SYNASC – Workshop NCA
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Stock Market Trend Forecasting with GEP Ensembles

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Abstract—The problem we tackle concerns forecasting the direction of movements of stock price on financial markets, formulated in terms of binary classification. Ensemble methods have long been used as a means to obtain robust and accurate complex classifiers based upon several diverse base classifiers. We investigate two approaches to construct robust ensembles using gene expression programming (GEP) induced base classifiers. The first approach consists in the classical majority voting of GEP classifiers obtained in a k-fold cross-validation scheme. The second approach is an adaptation of the stacked generalization scheme proposed by Wolpert, in order for it to be used with the evolutionary approach for inducing classifiers. To our knowledge, there have been no results on this type of problem using such ensembles of GEP classifiers. Experiments are performed on real stock market data. We compare the performance of the proposed ensembles against that of pure GEP classifiers and the random walk model that gives each forecast as the value of previous day. Comparisons with several state-of-the-art machine learning techniques are also provided in the paper. On the time series we investigated, the ensembles performed significantly better than the pure GEP classifiers and the random walk model. Moreover, they prove fair competitors of successful classical machine learning methods. The results in this study provide sound reason for further investigations.

Results of Ant-Based Models for Solving the Linear Ordering Problem

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Abstract—The Step-Back Sensitive Ant Model (SB-SAM) is inspired by the real behavior of Lasius niger ants including uturns in the process of selection. The so-called ’step back’ is taken by an agent if it reaches a virtual state modulated by various sensitivity levels to the pheromone trails. The contribution of the current paper is to show new results of Ant Colony System (ACS) and SB-SAM techniques for some instances of the linear ordering problem - an NP-hard combinatorial optimization problem.

Robustness Analysis of Ant-based Scheduling in Heterogeneous Computing Environments

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Abstract—This paper presents some preliminary results of an ongoing work concerning scheduling of tasks in heterogeneous and dynamic computing systems, e.g. Grid systems. The aim of grid scheduling is to nd suitable allocation of the resources for each job. In this paper, we analyze the robustness of ant colony optimization (ACO) approach to handle grid scheduling problem.

Further Investigations on Using the Tree Bond-based Representation for Ising Spin Glasses

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Abstract—Ising spin glasses are a rich source of challenging highly multi-modal optimization problems. The Ising model is one of the most widely used models for disordered systems in statistical physics. Finding the ground state of an Ising spin glass can be expressed as the problem of determining the minimum weighted cut in a graph. Encoding the state of spin glass can be done in terms of its spins or its atom bonds. Although bondbased representations benefit from the symmetry properties of spin glasses, they require more memory resources due to the larger number of bonds. In our previous research we introduced a bond representation defined on spanning trees which deals with this issue and tested it with a genetic algorithm. In this paper we continue this research by testing larger systems and also comparing the results against a Particle Swarm algorithm with spin-based and bond-based representation.