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THE PHYSICS OF HUMAN BEHAVIOUR

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ABSTRACT

The Human Behaviour, Human Behaviour Thermodynamics Themed Article 'The Physics Of Human Behaviour' by Vikram Singh consisting Four Parts Quantum Mechanics & Existence of Consciousness and Subconscious, Entropy & Human Behaviours, Statistical Approach of Human Behaviour, Chemical Kinetics of Human. Everything in this article is based on the hypothetical consequences / thought experiment based. In this article we will go to find the relation between physics and human behaviour. This hypothetical research may be used to understand of behaviour of human in different states of Environment.

I. INTRODUCTION

Quantum Mechanics & Existence of Consciousness and Subconscious

Let us to understand human behaviour we take concepts of Quantum Mechanics. Nobody understands consciousness and how it does work. Quantum mechanics is the best theory to describing the world at the nuts-and-bolts level of atoms and subatomic particles. Perhaps the most renowned of its mysteries is the fact that the outcome of a quantum experiment can change depending on whether or not we choose to measure some property of the particles involved. In Quantum Physics we are well known about Schrodinger's Cat experiments. In Schrodinger cat experiment, Schrodinger's place a cat in a box with tiny bit of radioactive substance. When the radioactive substance decays, it triggers a Geiger counter which causes a poison to be released that killed the cat. This is a thought experiments. This experiments follows law of Quantum Mechanics i.e. Law of superposition, this means the radioactive atom start to superimpose their state of 'going to decay' and 'not going to decay', the cat end up both dead and alive at the same time[1,2]. The same sense we are going to apply in human behaviour of consciousness & subconscious. In human behaviour as we seen the sometimes the things going on our mind but we don't know these are going in either on subconscious or on consciousness. This case we can understand by using Quantum Superposition theory in which both all the state are getting collapse and give new state. But here we can assume that in the above case the both the consciousness and subconscious state get collapse, get one of the state either consciousness or subconscious state.

The all the above point can be expressed in mathematical equation as.

$$\Psi_{\text{Final}} = \Psi_{\text{consious}} + \Psi_{\text{subconcious}}$$

$\Psi_{\text{collapse}} \rightarrow$ Wave function of collapse state

$\Psi_{\text{concious}} \rightarrow$ Wave function of conscious state

$\Psi_{\text{subconcious}} \rightarrow$ Wave function of subconscious state

Wave function is an essential elements of Quantum Mechanical system and help scientists to find information about system and denoted by $\Psi(r,t)$ or $\Psi(p,t)$. The wave function Ψ is find by solving a second order differential equation called Schrodinger's Wave Equation[3] and given as:

$$\frac{ih}{2\pi}\frac{\partial\Psi}{\partial t} = \left[-\frac{h^2}{2\pi}\nabla^2 + V\right]\Psi$$

Uncertainty principle and Human Ideology:

Quantum mechanics describes behaviour of tiny particles that make up matter in the universe called atoms and their sub-atomic components but not applicable at larger scale. As we all are well known about all the things in the universe that are made-up of atoms including Human, it means the uncertainty principle of Quantum mechanics also applicable in Human Behaviours. So in this section we can try to relate uncertainty principle with human behaviours. We are well known about human body is made-up of atoms, also well known about an atoms is made up of electron proton and neutron. In big world one can know that in which state objects and what is its route to reaching in next state and one can predicts when objects should arrive at the next state. But in atomic world humans predictive power disappears i.e. we can't known exact location and momentum of atomic particles, but one could calculate the probability that the particle may appear in a certain spot. Just as

uncertainty pervades the subatomic world, it also affects Humans decision making process. Uncertainty and affect are fundamental and interrelated aspects of the human activity. Uncertainty is often associated with negatives affect, but it is also associated with positive affect. Uncertainty is universal, touching almost every aspect of our lives. Humans would consistently weigh the objective values of two options before choosing between them. But in reality, people don't always work that way; their subjective feelings about a situation undermine their ability to make objective decisions. The Uncertainty principle formally limits of precision to which two complementary observables can be measured & establishes that observables are not independents of observer[4]. This statements related to Human aspects which can helps and concludes that nothing in Human life is exactly and all the things happening in their life is interrelated and can affects one another. Also we can say that the things true for one can becomes wrong for another one.

Entropy & Human Behaviours

In universe, due to occurrence of natural process that are irreversible, entropy is increasing and ultimately it may reach that the state of maximum entropy when all the temperature will be equalized and no work would then be possible[5]. Entropy is a mysterious state function and its existence directly related to internal energy so human physiology it is directly related to Blood Pressure, heart rate, Skin temperature[8] and also affect Human Behaviour in very large scale. Since Entropy is directly related to Blood Pressure so it also affect neurons which create disaggregate Human Behaviour and completely distinct from last one. Similarly entropy is directly related to Heart rate and it also became the reason of nonidentical human behaviour from last one. Entropy is a thermodynamic property that refers to the degree of disorder or randomness in a system[6]. Entropy is the energy per unit temperature that is unavailable useful. Entropy is also related to the arrangements of things in life. In ours daily life the contribution of entropy is highest. In this section, we review about contribution of entropy in Human behaviour but it is very typical to explain it because it is interrelated to every aspects of life. The scientists of USA have been use entropy to know about Human Physiological System[7].

In understand affect of Entropy in Human Behaviour, we must appreciate that for every microstate of system which corresponds to a fixed energy and other extensive parameters, there are number Ω of compatible microstate and the system could be in any one of them. Since according to Quantum mechanical approach that the system will have discrete set of energy eigen-states, are countable[8]. If we consider that the probability of a given microstate $\frac{1}{\Omega}$, the entropy is a function of the number of microstates.

i.e. $$S = f(\Omega)$$

We well know about that the in natural process in which entropy increasing constantly. But if entropy increasing monotonically then [9]

$$S = k\log\Omega$$

This equation also help scientist to under human behaviour in a great manner because in this equation the entropy is proportional to the logarithm of the number of microstate in a given macrostate[9].

Since third law of thermodynamics is related to entropy and so it is necessary to consider third law of thermodynamic to understand human behaviour. The third law of thermodynamics is concerned with the limiting behaviour of system as the temperature approaches absolute zero. The entropy of a thermodynamic system in internal equilibrium approaches a universal constant which is independent to phase as temperature tends to absolute zero[10]. The above concept deals with logically with human behaviour in the process of getting salvation. In this case of getting salvation Humans put away all intent and removed all the randomness from his inside. This above sentence is identical with third law of thermodynamics. Since getting absolute temperature is impossible and similarly to get salvation is impossible for human.

Statistical Approach of Human Behaviour

In statistical physics that use methods of probability theory and only a tool for dealing with the large populations and approximations. The statistical physics also relate microscopic parameters that fluctuate around an average. Statistical approach can become more helpful towards to known about Human behaviour. The phase space[11] of statistical physics can be related with human behaviours by considering human as a mechanical system. A phase space is a in which all possible state of Human(Loving, angry-ness, consciousness,

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caring, tension-able) are represented with each state corresponding to a unique point. A concept of ensemble[12] can also relate with human behaviour. The ensemble in human behaviour define as the collection of large number of assemblies of thought or expression which are essentially independent to each other but which have been made microscopically[13] identical as possible. These two important concepts of statistical physics can help Scientist to simulate human behaviour morally in the case of changes in Human behaviours in every second.

In order to explain human behaviour, we can use statistical approaches in which take two different families such as

1. In first family a man has approach towards 10 persons so the attraction (philia or neikos) towards one person is around 1/10.Here I am going philia or neikos in terms of energy.
2. In second family a man has approach towards 5 person so the attraction(philia or neikos) towards one person is around 1/5.

When we compared both these points, we see that the attraction in second case higher toward each person as compared to first case

On the basis of these points we conclude that the attraction increases exponentially

Mathematically we can express as

$$N = A\, e^{\beta . E_i} [14]$$

Here N – Number of person, constant, ß= $\frac{1}{kT}$,k is Boltzmann constant & Generally E_i in statistical physics represent energy but here we are going to simulate human behaviour in this case we are define E_i as Attraction or repulsion energy between two or more living thing.

Chemical Kinetics of Human

Chemical kinematics or reaction kinematics is the branch of Physical Chemistry which deals with the rate of the chemical reaction. The chemical kinetics is disproportionate with thermodynamics which deal with the directions of the process occurrence but do not predict about the rate of reaction. Thermo-chemistry was our first science subject, involved nontrivial mathematics. It is great seems to appropriate to apply thermo-chemistry to understand Human behaviour before trying something harder.

Let us suppose that an chemical reaction just similar going inside the human mind which is responsible to action of human behaviour, which is just like a reversible reaction in chemical kinematics given below:

$$m_1A_1 + m_2A_2 + m_3A_3 + \cdots + m_iA_i \leftrightharpoons n_1B_1 + n_2B_2 + n_3B_3 + \cdots + n_iB_i$$

As in chemical kinematics, to find rate of chemical reaction to understand in how much time we get product and predict the basic properties of the reaction similarly in order to predicts human behaviour due to above reaction which is going inside the human mind we also find the rate of chemical reaction in term of Equilibrium constant & so the Equilibrium Constant (K) of the above reaction is given as

$$= \frac{[B_1]^{n_1}[B_2]^{n_2}[B_3]^{n_3}\ldots\ldots\ldots\ldots[B_i]^{n_i}}{[A_1]^{m_1}\,[A_2]^{m_2}\,[A_3]^{m_3}\ldots\ldots\ldots[A_i]^{m_i}} [15]$$

Represents concentration of chemical composition in atom per cubic centimetre.

Also we know about the change in Gibbs free energy ΔG, ΔV is Change in Volume & ΔS is the variation in entropy at pressure P and temperature T then we can find the equilibrium constant by using following relation:

$$K = \exp\left(-\frac{\Delta_r G}{RT}\right)$$

The value of the Gibbs free energy can be calculated by the expression

$$\Delta_r G = \Delta_r H - T\Delta_r S = \Delta_r E + P\Delta_r V - T\Delta_r S$$

Since in thermodynamics, the Gibbs free energy (or Gibbs energy) is a thermodynamic potential that used to figure out the maximum reversible work that may be featured by a thermodynamic system at a constant temperature and pressure. So it's analogous in Human's relationship we defined a term relationship free energy that is function of internal energy of human relation and deformation inside Human behaviour which help us to figure out the maximum reversible relation work between different families that may be performed by a Human at normal atmospheric condition.

II. CONCLUSION

In this article, by apply several physics concepts with Human behaviour to formulate Human behaviour. Human behaviour is an undefined puzzle but we try to formulate this as by the concepts of Quantum Mechanics, Statistical Mechanics, Chemical Reaction and several other concepts. These concepts are not enough but may be sufficient to defines several parameter of Human behaviour and Ideology regarding to other and their relatives.

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