL is a standard tool in the C+8 statistics library, to observe systems and predict their behavior.

availability, the system can proactively serve analyzed data as automated response to later operator queries and even suggest new operator focus areas.



All these steps occur at the same time as the system is continuously optimizing itself, while new inputs are simultaneously contributing to this optimization. Predictions made by data in the sandbox is validated continuously against real-world confirmation data.



XIII Examples of Real-Time Stream Analytics Monitors

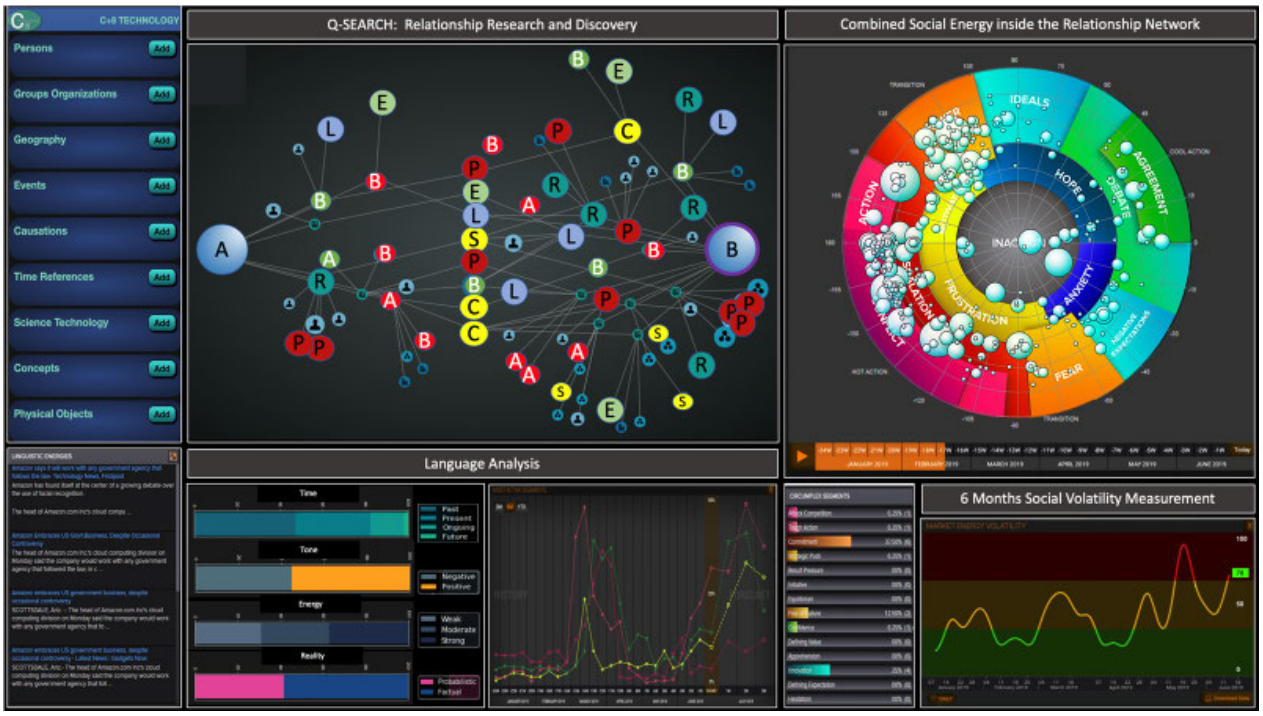
Below are a few examples of our real-time stream analytics monitors which can detect multiple dimensions in language (such as different qualities, categories, levels of aggression, goal definitions) for such domains and areas as economic trends and tendencies, anti-american venting, anti-social or deviant language (words, phrases, proxy-implications, etc.) and filter sources, entities, and evolving goals within all captured social energies, mapped to geographic, organizational, and conceptional spaces.

The system then autonomously develops behavioral signatures to optimize early detection and prediction, in order to identify the shift from simple deviant attitudes to potentially criminal or commercially adverse actions.

At present, we host these screens on the Refinitiv platform as an application named Decision Point™ and as a proprietary web application. The information presented on the two is different.

On Refinitiv we display data that is relevant to companies only.

As previously mentioned, the circumplex measures the energy in the qualitative fields developed using NLP. The underlying data gives us an even deeper understanding of the actual energy sources.



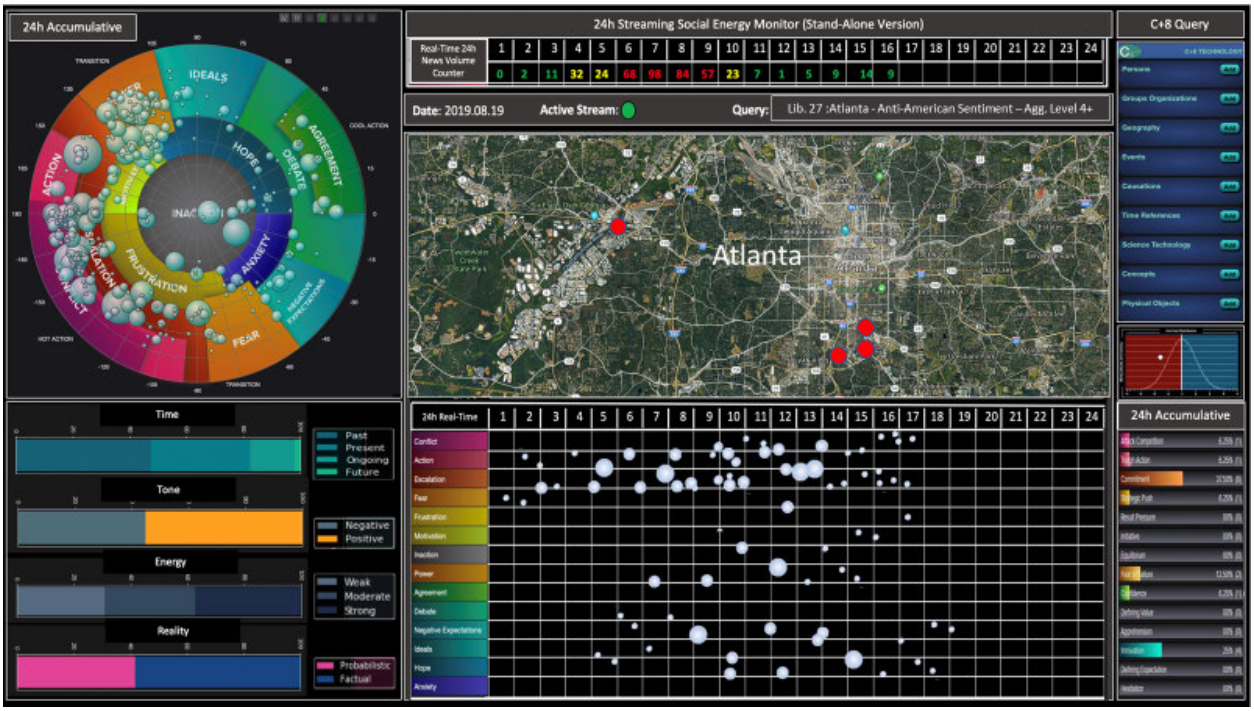
With Q-Search (the upper middle window), we investigate the space shared between two objects (A + B) – such as a person and a concept, or a group and an event, or a geography and a time reference, or a person and a technology. More objects can be chosen to model more complex spaces and interactive dynamics.

In the lower right-hand corner window, we measure the volatility of language that is used in reference to the subject of our investigation.

In the lower left-hand corner window, we can see the source data from selected energy fields.

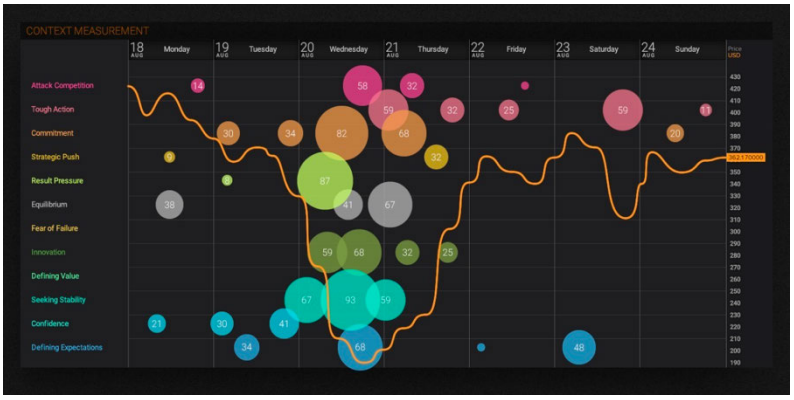
In the lower left window, we view secondary language measurements such as tense (past, present, ongoing, and future), tone (positive or negative), overall language energy (weak, moderate, and strong), and reality measurement (factual or imaginary language).

In the middle lower window, we view quantitative measurement of individual qualities over time.

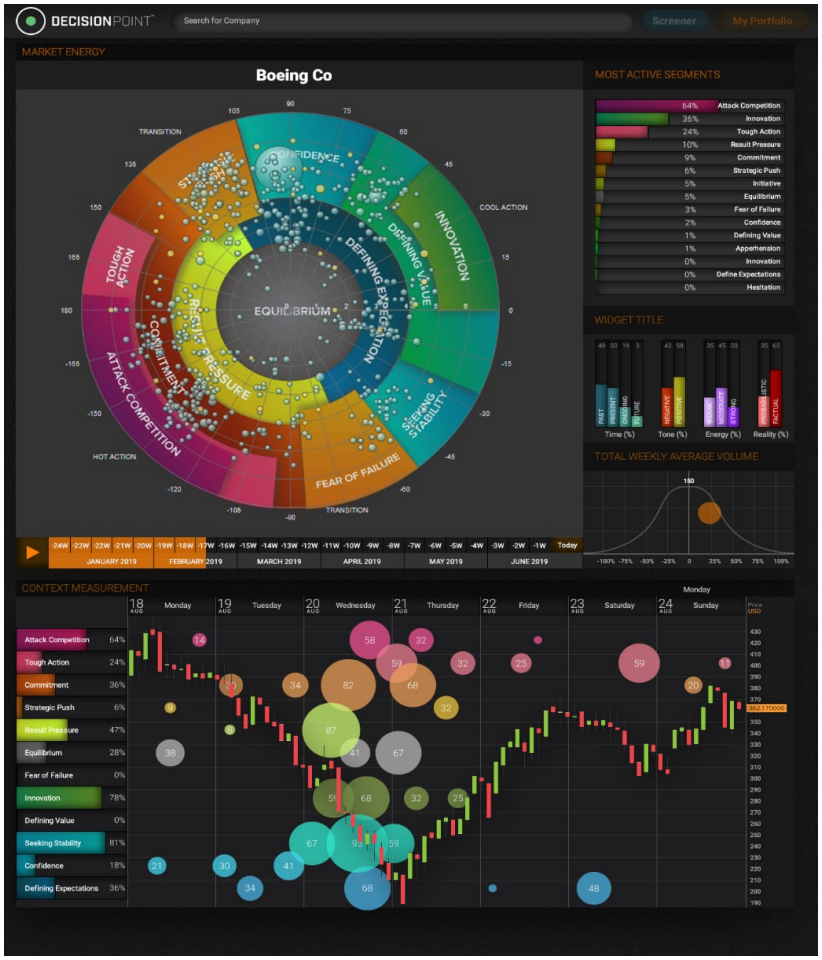


Above we also have a map window where we can see asymmetric threat detection with respect to geography, and a time series window monitoring social energies 24/7.

The next panel illustrates correlations between several events: changes in social moods, as they are measured with the circumplex of collective moods, and changes in stock market indicators, on a daily basis across one week. The underlying assumption is that a visual co-incidence of change in how the data behaves can indicate a potential causality between social-psychological factors and market dynamics. In the image above, an increase in circumplex data points on the timelines (the bubbles) correlates with a decrease in the market indicator. This is a correlation worthwhile to be explored on the timeline, by calling up supporting data and assessing the social-historical events that contextualize the correlation.



When placed in the company analysis window in Refinitiv[31] (see below), these timelines of social moods and market volatility draw a very generous picture of the public perception and performance of the said company. The circumplex is a snapshot of collective moods – how people feel and behave towards the company. The tone, tense, reality and energy thermometers indicate the time orientation, level of realism, intensity and tone of these moods. The timeseries show how these aspects change over one week, in correlation with market values.



[31] Refinitiv is a global provider of financial markets data and infrastructure. The company was founded in 2018. It is jointly owned by Blackstone Group LP which has a 55% stake and Thomson Reuters which owns 45%. The company has an annual turnover of $6bn with more than 40,000 client companies in 190 countries

XIV Conclusion

The world is in turmoil all around us. For the past two decades, nation-states have been on the move, realigning their political orientations, associations, and systems of values and beliefs. At an increasing pace, old countries and empires are collapsing, and new societies and nations are being born. Unfortunately, war, ethnic and religious cleansing, torture, social and political injustice, rent-seeking and oppressive commercial competition and irresponsible financial behavior on a global scale have also become part of this process of radical change. Perhaps at no other time in human history have local and global leaders been more challenged than now to find the right path to a sustainable future for humankind. The lack of clean and affordable energy, the diminishing supply of clean water, the imminent global collapse of the food supply to a vastly expanding human population, the fast growth of pollution due to the increasing industrialization of emerging nations, climate change issues, ever-sharpening conflicts due to unequal access of many communities to natural resources and affordable technological solutions, and the impasse of philosophical and ideological differences; all of these interdependent factors that decision-makers are called upon to accept as reality and, in an ironic twist, to create simplistic binary decisions on.

To compound the problem, the velocity and effectiveness of contemporary communication technologies and public media allow local and global leaders little time to catch their breath and carefully consider their actions. Momentous decisions must be made almost instantaneously, in real-time and in extreme opacity, often resulting in unforeseen and devastating consequences for humanity. This escalation in speed and volume of flawed political, economic, and environmental decision-making has produced an avalanche of global instability and uncontrolled change, which has led, in turn, to more turmoil and confusion at all levels and across all geographies.

At the same time, people are producing massive quantities of information about themselves, about others, about things, relations, and interactions that shape the world – these are part of a socio-technical phenomenon that is equally complex and simple. It is complex in its diversity of colors, languages, nuances, timings, technologies; yet it is simple in its patterns, trends, and rules of organization around nuclei of energy.

In order to bring about a reliable and usable solution to the issues and challenges we face, there needs to be a robust framework to reliably process and analyse the information at an unprecedented level in order to predict, to preempt and to prevent the spread of avoidable turmoil.

C+8 Technology provides such a solution. In an unprecedented, cutting-edge system, its self-organizing contextualization of our rea lity – replicated in the digital sandbox – is an exclusive, premium source of knowledge about the current and potential dynamics of the world. With it, we can replace emotional with evidence, fundamentally reshaping how we respond to the future.

XV Contact

For more information on how C+8 functions, or if you wish to contact our Sales Department, please visit www.prisma-analytics.com.

ANNEX 1 – STRATEGIC PLANNING CENTER (SPC) AND SITUATION ROOM WITH MEDIA CENTER OPTION (SR)

We are living in the third millennium, governments and organizations face an unavoidable need to adopt the efficiency of flexible, responsive, and successful systems that aid in an ever increasingly fast-paced decision-making environment.

C+8 Technology makes it possible for Prisma Analytics to deliver cutting edge decision support tools that stream in real-time in each Strategic Planning Center and Situation Room that we deliver. Besides furnishing the client with all desired outputs and tools using C+8 with our data pool, with this service, we also offer an empty (meaning without any data furnished by Prisma Analytics) C+8 structure that the client can fill with their own data so that it remains completely secure – no one else has access to this particular structure, but it also cannot be modified by the client in any way, the only thing that can be touched is the data they choose to input. On the other hand, the data in the C+8 pool cannot be touched in any way by anyone.

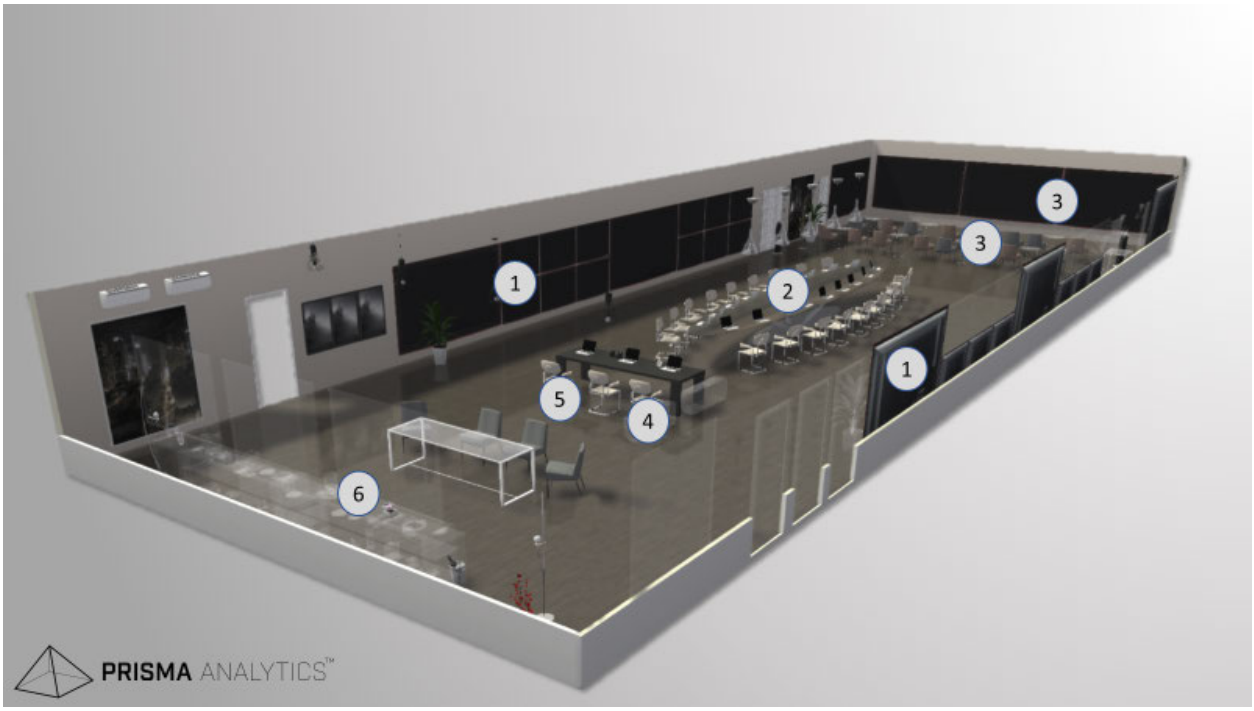
The value delivered by a planning center and situation room operated using C+8 Technology is made crystal clear by observing that it provides total, uncompromised real-time information awareness; a work environment containing leading predictive and competitive real-time knowledge; enforcement of unprecedented organizational security; decision advantage through complete contextual knowledge; high analytics speed for all integrated information; accurate differentiation between fact and fiction; and the enablement of a superior level of organization leadership no matter the situation or conditions.

Using C+8, we deliver the following services and features:

- Coherent and centralized real-time opensource intelligence
- Intelligence integration throughout the entire process of decision-making, based on best practice fully enabled by big data and safe C+8 AI
- Fully secure integration of opensource intelligence data with proprietary client data, strictly with per-user-permit access
- Proactive analytics services for crisis management
- An organizational knowledge environment interconnected across all desired branches of administration through data and its analysis
- Fake news and fake fact detection

Design and Functional Details

Prisma Analytics delivers all software and hardware, including all necessary furniture (if so desired), through Schloer Consulting Group (SCG), which is the technology incubator and implementation company for the SPC and SR projects.



The following are provided:

1. Over 110 square meters of high-resolution wall monitors that are fully segmental for display cells as small as 20-inch diameter, displaying real time information visualizations.

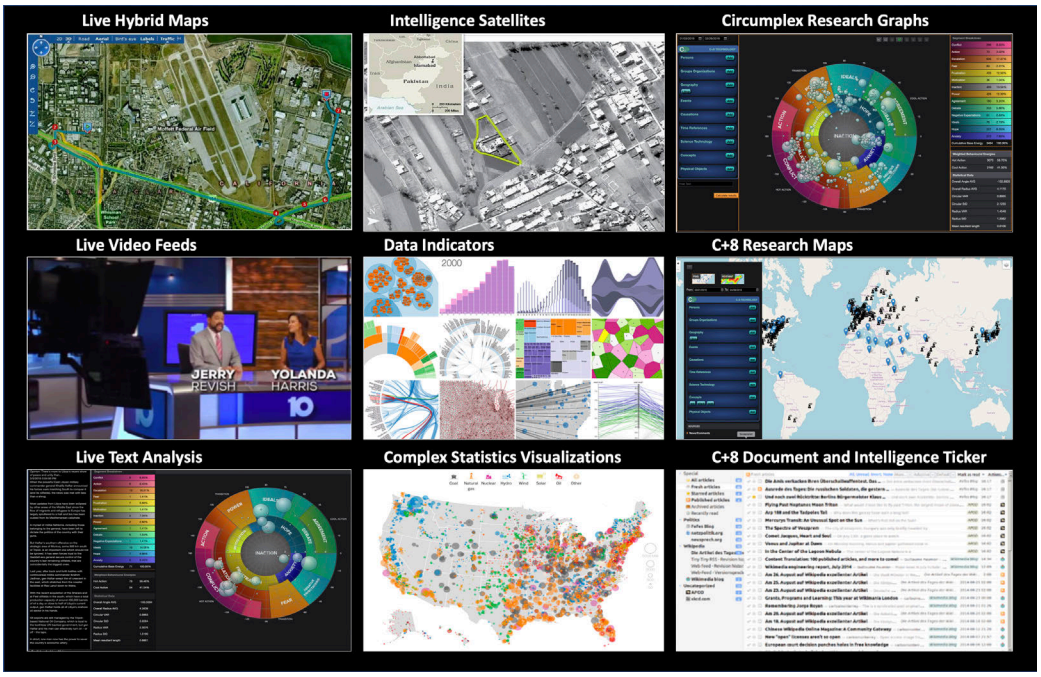
2. A center table with fully integrated fiber network and work stations for up to 20 analysts. It contains integrated liquid-crystal data table-elements in the center for the purpose of visualizing, sharing, and integrating real-time and continually evolving information between analysts.

3. A presentation and briefing area for intelligence and strategy presentations and meetings that can be separated from the rest of the center by an automated folding wall within 2 minutes for additional security purposes, shielding and securing the presentation area.

4. A workplace for the data visualization technician that facilitates the placement of the desired content on the correct monitor segment in accordance with analyst instructions.
5. A workplace for two information scientists, connected directly to the C+8 data center to define, request, and compose any type of real-time information visualization, statistic, or graph to be displayed on the monitor walls, in the presentation area, the center of the analyst table, or on the analyst workstations. Analysts can directly request the information scientist to create a new visualization from the available data or to select from an extensive reservoir of predefined elements.

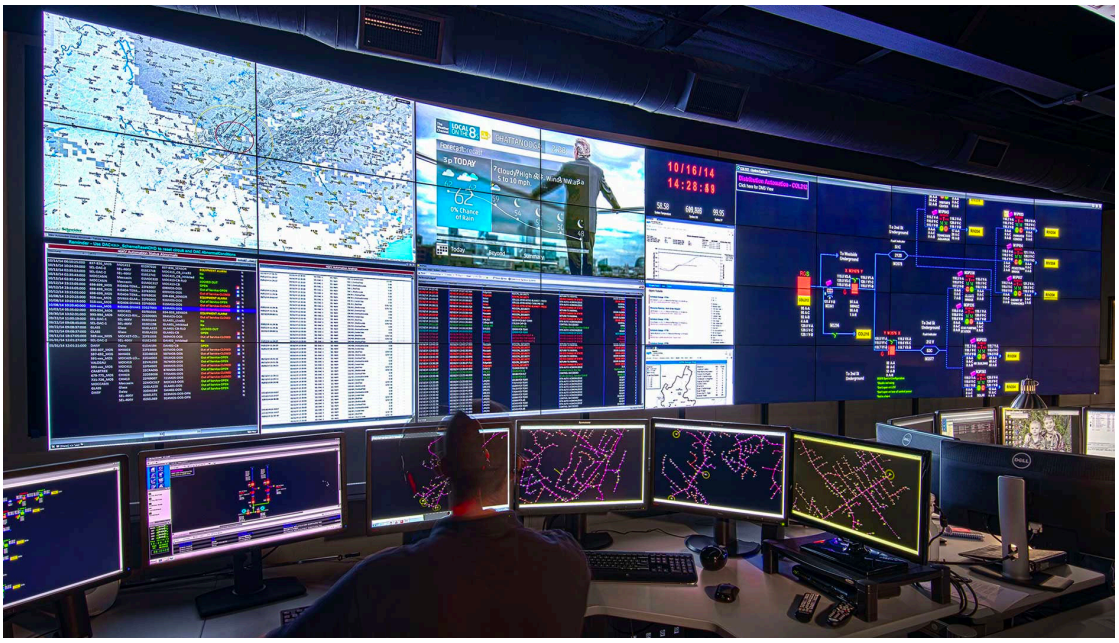
6. A break area for analysts and data scientists.

The extremely fine-pixel display walls can show any content, from any source, in any format, resolution, and size. Different content such as video, text, images, live maps, etc. can be displayed side by side, even if their pixel resolutions are different.



Media Analysis Center Add-On Feature

An optional feature is the Combination Analysis/Media Briefing Emergency Field Center Option. It monitors all available media to provide instant, in-depth situational awareness and can be set up within 96 to 120 hours after facility location and building are identified.



Technical Information

High-End Video walls 17.600 x 2.100 mm, 9.152 x 1.092 Pixel, 100% Front Maintenance, ultrafine with 1,9 mm pixel pitch

Name: MODELL ACT-VIDEOLED Ultrafine RPi1,9TOP-SMD(3in1}-SL-FW/160/160/9152x1092.
Physical resolution per page: 9152 x 1092 pixels
Case size (WxHxD): 17.600 x 2.100 x 88 mm plus substructure
Module design: Super-slim FRONT MAINTENANCE, aluminum die-cast housing for perfect fit, approx. 8cm depth, approx. 8 kg per module, fan-less power supply unit

Module size: 400 x 300 mm (per Modul 2x2 pixel cards, pixel card 200x150 mm)
Pixel pitch physically: 1,923 mm
Total pixel count: 9.993.984
Total LED chips: 29.981.952

Weight LED modules: approx. 8 kg per module, approx. 2.464 kg in total without substructure
Viewing angle: 160° horizontally, 160° vertically
Max. displayable colors: 16.7 Mio
Color depth processing: 281 Trill. To dye

Max. recommend scan rate: 3840 Hz
Control: PC-DVI main controller video wall
Connected load: 200 W / module (300x400 mm) per module one Meanwell power supply HSP200-5, total approx. 62 kW
Maintainability: 100% Front Maintenance. The pixel cards can be magnetically removed from the front. New extra-slim module design, also the power supplies and receiver cards are simply removable to the front.

High-End Video wall 8.000 x 2.700 mm, 5.120 x 1.728 Pixel, 100% Front Maintenance, ultrafine with 1,56 mm pixel pitch

Name: MODELL ACT-VIDEOLED Ultrafine RPi1 ,5TOP-SMD(3in1)-SL-FW/160/160/5120x1728.
Physical resolution per page: 5.120 x 1.728 pixels
Case size (WxHxD): 8.000 x 2.700 x 88 mm plus substructure
Module design: Super-slim FRONT MAINTENANCE, aluminum die-cast housing for perfect fit, approx. 8 cm depth, approx. 5,5 kg per module, fan-less power supply unit

Module size: 400 x 300 mm (per module 2x2 pixel cards, pixel card 200x150 mm)
Pixel pitch physically: 1,563 mm
Total pixel count: 8.847.360
Total LED chips: 26.542.080

Weight LED modules: approx. 5,5 kg per module, approx. 990 kg total without substructure

Viewing angle: 160° horizontally, 160° vertically
Max. displayable colors/pixels: 16,7 Mio
Color depth processing: 281 Trill. To dye
Max. recommended scan rate: 3840 Hz
Control: PC-DVI main controller, video wall

Connected load: 200 W / module (300x400 mm) per module one Meanwell power supply HSP200-5, total approx. 52 kW

Maintainability: 100% FRONT MAINTENANCE The pixel cards can be magnetically removed from the front. New extra-slim module design, also the power supplies and receiver cards are simply removable to the front.

The Social Energy Diagram
August 2019

Hardy F. Schloer, Lead Scientist
Adela Fofiu, Lead Social Scientist
Stephen Kawas, Lead Statistician
Juan Carlos Armenteros Carmona, Statistician

ANNEX 2 – THE SOCIAL ENERGY DIAGRAM

Introduction

The private sector is witnessing an increase in the popularity of data science, with decision makers relying heavily on statistical analyses that identify and illustrate trends in a linear fashion. Basic frequencies displayed on time series are the general norm for any instance and situation, great or small, from estimates of world hunger (Our World in Data, 2018) to lipstick sales in the United States (The Economist, 2009). Current forecasting and prediction techniques use knowledge of past events to determine what might happen in the future by analyzing various single-dimensional quantitative measurements combined with different time indexes.

The Problem

This omni-popular approach provides clear evidence that the theories, methods, and data currently available for observing and understanding social energy dynamics in real time are fractional, and thus, not wholly reliable. They break the world down into small, manageable pieces, resulting in output that is undeniably of high quality. Nevertheless, this approach is atomistic and criterion-based – fit for the 20th century but not for the 21st. The pursuit of an integrated, complex system of knowledge management is useless without a holistic tool that collects, stores, processes, and analyzes data in a theoretically sound manner and with a high methodological validity. The solution that we have developed is the Social Energy Diagram.

Background

Our diagram has its social-scientific origin in James Russell's circumplex of affect (Russell, 1980), a micro-social measure of individual affective experiences. Since all emotions are mental states in response to pleasant or unpleasant stimuli, they can be described on two dimensions: valence and arousal. The circumplex model of affect was innovative at its time, offering a more flexible and statistically fuzzy method for studying and understanding emotions, compared to social and behavioral psychology's initial understanding of emotions as hierarchical and categorical. Nonetheless, we have reached the conclusion that the circumplex model of affect is only a micro-social measure of individual subjective experiences. It measures people's declarations removed from natural context and disconnected from mezzo- and macro-dynamics.

A quite recent transdisciplinary area of study, cliodynamics – the study of why things change over time – is at the intersection of macro-sociology, economic history, and mathematical modeling of long-term social processes. Cliodynamics has gained popularity through the work of Peter Turchin (2015), who proposes a systematic approach to make history a hard science. His research on historical records has brought forth groundbreaking understandings of economic cycles and crises, of cultural eras, of civilizational trends. However, we observe that cliodynamics works with macro-social data from the distant past, shaping it into a back-casting or retrospective science.

One particular way to observe such current and past cultural trends and cycles is to monitor social or collective moods. Robert Prechter's socionomic theory defines social mood as "a shared mental state among humans that arises from social interaction. Social mood predisposes individuals in the group toward emotions, beliefs and actions. It fluctuates constantly in a fractal pattern. It is

unconscious, unremembered and endogenously regulated." (Prechter, NA) Conventional wisdom dictates that events, especially collective events, determine how people feel. The innovative approach of socionomics and its understanding of social moods is the other way around: the attitude adopted by a group or a population regarding their future is the factor that determines events. (Casti, 2010)

The Solution – The Social Energy Diagram

The Social Energy Diagram that we have built as an essential component of our Prisma Proprietary Application illustrates the trends of collective moods on a circumplex, combining sectional measures with longitudinal measures displayed in a panel format. This data processing, visualization, and analysis tool displays polar data combined with trigonometric functions on a geometric space, thus allowing for more than two measurements on the same observation at a single point in time. Observations from our own extensive research introduce these additional points as principles that have guided the development of the Social Energy Diagram and will further guide the interpretations on the plotted data:

- Understanding the collective state of the mind of a society relative to a particular issue is the basis to understanding its behavior, both in the present and in the future.

- The collective mind of society makes very little difference between the situation people desire for the future, the situation they are faced with, or the situation they believe they are in presently. Therefore, hereinafter we name all of these the active states of a society – the "issues that are on people's minds" or the collective state of a society.

- When we read the collective state of a society, we get a strong indication of what reality society is currently transforming into. Buddha said, "what you think [what is on your mind] is what you become, what you feel is what you attract, what you imagine is what you create." This is especially true in social psychology. Therefore, reading the collective state of mind of a society is like reading a leading indicator with a positive probability to reveal our collective future.

- Every issue must be evaluated separately to assemble and understand the combined big picture. Most analyzed issues will produce a contradictory output. It is, therefore, important to understand the quantitative distributions of the qualitative elements within a society to understand the energy and direction in which it is moving.

How it works

Using radii, theta, and a circumference, the diagram is a geometric space on which data about collective moods, affects, and emotions is plotted, thus creating a dynamic and complex image of the way an object is perceived by collectives and to what intensity. Fourteen energy layers positioned in the geometric space observe collective affects and emotions at various degrees of valence and arousal.

A Glossary-Based Approach

A glossary-based approach in content analysis is fundamentally a technique for counting words. The empirical data – various types of discourses in text format – is first observed word by word.

Once a glossary entry is identified in the empirical data during this observation, it is extracted and counted. The Social Energy Diagram functions in the same way. Our computers run our Social Energy Glossary and adjacent Specialized Glossaries against our empirical data, identifying, counting, and extracting glossary entries. These entries are then plotted on the geometrical space. As the frequency of a glossary word plotted on the circumplex increases across empirical observations – or, in other words, as data is input in the algorithm – the diameter of the data point on the diagram increases.

The Social Energy Glossary is a state-of-the-art development of our Linguistic and Social Research Department. It is not only aligned with valuable standardized glossaries, such as the Linguistic Inquiry and Word Count Dictionary (Pennebaker, Francis and Booth, 2001) or the Regressive Imagery Dictionary (Martindale, 1975, 1990), but it is also built according to cutting edge computational social scientific principles that make human-machine interaction exciting and inspiring.

In addition to the generalized Social Energy Glossary, we have also built extension packs of specialized glossaries to observe and measure the dynamics of specific fields of interest. These extension packs are built in both a deductive approach, using expert sources of specialized vocabulary and an inductive approach: specialized vocabulary extracted empirically from the natural language in news articles and scientific sources classified by topic.

THE GEOMETRIC SPACE

Compared to Russell's circumplex, the Prisma Analytics Social Energy Diagram places arousal on the 0x axis and valence on the 0y axis, thus rotating the geometric space 90 degrees counter-clockwise.

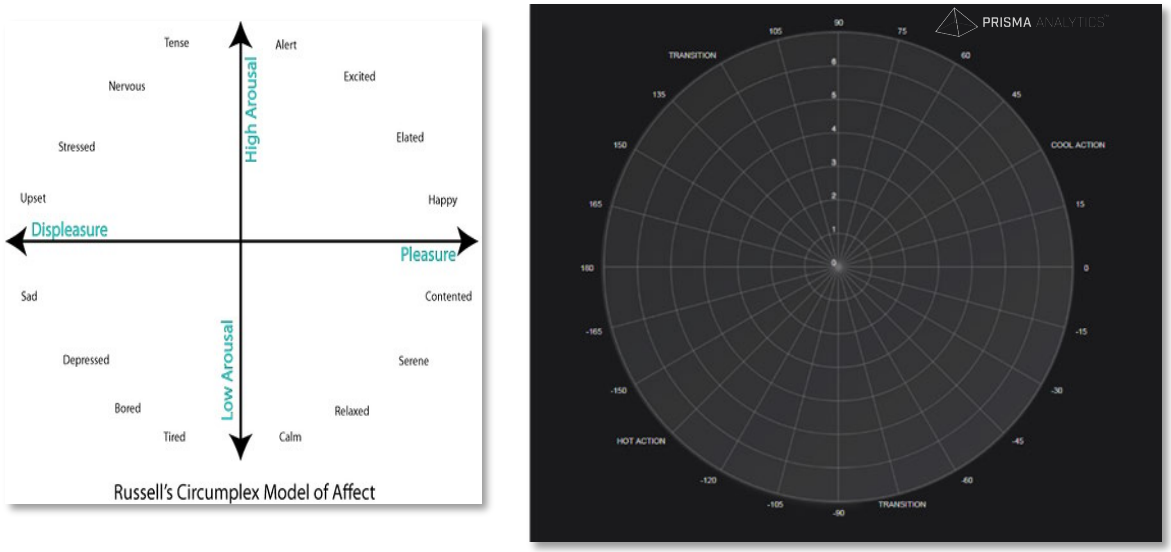


Figure 1. Left side: Russell's Circumplex Model of Affect. A circular distribution of affect words on a Cartesian system of coordinates. Right side: Technical model of the Social Energy Diagram, with polar coordinates and circle sectors defined for each variable

Our diagram is like a telescope. However, it does not look at the stars, it looks inwards, searching for the mass, gravity fields, and black holes of the collective minds of human society. These appear as circular fields of varying sizes on the graph plotting area, representing the amount of energy they carry. Depending on where they appear on the plotting area, they energize and fuel different sentiments and behaviors in society. It is important to understand that the distributions across the collective moods observed by the diagram set a very specific direction in how society thinks about various issues and how it will react to them in the future. Societies change all the time; therefore, one must measure multiple energies often. At Prisma Analytics, we do this frequent measurement by using the Social Energy Diagram as a dynamic tool that captures short-term, mid-term, and long-term event memories. Not only does our telescope look at queries precisely defined by our users, it also extracts the dynamics of social energies on a weekly basis. As a result, whenever there is interest, the diagram shows us how moods change across time, from one week to another, occasionally with stunning game changes.

THE C+8 TECHNOLOGY SUPPORTING DATA STRUCTURE AND USER QUERIES

The Prisma Analytics Social Energy Diagram harvests the complexity and simplicity of collective information by looking at the composition of the states of feeling and behavior. It captures the fine dynamic of action and reaction in social energies by inquiring about atomistic elements that build social and societal fabric: abstract concepts, time references, persons, events, physical objects, groups and organizations, science and technology, and geography. At Prisma Analytics we call this the C+8 technology and we use it to study causality phenomena in our sustained, highly qualified, and successful effort to understand the rhetoric of our times. The user can select time intervals and any or all of the C+8 atomic elements that need to be observed on the geometric space of the diagram. The data pool contained in C+8 includes multiple types of data (images, video, text, etc.), but the circumplex currently explores discourse, two types: media and scientific.

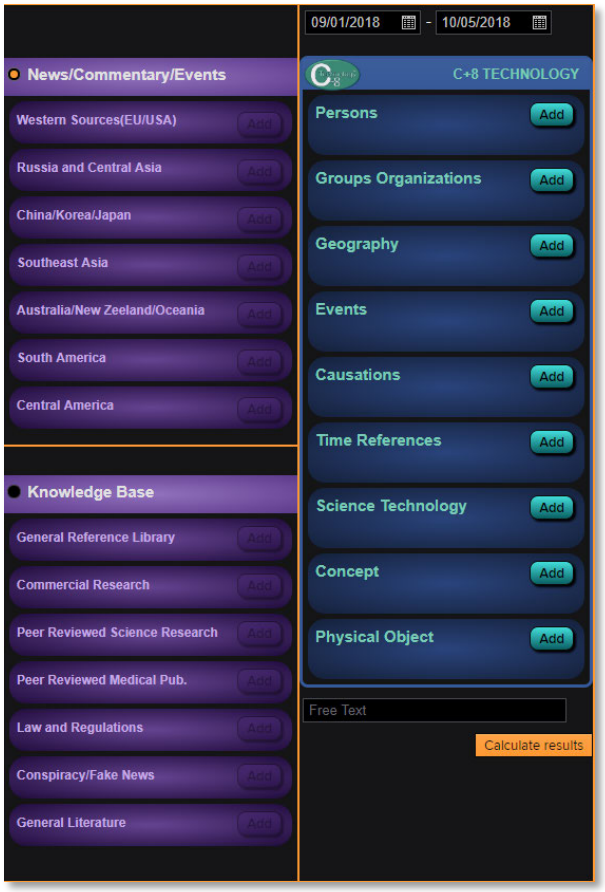


Figure 2. The C+8 Technology query tool in the Prisma Analytics Social Energy Diagram tabs. Taken on 11 December 2018

THE ENERGY LAYERS

Figure 3. Technical model of the Energy Layers on the Social Energy Diagram

As the data points populate the Social Energy Diagram, collective trends and patterns of feeling and behavior can be observed. The circular distribution of the variables of social mood invites the user to read and interpret human behavior and sentiment as moving between different directions and levels of arousal, as previously described. As such, the circle displays collective content in an Active Environment on the left hemisphere and a Reactive Environment on the right hemisphere. Our Active Environment is the intense, hot, incited side, where the expected behavior is more action, less talk. The Reactive Environment is the "cool" side, where behavior is more debate and talk, and less action.

Of course, it is important to stress that these states of feeling and behavior have various degrees of intensity which are captured and illustrated by the radius of the diagram. Level 0 in the center, measured on the 0-2.5 radius, shows a low interest in reality, where people live in their own world and do not care much about external reality, unless it has a direct and immediate impact on themselves. The mid-range level, on the 2.5-4 radius, indicates a normal sense of reality. People and collectives live in a balance between their own mental space and the external influence of life. The outermost level, on the 4-7 radius, is where an extremely strong sense of reality and participation in life affairs exists. This describes an intensely participatory culture in both the Active and Reactive environments.

The Social Energy Diagram in the Prisma application displays an Energy Layers legend, called Segment Breakdown, where each layer, identified by color and label, is assigned the frequency count of glossary word occurrences that are plotted on the circumplex. This gives an initial insight

into which energy is most intense for a particular query in the application. More refined statistical calculations bring detail and nuance to word frequencies. Percentages and means per layer, circular variance and standard deviation, variance and standard deviation of radius, and mean resultant length are used to indicate which layer of the Social Energy Diagram is most and least intense in terms of social moods. It is our objective to use such measurements to observe change across time, computing the statistical data of the diagram in time series and probability models.

The versatility of the energy layers based on the Active/Reactive Environment distinction allows us to create custom Social Energy Diagrams, based on the needs of our customers. Currently, the Prisma Analytics application integrates four models of the Social Energy Diagram: Social & Political Momentum, Business & Economic Momentum, Disruptive Technology Momentum, and Global Security and Threat Momentum.

The Social & Political Momentum Social Energy Diagram

Figure 4. Illustration of the different layers of the Social Energy Diagram describing the Social & Political Momentum

Our Active Environment is the intense, hot, incited side, where the expected behavior is more action, less talk. Here, we observe how Frustration and Motivation are the underlying collective moods. Power and Fear – the Orange Zone in Figure 4 - on both sides of the Red Zone are a kind of feeding zone, where social mood trends feed Escalation, a realm between power, action, and fear. These two orange surfaces also feed each other through polarization and calls to action. The Red Zone is the escalation zone, containing the most punishing, energetic, expected, and uncontrollable tendencies nurtured by the current state of power and fear on its sides. On top of it, the Pink Zone indicates strong decisiveness and supports violence as a solution. This is when and where aggression transforms into direct violence. Further on, at the top of these three zones we find the Magenta Zone, where crisis, war, and major catastrophes are on the brink or in full progress.

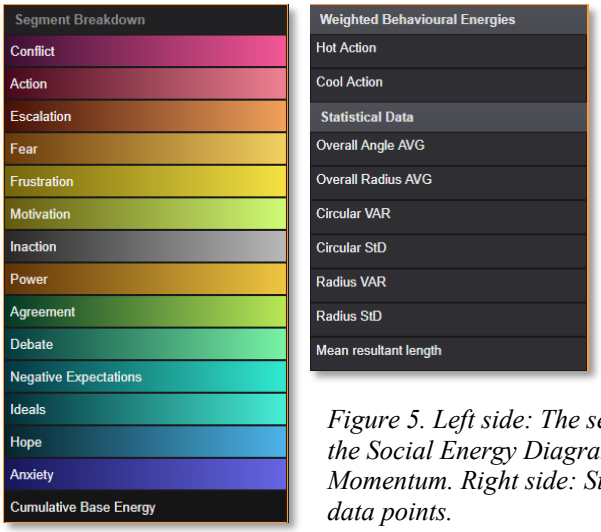


Figure 5. Left side: The segment breakdown of the different layers of the Social Energy Diagram describing the Social & Political Momentum. Right side: Statistical data calculated on the circumplex data points.

The Reactive Environment is the 'cool' side, where behavior is set by Hope, Anxiety, and Debate, but much less by action. The Blue Zone social mood on top of the Dark Blue and Navy Zones hopes for and expects an uneventful status quo. It is characterized by social inertia and low energy in how social change occurs. In its upper sector this zone illustrates that people seek ideas and ideals. In its lower sector, the Blue Zone shows a life filled with negative expectations, social action is almost frozen. The next layer, the Green Zone, is where people debate and innovate. The Dark Green Zone is where people find consensus and come up with constructive solutions, where they are driven by hope. The middle of the circumplex, the Grey Zone, is where apathetic collective moods converge.

In a more applied reading, Power – Inaction – Fear form an ideological axis. To its left, Frustration, Motivation, Escalation, Action, and Conflict accumulate their energies in a HOT ACTION trend that, obviously, indicates propensity towards intense action. To the right of the ideological axis, Anxiety, Hope, Ideals, Negative Expectations, Debate, and Agreement accumulate energy in what we, at Prisma Analytics, call COOL ACTION. This energy indicates that people seek ideas and discuss possible solutions to social issues.

EXAMPLE

Public Health Issues – Human Papilloma Virus

HPV is contracted by about 80% of the world's population at a given moment during active sexual life. It is highly contagious and, in some cases, leads to cervical cancer. Being classified as an STI, HPV is stigmatized and associated with feelings of shame. It is one of the most challenging issues in epidemiology and pharmacology, since there is no known cure. Vaccination is a prophylactic solution. A series of queries in the Prisma Analytics Social & Political Momentum tab illustrate the dynamics of collective moods around this sensitive issue of the 21st century.

Select Date -- 1.01.2018 – 25.09.2018

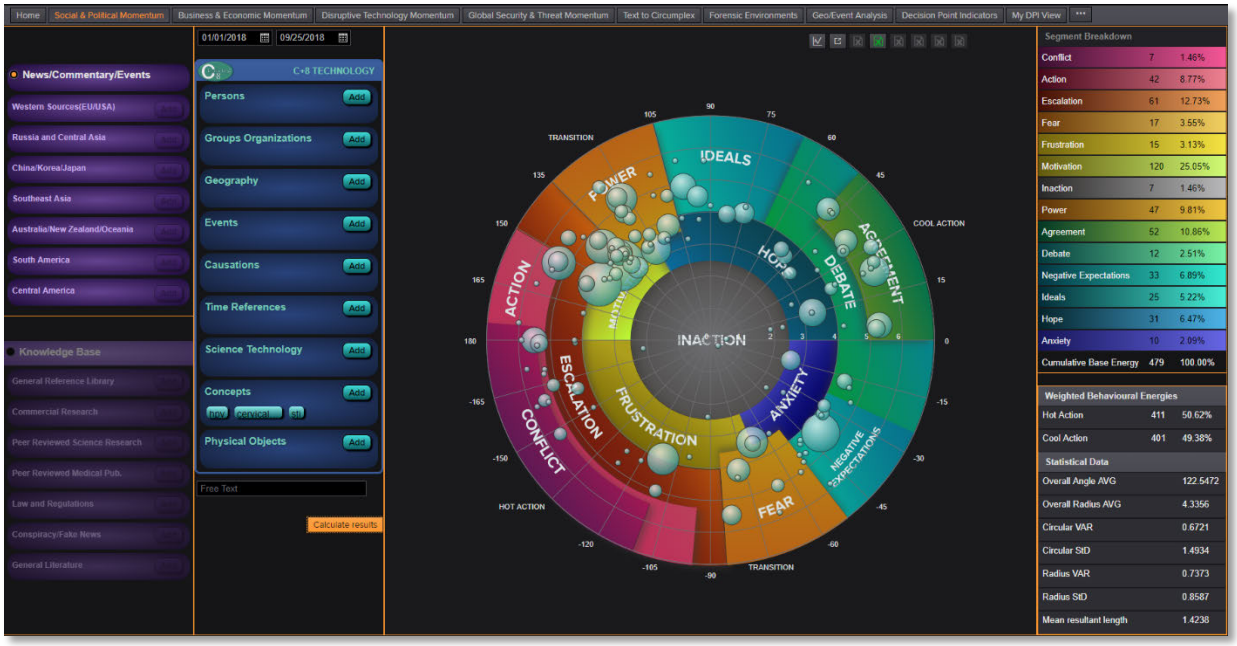


Figure 6. Screenshots of the Prisma Analytics Social Energy Social & Political Momentum tab, with three C+8 Concept associated queries. Taken on 3 May 2019

A simple search with the HPV term shows that both Action and Reaction characterize the public discourse about the virus. On the Active Environment hemisphere, Motivation and Escalation are the most intense, highlighting the fact that there is strong motivation to hinder the spread of the virus, but also that this very spread is an escalating problem. On the Reactive Environment hemisphere, Agreement and Negative Expectations indicate that finding a solution to this health issue is something everybody agrees is necessary, but also that, given the slow progress in addressing it so far, people continue to expect negative societal outcomes due to its spread and continual stigmatization. In brief, there is only slightly more talk than action on the issue of HPV. Interestingly, adding search terms such as „cervical cancer" and „STI" to the query result in a different collective dynamic, but the Motivation layer is consistently the strongest throughout.

Adding „vaccine" as a possible technological/scientific solution to the risks of contracting HPV, the chart reverts back to the Reactive Environment being the most "vocal," where people talk, debate, hope, seek agreement, are anxious, and fear negative outcomes. It is noteworthy that, on the Active Environment, Power is the most significantly weighted after Motivation, suggesting that vaccination against the spread of HPV is also a social power issue.

Figure 7. Screenshot of the Prisma Analytics Social Energy Social & Political Momentum tab, with three C+8 Concept and one C+8 Science Technology associated queries. Taken on 3 May 2019

The Business & Economic Momentum Social Energy Diagram

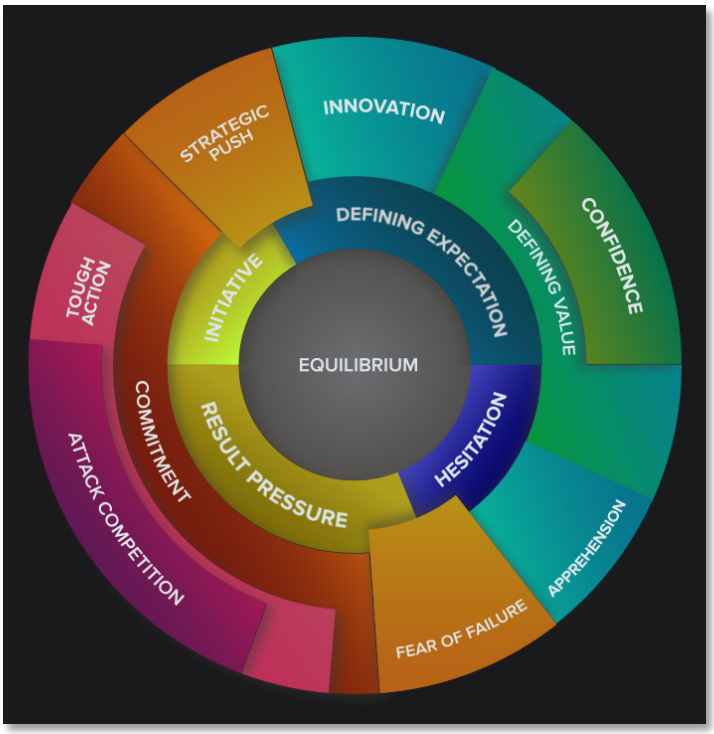


Figure 8. Illustration of the different layers of the Social Energy Diagram describing Business & Economic Momentum

The Active Environment is the area committed to heat, pressure, and force. Decisions and actions made in order to crush rivals, avoid financial downfall, initiate hostile takeovers, and so on are located here. On the other side we have the Reactive Environment that is defined by greater calm and positivity. We find new ideas, higher goals, and positive expectations in this area. The Orange Zone shares both Environments, since Strategic Push and Fear of Failure can have both heat and calm. This zone feeds all the others on the circumplex and is equally balanced through its polarization on opposite sides of the wheel.

The Dark Yellow Zone indicates the beginnings of result pressure, not strong enough to really make anything happen, but causing enough disturbance to make its presence felt. The Yellow Zone shows initiative. The zones with increasing heat levels are Red, Pink, and Purple, respectively, positioned on top of each other. The Red Zone indicates commitment, where future actions and decisions are pushed forward by the Orange Zone on both its sides. The Pink Zone – tough action – is determined by the Red Zone and is characterized by harsh actions that lead to success or failure. Conflict is imminent in the Pink Zone, escalating until it reaches the Purple Zone that contains open attacks and activities against various entities.

The Dark Blue and Navy Zones are the base for all the other zones on the Reactive Environment. The first step to confidence, value definition, and innovation is defining expectations, while to apprehension is hesitation. This zone contains almost no action and identifies more with thought and speech. Next are the Blue, Green, and Dark Green zones. Policies and future goals are

determined here. The Blue Zone is both innovative and apprehensive, and is affected by the Orange Zone. The Green Zone is more focused on defining value and making progress, a step higher than the Blue Zone but not as high as the Dark Green Zone, where we find confidence. Level 0 (grey) indicates equilibrium, the status quo is maintained here with no issues that upset balance.

In a more applied reading, Strategic push – Equilibrium – Fear of Failure form a Vision axis. To its left, Result Pressure, Initiative, Commitment, Tough Action, and Attack Competition accumulate their energies in an EXECUTION trend that indicates action to be taken on the market or against competition. To the right of the Vision axis, Defining Expectation, Hesitation, Apprehension, Innovation, Defining Value, and Confidence accumulate energy in what we call STRATEGY, which indicates strategic planning and development to be in tune with the market.

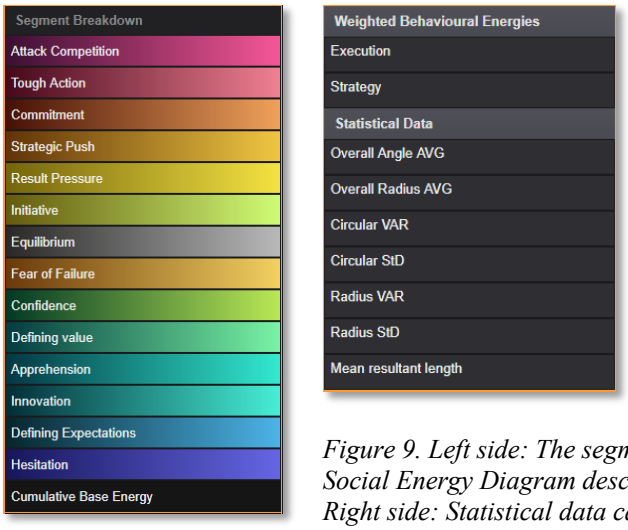


Figure 9. Left side: The segment breakdown of the different layers of the Social Energy Diagram describing the Business & Economic Momentum. Right side: Statistical data calculated on the circumplex data points.

EXAMPLE

Natural Resources – Cannabis

Cannabis has gained increasing attention recently, due to its functionalities and properties that make it an abundant natural resource with multiple applications. Here, we query the social mood in business towards cannabis as a resource for medicine.

A simple query with the term cannabis indicates a propensity of collective moods in business towards Strategic Push and Commitment. This is understandable, given its increasing legalization trends and the associated marketing opportunities. We also explore how the social mood changes when looking at cannabis in the medical field:

Select Date -- 1.09.2018 – 5.11.2018

Figure 10. Screenshots of the Prisma Analytics Social Energy Business & Economic Momentum tab, with two C+8 Concept associated queries. Taken on 3 May 2019

The Disruptive Technology Momentum Social Energy Diagram

Figure 11. Illustration of the different layers of the Social Energy Diagram describing the Disruptive Technology Momentum

To the west we have the Active Environment which contains elements that are characterized by heat and pressure. Aggressive decisions and actions find their place here. To the east we have the Reactive Environment in which a more tranquil and stable atmosphere is found. We find new ideas, higher goals, and mostly positive expectations in this area. The Orange Zone shares both Environments, since Influence and Fear of Failure can be both aggressive and calm. This zone feeds all the others on the circumplex and is equally balanced through its polarization on opposite sides of the wheel.

The Dark Yellow Zone indicates the beginning of pressure to go to market, not strong enough to really make anything happen, but causing enough disturbance to make its presence felt. The Yellow Zone indicates potential. The zones with increasing heat levels are Red, Pink, and Purple, respectively, positioned on top of each other. The Red Zone indicates commitment, where future actions and decisions are pushed forward by the Orange Zone on both its sides. The Pink Zone – tough action – is determined by the Red Zone and is characterized by tough decisions that lead to success or failure. Energies in the Pink Zone escalate until they reach the Purple Zone that contains open market disruptions.

The Dark Blue and Navy Zones are the base for all the other zones on the Reactive Environment. The first step to innovation, value definition, and confidence is defining application, while to market hostility is uncertainty. These zones contain little action and identify more with thought

and speech. Next are the Blue, Green, and Dark Green zones. Policies and future goals are determined here. The Blue Zone is both innovative and open to market hostility, and is affected by the Orange Zone. The Green Zone is more focused on defining value and making progress, a step higher than the Blue Zone but not as high as the Dark Green Zone, where real strong confidence is found. Level 0 (grey) indicates stalling, a place where no progress is made and nothing is done to achieve any goal.

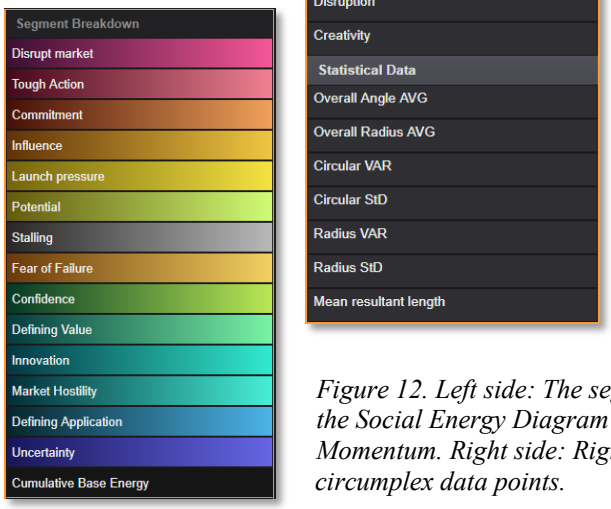


Figure 12. Left side: The segment breakdown of the different layers of the Social Energy Diagram describing the Disruptive Technology Momentum. Right side: Right side: Statistical data calculated on the circumplex data points.

In a more applied reading, Influence – *Stalling* – Fear of failure *form a Strategy axis. To its Left, Launch Pressure, Potential, Commitment, Tough Action, and Disrupt Market accumulate their energies in a DISRUPTION trend that indicates fast-emerging digital ecosystems bringing unexpected new competitors and market advantage. To the right of the Strategy axis, Defining Application, Uncertainty, Market Hostility, Innovation, Defining Value, and Confidence accumulate energy in what we call CREATIVITY. This energy indicates technology-based goods and services which are about to be taken to a new creative level of digital experience and product innovation.*

EXAMPLE

Cryptocurrency on the market

The cryptocurrency market (Bitcoin, blockchain, initial coin offerings, ether, exchanges, etc.) have caused quite an uproar in media discourse, financial institutions, and private conversation. The interest in this topic is particularly intriguing for governments, tech companies, and private citizens, as the cryptocurrency market is on an exponential, yet highly volatile, growth. Moreover, the technology underlying cryptocurrency is continuously updating and changing. Increasing its mysterious allure is a level of knowledge below average regarding how it works. To understand the social energies surrounding it, a series of queries in the Prisma Analytics Disruptive Technology Momentum tab illustrate the dynamics of collective moods around this issue.

A search for "cryptocurrency" over a period of almost a month will yield a multitude of results on both the Disruption and Creativity hemispheres, but with a higher presence on the Creativity Side. They are clustered mostly in Confidence and Market Hostility. The other intense zones are Defining Application and Innovation. However, on the Strategy axis, the Influence energy layer is quite populated, highlighting the fact that cryptocurrencies are becoming increasingly influential as capital options.

Searching for "Bitcoin cryptocurrency" will also yield results that are more active on the Creativity Side, with Market Hostility carrying the most weight, a reality well emphasized by Bitcoin's decreasing value since its December 2017 high. The higher activity on the Creativity side indicates a desire for redefining and innovating cryptocurrency.

Select Date -- 15.09.2018 – 10.10.2018

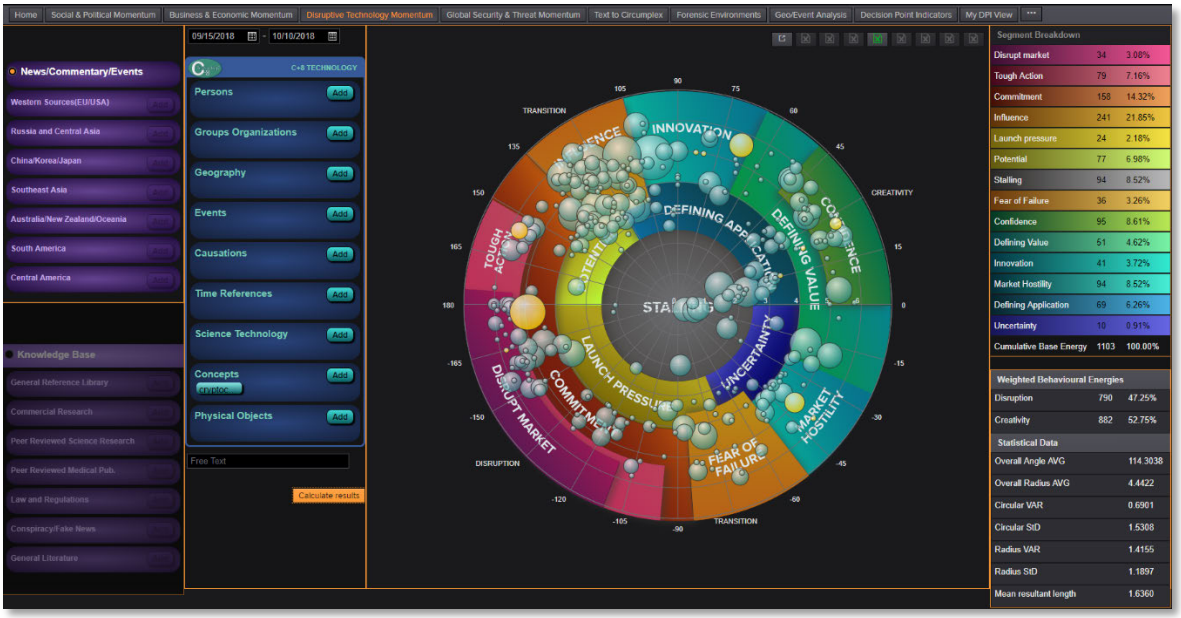


Figure 13. Screenshot of the Prisma Analytics Social Energy Disruptive Technology Momentum tab, with one C+8 Concept queries. Taken on 3 May 2019

Figure 14. Screenshot of the Prisma Analytics Social Energy Disruptive Technology Momentum tab, with one C+8 Concept and one C+8 Science Technology associated queries. Taken on 3 may 2019

The Global Security and Threat Momentum Social Energy Diagram

Figure 15. Illustration of the different layers of the Social Energy Diagram describing the Global Security and Threat Momentum

On the right we have the Reactive Environment, constituting a relative sense of safety and confidence. There is more freedom here to evaluate threats unhurriedly, create better systems, and generally increase the feeling of security. On the left we have the Active Environment, the area where threats and attacks are found. The Orange Zone shares both Environments – Strategic Power and Fear are an indivisible part of security, since without fear there is no need for security and without Strategic Power there is no way to prepare adequately for anything. This zone, though at polar opposites of the wheel is perfectly balanced and is obviously the most connected to all the other zones on the circumplex.

The Dark Blue and Navy Zones are the base for all the other zones on the Reactive Environment. Defining expectations is the first step to balance, dialogue, and security, while to instability is vulnerability. The Reactive Environment is generally characterized more by thought, planning, and speech than by action, and this can be seen in all its zones – Dark Blue, Navy, Blue, Green, and Dark Green. The Blue Zone indicates both balance and instability, like yin and yang, clearly influenced by the Orange Zone. The Green Zone focuses on dialogue to achieve the security of the Dark Green Zone.

The Dark Yellow and Yellow Zones are, in their turn, the base for the zones on the Active Environment. They contain preparedness and threat environments. The zones with increasing heat levels are Red, Pink, and Purple, respectively, positioned on top of each other. The Red Zone indicates threats have been detected and necessitate a response, the Orange Zone is closely related to the Red Zone. The Pink Zone is where we find expected attacks and uncontrolled actions which

can lead to the ultimate escalation found in the Purple Zone where conflict is already present. Level 0 (grey) indicates inaction regardless of threats or attacks, or the lack of them.

In a more applied reading, Strategic power – Inaction – Fear form a Strategy axis. To its left, Threat Environment, Preparedness, Threat Detected, Attack Expected, and Conflict accumulate their energies in a CONFLICT trend that indicates an alert environment for detecting and pursuing, or mitigating a threat or an attack. To the right of the Strategy axis, Defining Expectations, Vulnerability, Balance, Instability, Dialogue, and Security accumulate energy in what we call PROTECTION. This energy indicates a good level of security which is able to scan for potential threats while developing strong defenses against them.

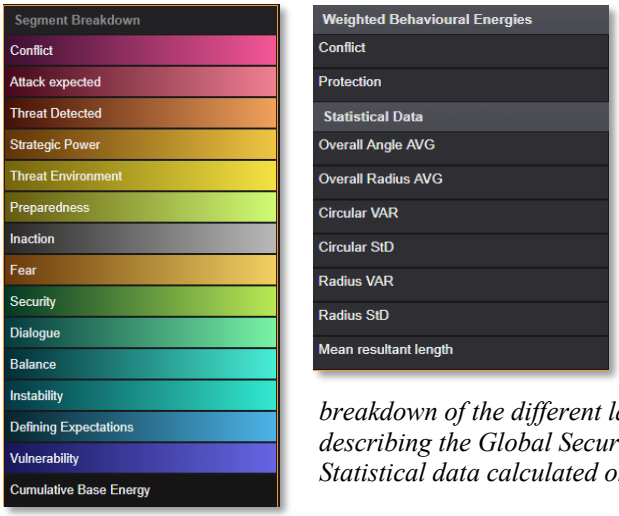


Figure 16. Left side: The segment breakdown of the different layers of the Social Energy Diagram describing the Global Security and Threat Momentum. Right side: Statistical data calculated on the circumplex data points.

EXAMPLE

Surveillance Technology

Surveillance is used by every country in the world to some degree. In many countries its use is highly controversial and there is a very fine line between keeping people safe and invading their privacy. Given that it is such a sensitive practice and topic, it is essential for all sides (government, tech companies, private citizens) to understand the social energies surrounding it. A series of queries in the Prisma Analytics Global Security and Threat Momentum tab illustrate the dynamics of collective moods around this issue.

A search for "surveillance" during the past few months will yield a multitude of results on both the Active and Reactive hemispheres, but with a markedly higher presence on the Active Side. They are clustered mostly in Threat Detected and Attack Expected. The fact that such a great number of the data points are located on Fear is highly reflective of present-day security situations; on the other side we see also a marked presence on Strategic Power – these are the two most populated zones. Increased surveillance clearly leads to crises that most likely end in conflict of some sort.

Select Date -- 1.07.2018 – 26.09.2018

Figure 17. Screenshot of the Prisma Analytics Social Energy Global Security and Threat Momentum tab, with one C+8 Concept query. Taken on 3 May 2019

Searching for "surveillance technology" will also yield results that are intensely Active and Reactive. However, there is slightly more balance in this case, with most results on the Reactive side in the Vulnerability zone. This indicates a feeling of exposure relating both to the effect of the technology on people's lives and its current inadequacies in providing sufficient protection. The Active Zone, however, retains the same emphasis on Threat Detected and Attack Expected, leading to conflict.

Figure 18. Screenshot of the Prisma Analytics Social Energy Global Security and Threat Momentum tab, with one C+8 Concept and one C+8 Science Technology associated queries. Taken on 3 May 2019

EXTENDED FUNCTIONALITIES

Text to circumplex

Figure 19. Illustration of the different layers of the Social Energy Diagram in the Text to circumplex tab

All tabs described previously mine the data that our system parses and stores in real time. Text to circumplex is a spin-off of these tabs, fit for users who want to explore their own unstructured, natural language text. Currently, the tool is usable with text in English, Arabic and Malay. The Social Energy Layers are similar to those in the Social & Political Momentum tool, as Text to circumplex explores the affective dimension of the full text that the user inserts in the text field on the left side of the screen. The automatically generated descriptive statistics follow the same structure that we have already illustrated in the previous sections. Figure 20 shows an almost homogeneous distribution of collective moods across the Social Energy Layers in the random sample of tweets using #metoo.

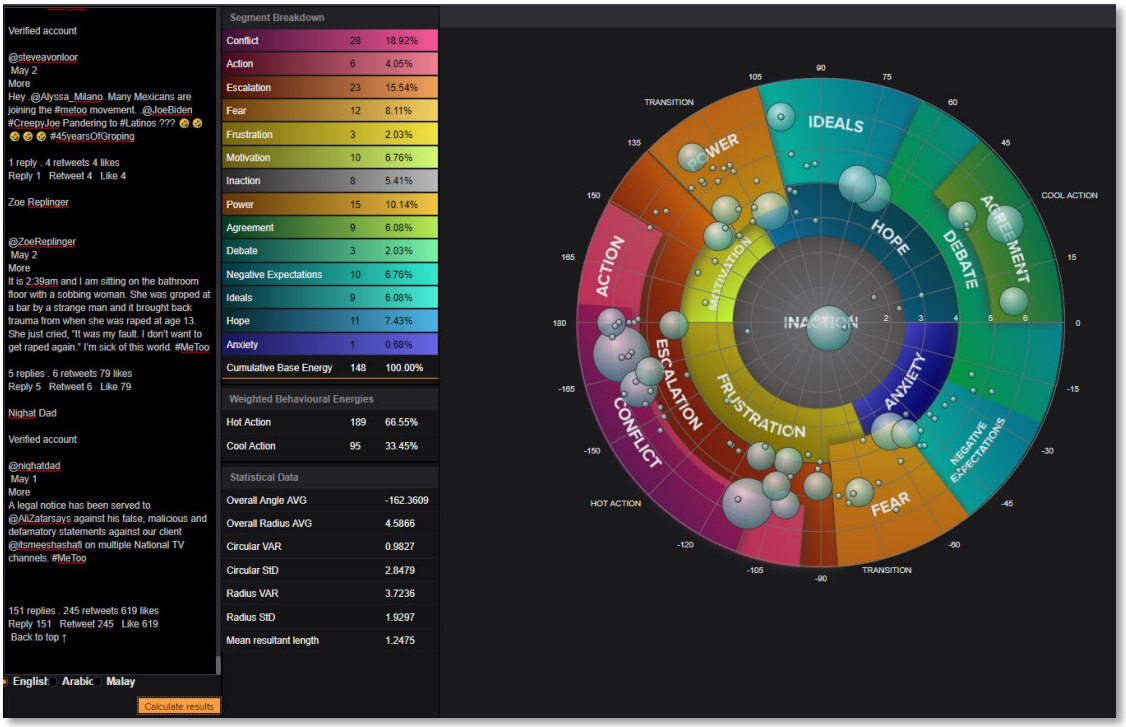


Figure 20. Illustration of the Text to circumplex tab with a random sample of tweets containing #metoo. Taken on 20 May 2019.

Circumplex Analysis

Circumplex Analysis is a window that opens in a new tab in the web browser which displays the circumplex and its Segment Breakdown, Weighted Behavioural Energies and Statistical Data panels. What is added to this window is two panels that display candlestick charts of various indicators that can be selected from a drop-down list. The main panel in this window displays, of course, the circumplex, but with a twist: the original query ran in the Social & Political Momentum tab, for example, is automatically re-run by our machines, on a temporal unit of analysis of one week, back casted 78 weeks in our data pools. As a result, the app generates 78 unique circumplexes, each with its statistical breakdowns on linguistic data, which can be visualized in an animated manner using a slider with play/pause buttons. The candlestick charts on the right of the window are synchronized with the 78 circumplexes, allowing and even inviting the user to explore how the fluctuation of various stock market indicators is associated or correlated with the linguistic indicators of collective mood and affect on the circumplex. This functionality is, as already mentioned, animated, and it is best understood by visiting our app. Figures 21, 22 and 23 illustrate some random snapshots of the 78 automated circumplexes generated for the query "self driving car" in C+8 Concepts:

Figure 21. Illustration of the Circumplex Analysis window, C+8 Concepts query "self driving car", Tesla and Aluminum indicators, 54 weeks ago. Taken on 18 June 2019.

Figure 22. Illustration of the Circumplex Analysis window, C+8 Concepts query "self driving car", Tesla and Aluminum indicators, 37 weeks ago. Taken on 18 June 2019.

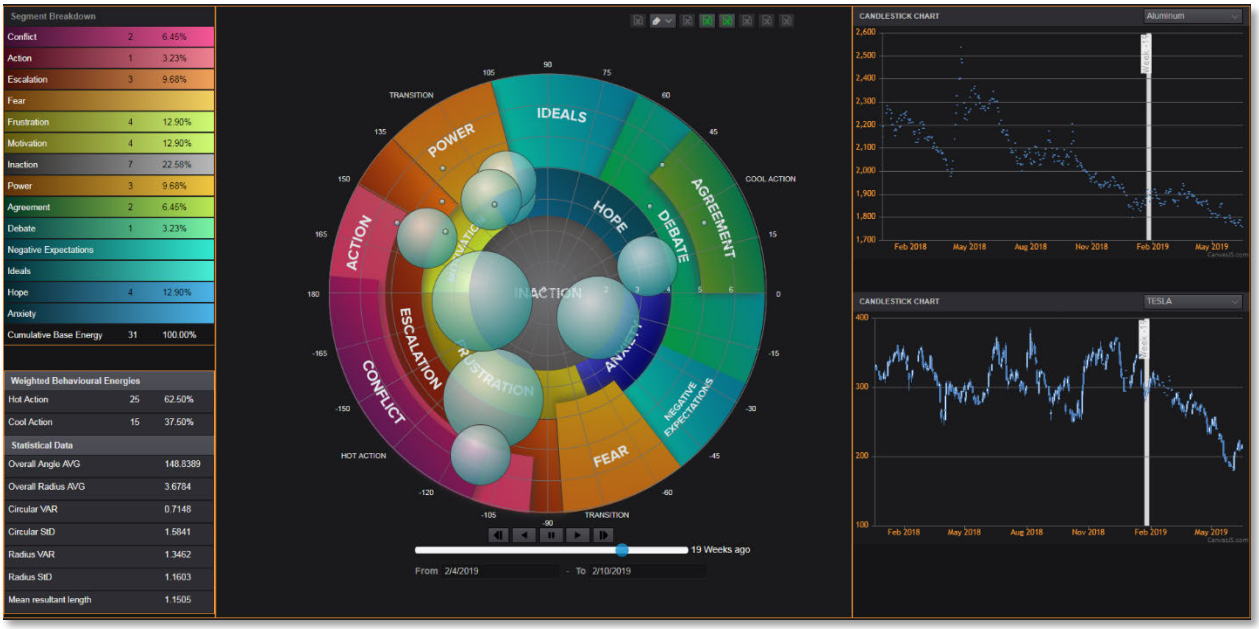


Figure 23. Illustration of the Circumplex Analysis window, C+8 Concepts query "self driving car", Tesla and Aluminum indicators, 19 weeks ago. Taken on 18 June 2019.

Export to Excel

Each circumplex tab, including the analysis window, offers the option of data export to Excel. The resulting file contains the query data, polar coordinates and frequency for each data point, the values in Segment Breakdown, Weighted Behavioural Energies and Statistical Data. The user can use these values either in themselves for further statistical analysis, or in combination with data from ecosystems outside of Prisma Proprietary App. The circumplex analysis window provides these values per week, for the 78 back casted weeks, opening to the user the possibility to generate custom made time series with various statistical analysis software.

CONCLUSION

The foundations of Prisma Analytics' Social Diagram and its intention to provide a useful tool that can identify, measure, and track social energies in an unbiased, scientific, and holistic way are firmly rooted in the convergence of Social Sciences and today's advanced technological capabilities.

Clearly, as enablers in our task, we are very pleased to offer academia the newfound benefits of the Social Diagram. Easy access to such qualitative and quantitative insights will add a new dimension to exploring, formulating, testing, and tracking the varied and diverging understandings of topics and themes across the Humanities throughout the ages. The subsequent discoveries will surely present academics with a greater opportunity to make inspiring contributions amid the ivory towers of knowledge.

The massive quantities of information that people currently produce about themselves, about others, about things, relations, and interactions that shape the world are part of a socio-technical phenomenon that is equally complex and simple. It is complex in its diversity of colors, languages, nuances, timings, technologies; it is simple in its patterns, trends, and rules of organization around nuclei of energy. The contextualization of the reality atoms in the C+8 model on the Social Energy Diagram is an exclusive, high premium source of knowledge about the current and potential dynamics of the world. We provide insight into collective initiatives of polarized action and into reactions and responses to such initiatives. We provide an elaborate guide to interpret these behaviors and the associated feelings that arise from our crowd data. The Social Energy Diagram is an excellent, cutting edge digital tool that offers contextual qualitative insight into the stories that frame economic and political events, while also allowing the user to draw their own conclusions about the universe. The diagram is equally directed and undirected – it provides expert guidelines as to what the data means, while at the same time encouraging a personal interpretation and explanation of behaviors. We use text as big data to look at the world through the Social Energy Diagram the same way we would look at the stars through a telescope. Words and phrases are the stars on a densely populated cultural and civilizational sky, where action and reaction happen in cascades and waves of energy.

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