

Nature Inspired Computing

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Abstract --Nature has always been a source of inspiration where we find many things very complex. Over the last few decades, it has stimulated research on new computing paradigms and showed a path of different fields which are very unique and new like 'Nature Inspired Computing', 'Evolutionary Computing', 'Complexity Theory', 'Swarm Intelligence', 'Artificial Immune System' and 'Neural Networks'. In this paper I examine and review about the impacts of computing paradigm like called Nature Inspired Computing in complex problem solving.

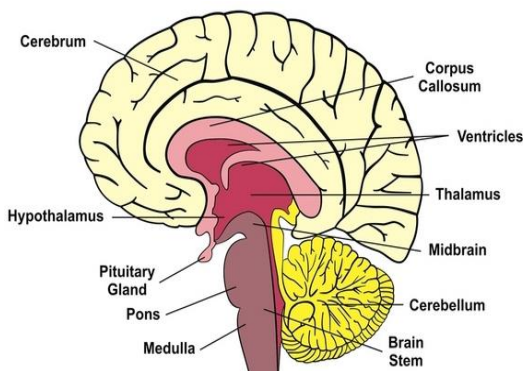
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INTRODUCTION

In this world we see many simple things which hide their huge complexity where this complexity of their nature is used for our latest and advance inventions. For example, working of our brain, intercommunication of Ants and Bees, communication of aquatic life, etc., We find certain rules and observations in this Nature Inspired Computing like self-organization, spontaneity, random virtualization, etc.,

Though we found many inspirational things the problem that puts us back is that we are unable to find the way or the engineering that made such complex things very simple to work and though we have very advance technology they are rather limited to face the growing complexity of software systems but in other hand nature inspired computing reduces considerably the algorithmic complexity through software. For this reason, we find solutions for our problems with the help of Nature Inspired Computing Technology. We see natural modals like.

HUMAN BRAIN



To understand the complexity of brain let we see few questions

- 1) How do we react very fast when we see any dangerous things near us?
- 2) How can we sense all colours and smells of many things with fraction of seconds?
- 3) How do we judge everything?

For all these questions brain plays a major role of spontaneous reactions. In brain neurons communicate very fast by generating electric pulse. This same technique is used for designing the robots which act spontaneously. The nervous system of human brain is base modal of very complex network systems like proper management of World Wide Web.

SWARM INTELLIGENCE:

ANTS:

Another important field where we see Nature Inspired Computing is this Swarm Intelligence. Here we see interaction between group of ants i.e. colonization of ants.



To know this, we see few questions like

- 1) How do ants build their colonies, without any central control?
- 2) How do species evolve without any direction or imposed objective function?

Now by seeing this questions let us see where this questions related in modern world problems

- 1) Can we build self-adapting, self-organizing, and evolving computer systems and Programs just like ants as we saw?

Answer for this question may not be such easy because there is a huge complexity in this technique but if we use the way where ants are using this problem would be solved very easily.

This is the power of Nature Inspired Computing Technology.

BEES:

From seeing honey bees also, we perform many things which are very complex to us. We see few questions about honey bees

1) How does honey bee communicate with each other and how do they assign their work with other?

Now problem related to general life

2) Is it possible to design a robot that could assign its own work according to its capability?



In latest technology we see many algorithms and Techniques that use honey bee communication technique. Like robots were designed in such a way that they were allocated their work with human less effort and when task is completed they automatically they will change their work.

APPLICATIONS:

With help of this Swarm Intelligence image sensing is done in game coding.



Automatic coding is done internally to get such images

CONCLUSION:

Nature Inspired Computing as being given a remarkable success in the field of technology. By this method we can solve many problems very easily. By understanding nature, we can discover many things which we can't solve naturally

REFERENCES:

1. J. Kennedy, R. C. Eberhard, and Y. Shi. Swarm Intelligence. Morgan Kaufmann, 1 edition.
2. Yoshida, Z., Nonlinear Science: the Challenge of Complex Systems, Springer.
3. M. Dorigo, V. Maniezzo, ET A. Colomi (1996) Ant system: optimization by a colony of cooperating agents, IEEE Transactions on Systems, Man, and C
4. Keedwell E., Narayanan A., (2003) "Genetic algorithms for gene expression analysis"
5. W. G. Hunter and J. R. Kittrell. (1966). Evolutionary operation: A review. Technometrics.
6. Kannan and S. N. Kramer (1994). An augmented Lagrange multiplier based method for mixed integer discrete continuous optimization and its applications to mechanical design. ASME.