A Platform for Trading Agent Competition

Dongmo Zhang and Chun Gao

Intelligent Systems Laboratory
University of Western Sydney Australia
Outline

1. Trading Agent Competition
2. Market Design Game
3. Strategic Trader Game
4. Conclusion and Future Work
Trading Agent Competition (TAC)

“Trading agents are autonomous software programs designed to trade in electronic markets.” (http://tradingagents.org)

“The Trading Agent Competition is an international forum designed to promote and encourage high quality research into the trading agent problem.” (http://www.sics.se/tac/)

TAC Games

- TAC Classic: 2002-2006
- TAC Supply Chain Management (SCM): 2003-2012
- TAC Ad Auctions: 2009-2012
- Power TAC: 2011-2012
Market Design Game: CAT Tournament

The TAC Market Design Game simulates competition between financial markets. Each participated agent, called a specialist, represents a market maker who runs a double auction market for traders to sell and buy goods. A specialist wins a game if

- it owns more marketshare;
- it has higher transaction rate;
- it earns more profit.
Market Design Game: Issues

- Market mechanism is limited to double auction.
- Competition is limited to market makers. No competition between traders.
- Simulation results heavily rely on traders’ behaviour, which are simulated by the server.
- Far from real-life.
Strategic Trader Game: aims

Overall:

- Develop a platform for a new TAC game replacing the current Market Design Game (short term)
- Develop a flexible simulation system that can test variety of market mechanisms, traders’ strategies and their relationship (long term)

Specific:

- Implement more types of markets. Markets should be represented in a way that an intelligent agent can understand.
- Design highly intelligent agents that can understand market rules and trade in more complicated market situations.
- Create a game scenario that can promote trading agent design.
Strategic Trader Game (STG):

**Entrants:**
- Each entrant acts a trader and they compete each other to earn profit.
- Each trader operator a number of trading account.
- Each trading account can either a buying account or selling account.

**The server:**
- A number of markets, each of them allows a single good trading. Different markets may use different mechanisms.
- A bank provides services, such as cash flow, loans and dividend/inventory.
STG Platform

Platform for TAC Strategic Trader Game.
A STG market

Each STG market runs under a pre-specified market mechanism for trading a single good.

A market may

- accept or reject shouts/bids from traders
- match shouts or select winners
- provide daily trading information
- charge service fees
The bank

The bank provides services:

- Cash deposit. Each trader holds an account at the bank.
- Financial approval. Lock fund for each shout a trader makes.
- Loans. A trader can borrow money from the bank based on its credibility.
- Dividend. The bank calculate dividend of each good, if any, and credit them into the traders’ accounts.
A STG Trader

- Each trader consists of a number of trading accounts.
- Each trading account can either be a selling account or buying account for a single good.
- Each trading account is endowed with a trading strategy, determining when to make a shout and its price.
- The trader determines with goods to buy or sell through fund allocation to each trading account.
The aim of the STG is to create trading strategies for different market environments and commodity types to maximise profit gained by the trader.

With the current implementation, all markets sell the same good. The game master controls one trader for each market who sells goods to the markets from time to time.

The platform was built upon the existing game platform JCAT.

The platform adopted the client-server structure, socket-based communication and plain-text message language, inherited from JCAT.
Conclusion and Future Work

Summary

- Automated trading has been a rapidly growing research area.
- Our system allows more variety and sophisticated trading strategies to be created and tested.
- It can also be used to test market and banking system designs.

Future Work

- Add more markets and each market only allow the trading for one type of commodity.
- Add more banks and provide competitive separate banking products for the traders to choose.
- Write intelligent traders with different trading strategies to test the platform.