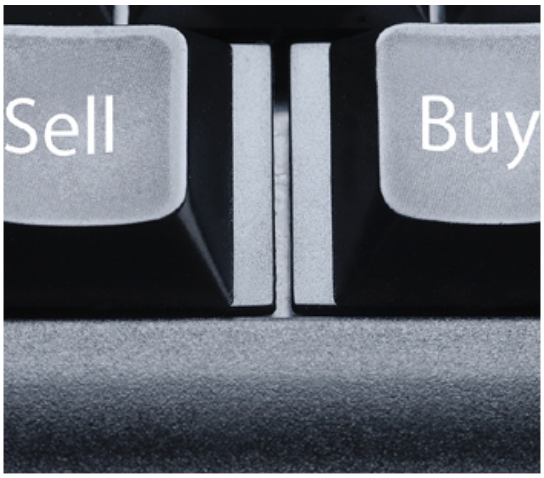
Generating Trading Systems Through Genetic Programming



Source: photos.com

Introduction

Traders are frequently using technical analysis and trading systems as their tools to master the stock market. However, it is a complex and time-consuming task to manually generate such systems.

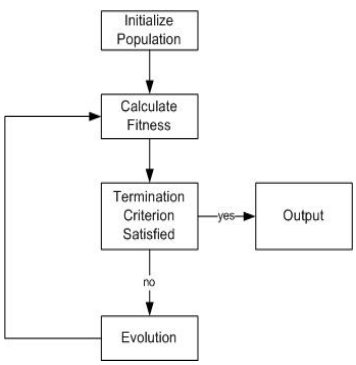
Therefore, this project looks at the possibilities of using genetic programming to create trading systems automatically. Two problems will be discussed, namely how to develop a general trading system language and how to adapt genetic programming to generate trading systems from that language.

Trading System Language

To make results from machine learning algorithms, which are generating trading systems, easier to interpret, and simplify the simulation and reporting functionality, a standardized trading system language is needed. This will also increase the ability to compare trading systems from multiple implementations.

Genetic programming

Trading systems are generated through a technique called genetic programming. An initial population of trading systems are randomly generated. Then, after benchmarking, the best systems of these evolves into the next generation through crossover and mutation, and the process starts all over with these new individuals as a population.



Overview of the genetic programming process.

```
<rules>
        <rule action="BUY()" timing="CLOSE" id="1">
                <if test="#MA{12} &lt;= #CLOSE{1}"></if>
        </rule>
        <rule action="SELL()" timing="CLOSE" id="s_1">
                <if test="#MA{12} &gt; #CLOSE{1}"></if>
        </rule>
</rules>
```

```
<rules>
        <rule action="BUY()" timing="OPEN" id="1">
                <if test="#MA{23} &lt;= #CLOSE{1}"></if>
        </rule>
        <rule action="SELL()" timing="CLOSE" id="s_1">
                <if test="#MA{12} &lt; #CLOSE{1}"></if>
                <if test="#CLOSE{3}*0.995 &lt; #CLOSE{1}"></if>
        </rule>
</rules>
```

Example of a trading system during mutation

Project Details

MSc Student: Tom Heine Nätt
Supervisor: Associate professor Roland Olsson



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Results

Even though not finding any supreme trading systems among the results, the project finds proof of an ability to discover patterns in historical data. Even though in themselves profitable, these patterns are too small to take advantage of when transaction cost is included in the calculation.

On the other hand, profitable trading systems might be generated in further work, by changing parameters or functions in use.