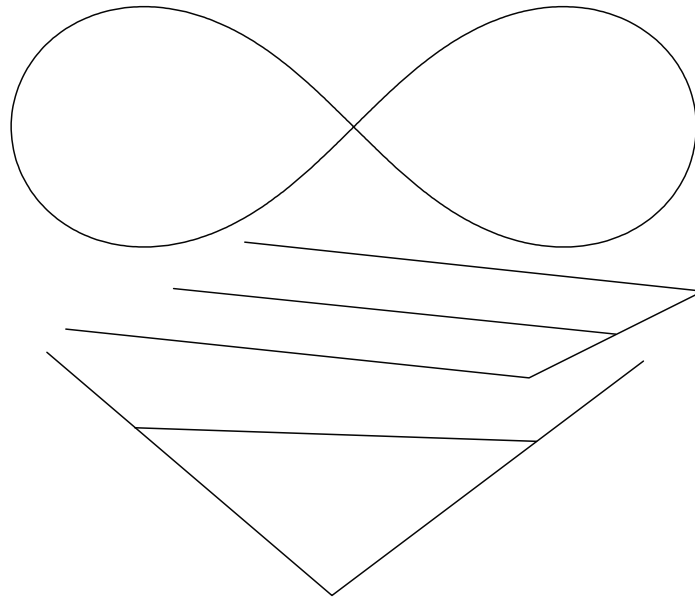


A Simple Pattern for Problem Solving and Measurable Credit [[video](#)]



A Universal Intelligence and ICO, IPO operating system.
Intent-content exchange protocol and network.

Abstract: Time is a de-facto natural currency used by processes to buy assets from nature. By building a data system about the assets created over time, we estimate the value of time as an expectation computation (a Stieltjes integral) of time with respect to assets (as a measure of sets) created over it. We encapsulate this information within the system, as sigma-additive "contribution certificates" generated for work of processes (doers, computers, machines) and investors, and stored in a immutable distributed database. Furthermore, we enrich the works with context information by introducing a context-free grammar derived by abstracting work (x) through equivalence principle (equation model $f(x)=y$) to describe the **Intent** (tasks, plans, ideas, and goals (y)) with respect to **Content** (world's assets like agents, places, events, and topics (f)), making every work meaningfully traceable to its purpose (goal w.r.t. assets), and automatically encapsulating procedural knowledge, allowing to parse work sequences into a technology map (of state transitions) capturing and explaining humanity's procedural knowledge. The time as currency can be mined directly with brain, processors, machines, or any processes that compute over time, while preserving the awareness of purpose (aligning the *Intent* of intelligence systems about *Content* (the world)).

Problems

Global coordination, analytics and funding at micro-level is hard.

(I) People don't quite understand technology and programs. Take any product that people need today, and it is possible in principle to manufacture it from raw materials with enough of human time and appropriate tool-chain-*defined* supply-chain. The know-how represents an alternative way to satisfy the people's needs without money and external supply chain. However, we don't have such a technology map in public. Most of the know-how is hidden in the corporate information systems, which are not widely open to study, and due-dilligence of projects is hard.

(II) People don't know what they want. While the AI technologies are advancing rapidly, we still have world conflicts between nations, corporations, and individuals. While this is not a major risk today, with the prospects of AI becoming superintelligent, it is an imperative for humanity to collectively define its goals to guide all optimization systems. We do not yet have a way to collectively define goals, people don't really know what they want.

(III) People can't easily acquire funding for experimental ideas without product prototypes, marketing material, etc., which generally require months of work to produce to begin exciting works. Ideally, a thinker would want to be able to have the good ideas naturally funded, just because simple textual description of them makes sense.

Solution

Introduce a language for coordination, analytics and credit.

To understand all humanity's know-how, we observe that the technology has evolved as a simple process of people in existing situations (f) thinking how to turn them into desired situations (y), and looking for actions to take (x), satisfying the equation model $f(x)=y$.

For example, a monkey in a cage (f) wanted a banana (y), so it used a stick to hit it (x). We can safely say that the current state of the world is a composition of such functions into a network of states (the known STRIPS model). If we know all the state transitions we can understand the know-how, and all what people had done through the the history boils down to thinking of their current situations, what they want, and acting on it.

Therefore, we start from the simplest non-trivial model, - the principle of equivalence.

$$(1) \text{ left} = \text{right}$$

Equality sign has been invented to represent the requirement of a condition that the left and the right side be equal. For example:

$$(2) \text{ World} = \text{Dream}$$

represents the condition that the World be same as Dream.

Introducing actors in (2), such as *us* in the World, and we can write :

$$(3) \text{ World(We)} = \text{Dream}.$$

Let's denote **World** by "f", **We** by "x", and **Dream** as "y", and we turn the standard mathematical equation:

$$(4) f(x)=y$$

into a tool to for humanity to self-actualize. We could say that fundamentally, living beings are solving (4) equation by trying to come up with better selves (x) to parametrize the world (f) to satisfy the equation with their goal state on the right (y).

To solve the (I)..(III) problems above, we have introduced a couple of innovations on top of the equation.

$$f(x)=y$$

f - world content

We observed that all variables in the world could be meaningfully grouped into *things*, and *thoughts* about them, and that it covers the space of variables with respect to which we could possibly describe the goal state (or "Dream World"). Therefore, we introduce five symbols to talk about the **world content**, namely: **Asset**, **Agent**, **Place**, **Event**, **Topic**, defined as so:

Asset: object of the world that have identity.
Agent: entity capable of volition, cognition, action
(instance of $f(x)=y$)
Place: location of world
Topic: thought of mind
Event: slice of timespace
(relating Agents, Assets, Places and
facilitating formation of new Topics
(hyperedges of propositions)).

When we formulate propositions about Assets, Topics are created, that refer to thoughts in minds as variables, so, we can possibly formulate higher order propositions that define hierarchies of thoughts. The **world content** is useful in defining goals.

y - our intent

We observed that all things that people made, were done by work to satisfy their **needs**, which are conditions for **world content**, and that people generally break down the pursuit of satisfaction of needs into mental hierarchies, starting from **goals** as sets of needs to satisfy, to **ideas** -- as transformations to independent variables of the world content that goal conditions depend on, to **plans**, which instantiate ideas with adding resources, and the **task** hierarchies under the plans. Therefore, we introduce five symbols to talk about **our intent**: **Need**, **Goal**, **Idea**, **Plan**, **Step**, **Task**, defined as so:

Need: A condition for random variables (Asset class or instance), which we use to define a Goal.
Goal: A set of desired conditions (**Needs**), which when satisfied, we consider the goal defined by these conditions - achieved.

Idea: relations that describe relationship between variables
(ones we can change, and ones that describe Goal conditions)

Plan: instance of Ideas with resources to realize Goals of
Agents (they may result in Events)

Step: non-terminal action needed to realize a Plan.

Task: terminal action needed to realize a Plan.

x - our actions

According to the introduced symbols, then we can *rewrite* the $f(\mathbf{x})=y$ as

$$[Content](\mathbf{Actions}) = [Intent],$$

where:

Content = Agents, Assets, Events, Places, Topics

Intent = Needs, Goals, Ideas, Plans, Steps, Tasks

The hypothesis is, that the symbols introduced are sufficient and efficient at expressing all society's work to understand all technology, and may serve as a convenient tool to share intent about content in the process of solving goal alignment problems.

Infinity Dialect

It is easy to see, that the symbols that had been introduced above, may correspond to reserved words of a language, about objects, processes, and programs:

Objects (F)	Processes (X)	Programs (Y)
(((
(Asset	(proc (program objects)),	(Goal (Need,...),
(Agent,)	...	(Idea
(Place,)		(Plan
(Event,)	...	(Step
(Topic,)		(Task
...		...
)))))))

Object: thing with identity

Program: sequence of operations on *Objects*

Process: instance of Program with resources

Programs thus can be viewed as descriptions of intent about content, and programming - as an expression of that intent.

It is important to notice, that sometimes programmer is limited by the computational resources that one can use, but it is critically important to have a way to allocate the resources and share computation results (e.g., resulting models and goods), as to optimize towards the pursuit of our common goals. Thus, it is critically important to keep all programs - computer programs, legal programs, government programs, etc. keep understandable to humans, and this language is for that.

Grammar

Connecting the symbols introduced above with the definition of a **Contex-Free Grammar**, we can say that the non-terminal symbols of the grammar are $N=\{\underline{\text{Need}}, \text{Goal}, \text{Idea}, \text{Plan}, \text{Step}\}$, and the terminal symbols of it are $\Sigma=\{\text{Task}\}$, and that when people think how to achieve a goal (set of needs), which we can mark as start symbol **S**, they come up with rewrite rules $R=\{N \rightarrow (N \cup \Sigma)^*\}$ to decompose it.

Just like poets who write verses as sequences of letters, society writes technology as sequences of works, and if we parse it into non-terminal symbols and rewrite rules ("ideas") to them, we just might understand it.

The Pattern

Processes (e.g., people, computers, machines) do the work in the world, they **spend time** and **create assets**. This pattern is all that was needed to create everything that humanity has ever created, which is the integral of time with respect to assets as a measure of it.

To define such integral, it is sufficient to record the work on tasks (actions - x), and add up the measure of its transition utilities with respect to our collective Goal (parts of path).

Given that we have a well-defined goal, the true absolute value of anything then is simply the amount by which it reduces our distance to that collective Goal. This can be illustrated as follows:

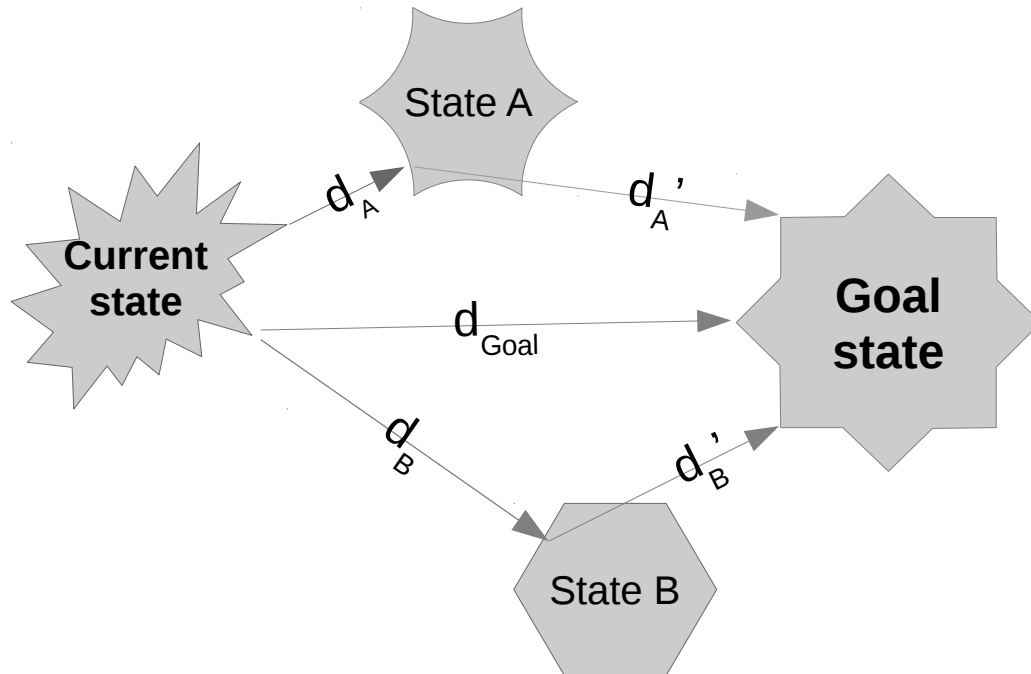


Fig 1. Real world states are never known precisely, and are defined as interval regions for values, which are geometric entities.

Taking action to **State A**, we reduce distance to goal by:

$$\Delta d_A = d_{\text{Goal}} - d'_A,$$

but while taking **State B**, we reduce distance to goal by:

$$\Delta d_B = d_{\text{Goal}} - d'_B.$$

Since the distance reduction in the case of **State B** is larger ($\Delta d_B > \Delta d_A$), taking the action to get to State B must be a more valuable.

Deciding reduces to the shortest path problem, when distance measure is well-defined, enabling us to obtain the lengths of paths by integrating intervals.

Measuring distance

To measure distance increments of works to Goals, we need data about Goal states in terms of assets, that define the states, as well as the changes in states.

Asset flows may occur in every element of system, where I/O (input/output) is performed, such as a tasks.

The below is a description of the specific mechanics of the investment system used on the Infinity Project, that integrates well with the multitude of currencies patterns of investment in existence, such as IPO, and ICO, project management and audit.

Infinity could can be thought of as a tool to run self-documenting ICOs and IPOs in manner that automates information collection to understand these projects, so that accounting, due-dilligence and valuation are automated, and expressed in a language understandable to most humans.

A Universal Intelligence System

We introduce a purpose "AI-**interbase**" (distributed database as interface) model, that instantiates a system, enabling generally binding to world's objects and defining arbitrary programs with respect to them, using any programming language, as well as agree upon them using any human languages, and operating system under any jurisdiction, and funding programs using arbitrary currencies.

FULL THEORETICAL DETAILS: THE DETAILS HAVE BEEN WORKED OUT, AND TESTED BY WRITING UNIT AND INTEGRATION TESTS, WHICH WILL BE REVEALED IN LATER VERSIONS OF WHITEPAPER. THEY RELY ON STORING AND BINDING TO OBJECTS, DATA, PROCESSES AND PROGRAMS. THE SYSTEM RELIES ON NAMESPACES, TYPESPACES, AND TERMSPACES TO PROVIDE SPACE TO BIND TO DATABASES OF WORLD'S APPS, QUERY AND USE THEM WITH ANY NATURAL HUMAN LANGUAGE AS QUERY LANGUAGE, OR THE INTERFACE PROVIDED TO ACCESS, MODIFY, CREATE INSTANCES WITHIN ARBITRARY APPS. THE SYSTEM IS BUILT TO EMPOWER USERS TO OPERATE ON THE WORLD, WHILE ALIGNING GOALS.