

Examiner Report of the PhD thesis entitled “Feature selection and function approximation using adaptive algorithm” submitted by Varun Kumar Ojha.

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The thesis investigates into designing two multi-objective adaptive algorithms using tree like model for feature selection and function approximation. The proposed algorithms aim to overcome some of the challenges associated with the feature selection and prediction. Feature selection and prediction provide development challenging for predictive modelling. The thesis tries to take this challenge by proposing and testing the performance of predictive models named as multiobjective heterogeneous flexible neural tree (HFNT) and multiobjective hierarchical fuzzy inference tree (HFIT) using evolutionary algorithm for tree selection and metaheuristic techniques for parameter selection. This research work is quite important for the applied AI research, which has been a hot topic for developing novel and improved hybrid algorithms for real-world classification and optimisation problems. The proposed adapted approaches contain novelty and originality.

The thesis is very concise and brief, but it is well structured and easy to read. It provides a brief description and literature review of general intelligent models and its variants as well as classical and recent multiobjective optimisation algorithms. The candidate has justified the requirements of the research in developing effective approach for classification, feature selection and optimisation problems. This background information is placed in the context of the research topic of the thesis. A good breakdown is provided for a number of different approaches used to model and solve the problems, which appears to indicate that the candidate has a good understanding of the field and the current challenges faced in the OR research.

The thesis gives a reasonable analysis and evaluation of the proposed two methods with experimental results and comparative performance study. The effectiveness and applicability of the proposed algorithms have been demonstrated over benchmark and real-world datasets. The results of the proposed methods are compared with other approaches. The results of the experiments appear to be potentially useful. The final chapter briefly summarises the conclusions. There is significant scope for further research in this area and there is a brief discussion of some areas that could be investigated in the future.

The research work is quite important and its contents can be useful for researchers and practitioners in applied AI and OR. Although the idea of proposed approaches has not been tested in a wide range of problems to claim their generality, this thesis demonstrates a good contribution to the area. As it stands, the research outcomes contain publishable materials. In fact this has already been demonstrated by a number of published papers resulted from the research.

In summary, there are sufficient materials in this thesis to form a Ph.D. Given the overall quality of this work and the demonstration of clear understanding of area, I recommend that a PhD be awarded for this thesis.



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