Analysis of evolution of specific strategyin the pool of strategies.

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Background:

* **Prisoner's Dilemma** is a game theory simulation used by sociologists to study human interactions. It shows that two individuals might not co-operate, even if it appears that it is in their best interests to do so.
* It was originally framed by **Merrill Flood** and **Melvin Dresher** working at Rand in 1950.
* The comprehensive review was done by **Axelrod** and **Dion**, in 1988.

**Robert Axelrod** conducted the competition where the scientists,mathematicians came from all over the world and submitted their strategies out of which the ‘**TIT FOR TA**T’ came out to be the best evolving strategy.

Aim:

* The principle role of this paper is to place this work in the context of previous research on these and related issues put forth by the Axelrod.
* Study the evolution of strategies over generation through Charles Darwin’s concept of “Natural selection”.

Objective:

The prime objective of this paper is to provide the **quantitative analysis of representative Strategies played by individuals in the society.**

Description:

1. In this paper we analyze different strategies for their response against other strategies using the Prisoner's Dilemma.
2. **IMPORTANT TERMINOLOGIES USED**:
   1. **STRATEGY**: It is the choice made by the individual i.e. either cooperate or defect.
   2. **PRISONERS DILEMMA**:Each participant (Strategy)is awarded points (as per the payoff matrix) depending on its response (Cooperate/ Defect) chosen compared to the choice of the opponent (Strategy). Each participant’s decisionmust be made withoutknowledge of the other participant’s response. The participants neither know each other’s decisions nor can communicate.If both participants cooperate they both receive a reward. If both defect they both receive a punishment. If one defects and the other co-operates,the defector receives a reward and the participant who cooperated suffers from sucker’s payoff.
   3. **ITERATED PRISONERS DILEMMA**:The situation is more interesting when the participants play the game iteratively for a certain number of moves. The number of moves should not be known to the two participants.The individual with the highest score wins.
3. This paper describes the study made for **analyzing the relative population growth** of each representative strategy.
4. This paper also describes the **mathematical model and its implementation** developed for the above study.
5. Our experiment of placing different strategies in a pool and allow them to evolve in coming generations will show results of applying Charles Darwin’s principle of “Natural selection” to these strategies.

Conclusions:

Based on the results obtained from this study, the paper will discuss results in context of human interactions regarding cooperative behavior. This study can help us find out whether there is any hope for cooperative nature to increase in coming generations in the presence of other strategies like ‘Cheater (who will always cheat others)”. The paper will crosscheck the commonly believed (Common man’s) hypothesis “Cooperation and honesty is decreasing over generations”.