A Project Proposal for Parallel Genetic Algorithm for Stock Market Trading

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Introduction

Financial markets all over the world rely on computers to analyze data, give recommendations and make transactions. These days, humans would not be able to handle the vast amount of data that is constantly being produced and transmitted, to make an informed decision within a reasonable time span. To overcome this problem, computer systems have been developed and are constantly being optimized to handle this task even more efficiently.

Statement of Problem

Genetic algorithms (GAs) are problem solving methods that mimic the process of natural evolution. Unlike artificial neural networks, designed to function like neurons in the brain, these algorithms utilize the concepts of natural selection to determine the best solution for a problem. They are typically used to work on problems that cannot be resolved in a deterministic way. The main idea is to continuously generate varying solutions to a problem, while combining, mutating and evaluating them. By so doing, it is likely to converge towards a desired behavior; to solve the original problem.

A genetic algorithm starts with a population, called chromosomes (represented by one-dimensional vectors) which are evaluated in terms of an objective function.

There are three types of genetic operations that can be performed; Crossovers, Mutations, and Selections. These operations are used in a five-step process:

- To initialize a random population, where each chromosome has a n-length, where n is the number of parameters.
- Select the parameters that increase desirable results.
- Apply Mutation or Crossover to the selected parents and generate an offspring.
- Recombine the offspring and the current population to form a new population with selection
- Recursively repeat steps two through four.

After sufficient iterations, this process results in increasingly favorable parameters, that can be used to make trading decisions.

Objective

The objective of this project is to enhance a genetic algorithm for the optimization of technical trading rules (TTRs) with a parallelized implementation, making better use of the available computational resources and therefore producing results quicker.

References:

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