SumWEB: stock market experiment environment for natural and artificial agents

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Abstract

SumWEB (SUM Web Economic Behaviour) is a Swarm based web-application.

The simulation core is based on a Objective-C stock market simulation, SUM (Surprising (Un)realistic Market), developed by Pietro Terna (Terna 2000) enriched by new features.

The prices formation and the order enqueuing rules were directly inspired by MTA (Mercato Telematico Azionario, the Italian Stock Exchange). We included rules such as opening and closing auction, but more relevant a tick by tick formation price mechanism.

In order to increase simulation realism we can create various books to add more than one equity stock. The stock prices are used to calculate an index so we can activate a special book to collect index future proposals.

The agent population is very rich and heterogeneous. We can activate minded agent (equipped with an artificial neural network) or no minded purely random agent. We designed also some agents based on simple trading rules such as the stop loss agent or the arbitrageur agent.

SumWEB was mainly designed to introduce humans inside the simulation using the avatar tecnique. With this simple idea we can build a bridge from pure ACE (agent-based computational economics) approach to experimental economics. Humans can stress test model, can reveal implementation or logical error, slackness, or better can show unpredictable behaviours. We can study humans behaviour in an artificial controlled lab.

SumWEB was effectively used for two experiment, organized by Faculty of Economics (University of Turin). The first one was a class game with 57 persons on 6th May 2003 for one hour. The second one was a two weeks long online experiment, from 8th to 21th May 2003, with 152 persons over 486 agents. In both experiment the market was populated by three equity stocks and one index future.

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