MICHIGAN VERSUS PITTSBURG APPROACH: A COMPARISON FOR MARKET SELECTION PROBLEM

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ABSTRACT. *This paper analyses the application of learning classifier systems on a market selection game. The prime objective of an agent in this game is to strive for a better profit on its products when sold in the market. A judicious vision is required on the part of agents while choosing a market to keep in view transportation cost as well as the profit margins on the sale of their products in that market. If a large number of similar products are brought to that market, these will naturally yield low price. In the same way, high transportation cost will also result in decrease of profit margin. Hence, a balance between the two is to be maintained in order to gain high profits for an agent's products. We have proposed a new Michigan-Style algorithm for solving this problem. The proposed algorithm is then compared with Pittsburg classifier system approach to solve the same problem. The former works without a central coordinator, whereas the later works with the help of a central coordinator. Our experiments show that even though Michigan approach works with limited localized information, yet it produces high quality results quickly, consistently and at the same time all this is achieved by using less computational resources. We have also compared Michigan approach with the approach of unplanned coordination as proposed by Ishibuchi et al. in 2001. It also shows that the idea of using Michigan classifier system better suits the agents to solve this problem.*
Keywords: Michigan classifier systems, Pittsburg classifier systems, Evolution of game strategies, Evolutionary algorithm, Agent market selection

1. **Introduction.** In the field of computer science, researchers often face computational problems having multiple possible solutions. It sometimes becomes computationally non-feasible to find the optimal or near optimal solution. Computer scientists have come up with various approaches and techniques for investigating such problems in depth with a view to find a solution to the problem within the constraints of computational resources as well as within feasible amount of time. One set of these approaches draws its inspiration from the principles of natural evolution. Such approaches are grouped together by scientific community as Evolutionary Computation (EC) which is in fact treated as a subfield of artificial intelligence. Over a period of time, EC based techniques have been successfully applied in solving the real-world problems. These evolutionary algorithms perform quite well in solving multi-objective optimization problems. In contrast to mathematical programming technique, a single run of these algorithms provides a collection of possible members of Pareto optimal set. The concept of population in these algorithms corresponds with the possible solutions of a problem. Mathematical programming techniques, on the other hand, require a series of executions to get a set of possible solutions [1]. Evolutionary algorithms have been applied to various fields such as data mining, combinatorial optimization, fault diagnosis, classification, clustering, scheduling,