Synthetic Data Generation Based on Monte Carlo Simulation

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Abstract

This project aims to implement a Monte Carlo simulation in a web based application, using the Monte Carlo simulation method to randomly generate a synthetic price-time series for use in a business game.

The Monte Carlo simulation method is the name given to the use of random sampling to estimate the output of an experiment and can be used to solve a variety of problems. It makes it possible to simulate any process that is influenced by random factors.

The technology of choice for this project is JavaServer Faces (JSF), a new standard Java-based framework that makes it easy to build user interfaces for java web applications. This project will implement a Monte Carlo simulation in JSF using the histogram method to define probability densities and density functions.

Once a Monte Carlo simulation has been successfully implemented in JSF, it will be used in the implementation of a random synthetic price-time series with general features controlled by parameters. This time series will act as the basis for the third application, the business game.

The final stages of this project will be to design and implement the business game, during which human-computer interaction techniques will be used throughout. The aim of the business game is to demonstrate the fundamental nature of exchange within a market. The game will give users the option of buying and selling commodities with the aim of increasing the value of their portfolio.