A Mathematical Basis for Representation of Social Activities and Judgement

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INTRODUCTION

goal-directed thinking. Well organized activities result in significant and optimal projects, solutions, and even patents that contribute to social welfare, personal achievement, and corporate goals. The converse effect is also a serious outcome. In this case, lack of concern causes disruption. Interleaved actions of the organized thinkers lead to progress and prolife activities such as love, peaceful transactions, diplomacy, etc. Conversely, actions of the dispassionate and unconcerned groups result in antilife activities such as crime, wars, brutality, etc. Restless cycles of progress and regress occur in numerous phases. Society being dynamic supports both the movements and in numerous directions, disciplines, and demographics. The inflexions result from social, cultural, and economic factors making sciences almost incapable of predicting events and extents of swings in prolife environments to antilife settings. Science may fail in these situations, but human discretion has favored "good" over "evil"; true over false, love over hate, or honesty over deception, etc. This prolife urge has prevailed over the millennia making human evolution a continual and ceaseless social process.

In this paper, we present a basis of economic reasoning in human minds, societies, and corporate environments to gracefully balance in deployment of resources and actions to maximize the expected utility gained by any action in life, culture, society, or corporation. The variations in human personalities, societies, cultures, and corporations are included by classifying the objectives and/or goals. The equations for an individual become evident and extend for societies, cultures, corporations and even nations.

THE AUTONOMY OF ACTIONS OR VERB FUNCTIONS (VF's)

Actions result in change and have a beginning and an end. Predicting the entire history from the primal beginning to an indefinite end is impractical, if not impossible. However, actions (big or small) can be reintegrated to Mega VF's (MVF's) or disintegrated into micro-VF's (μ vf's). Human perception fails to perceive VF's at either extremes but offers a basis of controlling and monitoring the movements of individuals, societies, cultures and corporations. Computer scientists limit the variability of VF's to be in in every perceived direction of knowledge encompassing the actions or VF's by seeking to limit time, space, objects to accomplish any fragmented VF of micro instruction in the hardware.

Verb Functions (VFs) in Computer Sciences

Verb Functions are deployed extensively in all disciplines and in all aspects of computers ranging from global universally large programs, such as Space travel, Solution of matrix problems, Solutions of non-linear problems, etc.) to very specific problems**,** such as design and performance analysis of gating devices in integrated circuit (IC) chips, etc.). The integration of VF's is customized to larger more encompassing VF's thus creating a specific hierarchy of programs and/or series of related programs. Such integration is deployed in the hardware to build more and more complex VLS I chips**,** wafers, devices, and systems.

More Specific Knowledge Encompassing VF's

Verb functions are embedded in knowledge[1] environments, such as who does what or which VF, when, how, etc. Actions form a basis of knowledge; and each sentence (an element of knowledge) has at least one verb (or an action) embedded in it. In essence, a trail of knowledge is created when a series of actions takes

place. An entirely static (dead) world has no actions whatsoever in it and no knowledge associated with it. Communication becomes necessary between any objects to convey the effects of actions on one object upon another and the effect of reaction of the recipient object communicated back to the first thus invoking life for the objects.

Objects, actions, and communications are essential to form triangles, triads, tripods to mark the structures of deeds and corresponding structures (bodies) of knowledge. Figure 1 illustrates the processes the build how actions become larger deeds and how smaller bodies of knowledge become larger bodies of knowledge. These processes cast images in the minds of human beings and form neural nets of neurons in physiology. There is value, size, and significance attached to these structures that can be economic, mental, and/or spiritual and can live beyond the human life that builds and hosts these "goodly" structures (for significant and prolife deeds) or they die in the life that builds and hosts such "evil" structures (such as Covid, for deadly and antilife deeds of viruses and crimes).

INDIVIDUAL, SOCIAL, CULTURAL SETTINGS

The Prolife Movements in Environment

Great social benefits, inventions, masterpieces, shrines, etc., also emerge from large, positive, and prolife agents. Their deeds usher in a peaceful, just, and rational outcome. Golden, peaceful, and sometime immortal monuments are built in human evolution towards and being a more intellectual being. In a sense, sciences follow these guidelines as the disciplines adhere to the principles of truth and rationality. Logic and reason supersede notions and discontinuities.

The Anti-life Movement in Environment

Processes eluded in section 3.1 can also be universal. These occur in humans, social entities, groups, societies, cultures and even nations. The end effects are tenuous; as becoming petty, large, extreme, national, or even international. Such events can have profound environmental effects. On the negative end, damages, disasters, devastations, etc. can result by large negative social agents. Large, anti-life noun objects NO^{-}'s cause and ignite such events. The anti-life agents wage a cruel, and destructive war. The lifespans are respectively short, unjust, and transient. The cyclic reversal duration is short and equally painful. The social image mass of these social agents is low, and they follow higher frequency vacillations. Such effects are also evident in the behavior of petty planets, electrical circuits, lower valency elements, etc. Restlessly such noun objects try to find peace and justice.

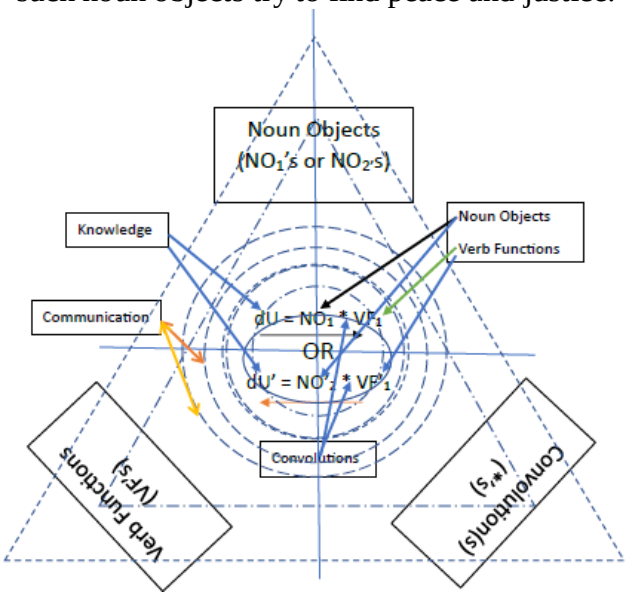

Figure 1 Representation of a dialog (large triangle) involved in a social interaction and communication between NO_1 and NO_2. All transactions between NO_1 and No_2 involve some action VF_{12} and reaction VF_{21} . The interaction continues and the associated knowledge also builds larger deeds are thus accomplished by cascading smaller VF's.

ECONOMIC, STABLE, AND STATISTICALLY JUSTIFIABLE BASIS OF HUMAN BEHAVIOR

Effort Involves Expenditure of Resources

Time, energy, action, and money are the chief resources considered most important to make perform significant deeds. Numerical values(s) or the expression of effort designated as can thus be written as Effort *E= f(e,t,a,etc.)*, where *e* = physiological, mental, and/or spiritual energies, *t* = time in wide ranges such as clock cycles to cosmic time, and *a* = physiological,, robotic, machine, or any other programmed and/or computational activities.

The measure of E, or its graphical depiction brings about a change in the expected utility [2] (EU) function of the gain resulting from the expenditure of resources. In linear systems, EU and E (i.e., effort and gain in utility) are proportional. However human feelings, gratification and their measure of resources are not linear such an oversimplification is not justifiable. For this reason a mathematical or a statistical bypass is necessary (Section 4.2) to circumvent the frailty of human nature by grouping human nature and profile as (i) "good", (ii) neutral, or (iii) as "evil". Even so human beings may be good in some directions and evil in others. Hence a set of statistical curves becomes necessary. Barring these mathematical issues (that the computers can handle effectively), Section 4.2 presents a methodology to proceed of finding a possible economic path to solving the human behavioral problems in the same fashion as economists try to predict economic behavior of national economies.

Human Behavioral Groups

The three groups good, neutral and evil are sensed rather than be identified based on numerical data.

Case (i)

$\int_{t1}^{t2} U(t).\,dt = dU_i = Ut_2 - Ut_1$; Expected $dU]_{t2}$ is generally positive by noble and positive humans NO+ (such as Carter, Obama, etc.) with noble, extraordinary, and high goals.

The value of dU_i enhances T, V, or B, and/or also decreases D, A, or H proportionately, or α_i times dU_i, where α_i is curvature factor with positive or negative (±) slopes. Thus, the personal (or social) effect E is desirable.

Effect $E = \alpha_i \,.\, dU_i$, or in general E = a customized function of (dU_i). The net effect is desirable and associated with social leaders (such as Carter, Obama, etc.)

Case (ii)

$\int_{t1}^{t2} U(t).\,dt = dU_{ii} = Ut_2 - Ut_1$; Expected $dU]_{t2}$ is generally insignificant for mediocre and ordinary humans NO± (such as knowledge workers, wage earners, and insignificant humans, who pursue trivial tasks. The value of dU_{ii} is neutral to T, V, or B, and, also to D, A, or H. on a statistical basis.

Case (iii)

$\int_{t1}^{t2} U(t).\,dt = dU_{iii} = Ut_2 - Ut_1$; Expected $dU]_{t2}$ is negative by disruptive and degenerative generally humans NO_{iii}. The net effect is undesirable and undesirable social leaders, (such as Putin, Mafia, etc.) with evil, hurtful, and uncivil goals.

The value of dU_{iii} enhances D, A, or H, and/or also decreases T, V, or B, proportionately, or α_{iii} times dU_{iii} where α_{iii} is curvature factor with positive or negative (±) slopes. Thus, the personal (or social) Effect E is undesirable. Effect $E = \alpha_{iii} . dU_{iii}$, or in general E = a customized function of (dU_{iii}), and the net (personal or social) effect is undesirable.

ECONOMIC STABILITY WITHIN SOCIAL ORGANIZATIONS

Longer term stability accrues by the diligent order and structure that build social organizations. All social entities have an innate need structure that drives them. Individuals, groups, societies, cultures, corporations, and even nations have such need structures. Freud [1], Maslow [2], and Ahamed [3] have documented such structures. Simon [4] and Ahamed [5] have also published evolved need structures for corporation based on social and financial needs of corporation.

In this paper, the need of a balance between the expenditure of resources and the survival of social entities are presented that monitor social entities to contribute to making the society better by social groups presented in Section 4.1, or worse by Social groups in section 4.3. Largely, the efforts of the social entities from group in Section 4.2 have little effect on of the longer-term movements in the society, even though this group is responsible for providing the solutions to short term stability within the society.

The social group classified in Section 4.2 is a great majority of the populous and are recipients of immediate and personal gains (such as money, gratification, reward, etc.) for their effort E (see Section IV) for their effort. The longer-term social movements, both positive and negative, result from sustained, perseverant, and cohesive effort E, presented in Sections 4.1 and 4.3.

Balance between Expected Utilities ([dU]1t2 and [dU]2t2) and Effort (EU1 and EU2)

Humans and social entities invariably weigh their actions and effects to the best of their ability and current information knowledge. Both effort and utilities have numerous directions, and a direct cause-effect relationship is not available. For this reason, only their estimated values can be approximated and weighed.

Maximization of Expected Utilities ([dU]1t2 and [dU]2t2)

Personality disposition of individuals, and policies, attitudes, and prior decisions of the social entities (corporations, cultures, and even nations, etc.) affect the expectations at this stage of the steps in the process. Two radically different outcomes (5.2.1 and 5.2.3) are feasible. In general, the expected utility is maximized by economic activity [6].

Benefit and Rewards in Society

On the positive side, the group in Case 4.1 will persevere to benefit and reward the society by (a) increasing the VF's^{+} and (b) concurrently reducing the VF's^{-}; thus leaving behind a positive movement in the Knowledge trail helping society move forward into human, corporate, cultural, etc. directions.

Little or No Effect in Society

The group in Case 4.2, on the neutral side will do little or help or hinder society by being passive. Being on lookers they leave behind no long term in the Knowledge trail helping society but cycle forward or backward causing noise or jitter. The purpose is essentially to provide momentum in the movement butvery little to change it.

Damage and Hurt in Society

On the negative side, the group in Case 4.3 will struggle and damage the society by (a) increasing the VF's^{-} and (b) concurrently reducing the VF's^{+}; thus, leaving behind a negative movement in the Knowledge trail helping the society backtrack in human, corporate, cultural, etc., directions.

OVERVIEW OF THE HUMAN AND MACHINE PROCESSES IN SOCIETY

Society has perfected the admixture of human effort and the artificial tools to derive the best results. Derived utility is maximized as the bulk of the physiological work is shifted onto the tools, leverage, mechanical gadgets, and devices. In the modern age, the trait is continued to minimize the repetitive calculations and logical functions. In the Internet age, human effort id reduced still further by communication devices and highspeed networks to communicate faster and accurately. In the vein, this section enhances the speed and efficacy of human beings by social machines and networks. The Artificial Intelligence HW, SW, and firmware facilitates the mundane programmable functions in numerous adaptive and intelligent machines that can play an assistive role in making life more friendly and efficient to provide more "leisure time" originally envisioned by great philosophers [6,7] of the past.

In this section, we also extend the concept of Flowcharts in the design for social entities and machines to get the functions accomplished accurately precisely as typical computers do by simulating the functions of IC's, VLSI's, devices, etc.; software, systems, operating systems; etc. Human behavior causes the greatest inaccuracies in these Social Flowcharts; however human behavior is becoming increasingly predictable based on principles in economics and social systems.

In Figure 2, a flowchart of social processes is presented. Although the level of certainty does not match the dependability of flowcharts in engineering design, the diagram depicts the beginning, middle, and the end of the human and machine efforts that bring about small and large changes in societies. In individuals, corporations, societies, cultures, etc. the logistics of cause-effect relationship are presented. The resulting sociological movements in human and social entities to depict the progress or the regress of individuals, corporations, societies, cultures, and (even) nations covering short and long timeframes (such as a cycle time of a microinstruction in a computer and cultural cycle time in a nation) are also represented. This illustration shows how elements of knowledge (dk's, see Section IV) play a role in moving social entities as time is shortened or prolonged. Both the progress (top half of the diagram) and regress (lower half of the diagram) are illustrated. The roles of humans, organizations, groups, and the AI machines and networks indicate the progress and the regress in boxes on the left side of the flowchart. The processes continue in a cyclic mode until they are intervened by reversal of the positive and negative roles of individuals and entities. These are the primary reasons for social ripples in around social entities.

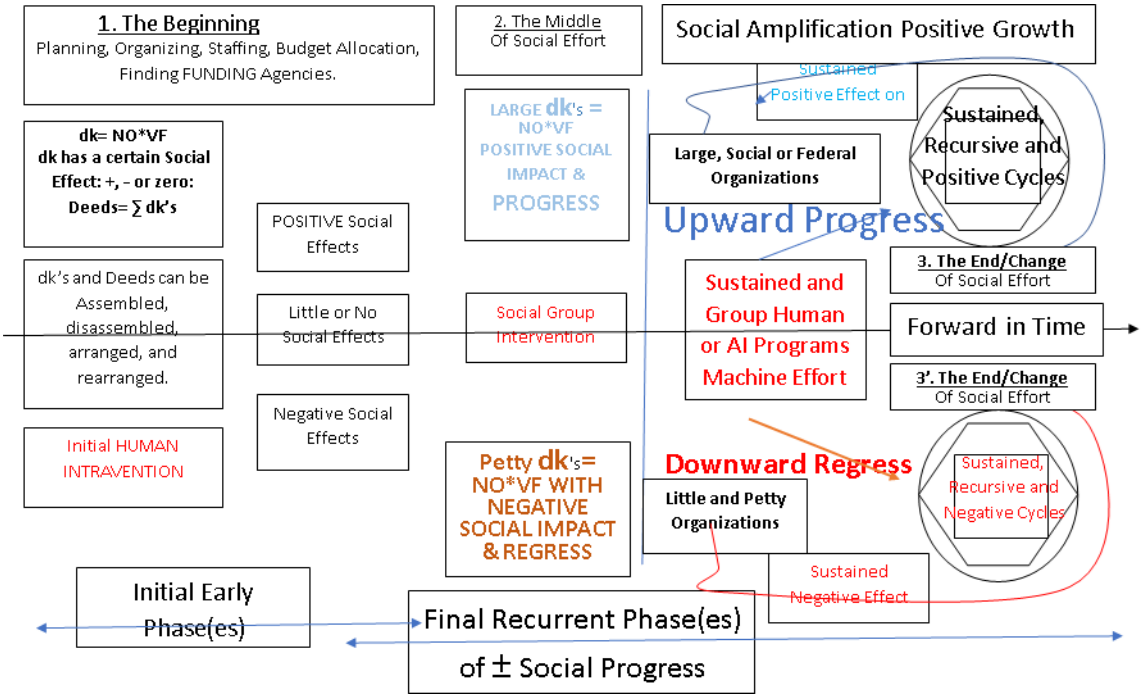

Figure 2 Social Flowchart of the Movements in human and social circles, social entities to depict the progress or the regress of individuals, corporations, societies, cultures, and (even) nations covering short and long timeframes (such as execution time in computer or cultural cycle time in nations). This illustration how elements of knowledge (dk's) play a role in moving social entities as time is shortened or prolonged. Both the progress (top half of the diagram) and regress (lower half of the diagram) are illustrated. The roles of humans, organizations, groups, and the AI machines and networks is shown is indicated in textbox between Progress and the Regress boxes on the left side.

CONCLUSIONS

Human activities and judgement are presented for their eventual programming and simulation of human effort that influences social progress or decay of personalities and social entities. The social influences and the logistic scientific steps to help move the society forward and deter the slide the society move backward are presented in this paper. Illogical and arrogant social leaders can defeat and overturn the finding and prediction of any unmonitored positively primed social machines as much as scientific and ethical leaders can defeat and overturn the results from negatively primmed social machines. Timings and social conditions are of essence in the reversals. The role of Wisdom derived from accumulated Knowledge (both stored as wisdom bases (WB's) and knowledge bases (KB's) in the AI based social machines) can reduce the severity of the misdeeds of negative leaders.

Finally, a flowchart of the activities from their inception to the end are presented to identify the positive deeds that initiate, deploy human progress, and tend to propagate human betterment and progress distinctly from negative misdeeds that start, deploy, but tend to defeat and derail human bondage and progress. The social implications are vast between the ideological different nature of individual and entities causing irregular and noisy social ripples that influence almost every member of the larger human societies. Effects of time, social attitudes, and the role of selflessness or selfishness of the influential leaders are stored in the knowledge bases of the social machines that eventually cause or even trigger the change from progress to regress and vice-versa. Predictive Intelligent Agents (IA,s) provide the status of social health of individuals and entities with a certain degree of confidence for monitoring social dynamics.

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Food Notes

[1].Knowledge becomes specific when the answers to a series of questions (who (a noun object (NO)) does what (VF), what, why, how, when, for how long, in which mode was the VF done.) Mire specifically how the NO accomplish VF is symbolically tied to NO by a Star (*) code, that represents a convolution between NO and VF or between VF and NO. Thus, an event of VF being accomplished as NO * VF and corresponding element of knowledge (dK) generated by the event is symbolically written as:

dk → NO*VF (forward) and dk' → VF * NO (reverse).

Cascading two VF's, dK becomes ∑ dk's or →→ ∑ NO*VF. These operations are symbolic and performed by Knowledge Processor Units or KPU's (see Reference [1]). The detail in every direction become unnecessary for practical use. Hence, the representation of dk is limited to who (NO) does what (VF) and how (*). It carries enough detail to build a structure of knowledge above as dK = ∑ dk's or as dk = ∑ μdk; s. Note that dK represents a larger body of knowledge (BOK), dk is current bok and μdk is microscopic bok.

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[2].Expected utility is an economic measure of the gain that may be expected from the deployment of resources.