Micro Business of Currency Conversion using Data Mining Techniques

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Abstract- Microfinance business is a prevailing business in third world countries and proves beneficial to improve economies of the country. In our paper we conceived and designed some algorithms by using data mining techniques to have general micro currency exchange businesses for a developing country. Our algorithm process two years historical records of currency rates and applies data mining techniques i.e. Median Method and Rise & Fall Method with probabilistic approach conceived by us. It can apply to N year’s data with unless desired results are achieved. This is to give best choice to micro currency business men to take decision to buy or sell currency. Some previous currency rates (i.e. Ups & Down) are also recorded from a popular bank of Canada & currency open markets as a proof of concept using our algorithm. Our algorithm can be efficiently used by all those who wish to initialize a small business (Cottage Industries) with a profitable income with less investment. We guarantee them to successfully launch their businesses with trust and courage.

KEY WORDS- Microfinance, Currency Conversion, Data mining, decision graph.

1. Introduction

We all know that human being living on the surface of earth from centuries, and always struggle for the fulfillment of their needs irrespective of the climate conditions. To achieve needs every one has to struggle in different shapes. Mainly in the work place this relation is called employee and employer [1, 2]. This sensitive relation is based on satisfaction and quality of work among both the parties.

An experiment on micro business (Cottage Industries by providing loans) [3] carried out by has been proved very promising. Our algorithm is a sequence of his efforts in new direction with new business approach by using computational science. The boarder line to come out of such situation was the main goal of our research, working independently and achieve better results, as the struggle and growth in work was directed towards own interest, this reduces the monetary problems and thus reduces the health related problems. The developed algorithm is simple that can be easily programmed.

2. Methodology

The methodology that we are acquiring consist of following steps

(a) Algorithm development [7] based inference to include ideas about new dimension to data mining techniques and decision support environment for business.

(b) Finding appropriate tools like VB.Net, Sql Server or oracle, ASP.Net & that historical data support decision environment may be created.

(c) Choosing data mining tools and selection of data mining techniques to visualize the decision graph.

(d) Testing of algorithm in real market data for authenticity [6].

3. Theoretical Analysis Approach

If we see the analogy with stock, it has two aspects

1- Instrument (Security )

2- Speculation [8]

   a- Fundamental Analysis ( Soundness and Health of a Company)

   b- Technical analysis (Decision on Visualization, Fibonacci , MACD (Moving Average CD)

In our paper we will concentrate on the 2-b because it is a micro business on low scale for less/low inverters.
Generally if we analyse the market, the currency rates seem to be directly propositional to Demand and inversely to Supply, keeping external factors constant like oil prices, political situations, etc [9].

\[ \text{Currency Rates} \propto \text{Demand} \]
\[ \text{Currency Rates} \propto \frac{1}{\text{Supply}} \]

Figure 1: Demand and Supply Graph

From the above definition we derive a simple relation i.e;

\[ \text{Currency Rates} \propto \text{Demand} \]
\[ \text{Currency Rates} \propto \frac{1}{\text{Supply}} \]

Where CR represents Currency Rates and D represents demand, similarly;

\[ \text{Currency Rates} \propto \frac{D}{S} \]

Where S represents supply.

Equations 1 & 2, both explain that currency rates are directly proportional and inversely proportional, to demand and supply, respectively. By the combination of equations 1 & 2, we get,

\[ \text{Currency Rates} \approx C \times \frac{D}{S} \]

In Equation 3, C represents the constant, i.e., which is variable and changes with the oil price or other factors of the country, such as inflation, political, etc. This equation explains that the currency rates of a specific country with respect to other currency or some standard currencies.

3.1 Theoretical Findings

Our findings are based on the two data mining techniques i.e,

1) Stream Data mining (Complex event processing)
2) Time Series

3.1.1 Algorithm

\[ X_i = \text{Yearly data} \]
\[ \text{If } X_{i+1} > X_i \text{ then} \]
\[ YR_j = 1 \text{ else } YF_j = 0 \]
\[ \text{If } X_{i+1} < X_i \text{ then} \]
\[ YR_j = 0 \text{ else } YF_j = 1 \]
\[ ZR \text{ Weekly rise} \]
\[ ZF \text{ Weekly fall} \]

For \( k = 0 \text{ To } N \) \( N \text{ is Early data} \)
For \( i = 0 \text{ To } i < 7 \) \( \text{Weekly Records} \)
Sum \( R_i := YR_j \) \( \text{Weekly Rise} \)
Sum \( F_i := YF_j \) \( \text{Weekly Fall} \)
Next
ZRk = Sum Assigning
Next
For \( i = 0 \text{ to } i < N \) ‘Loop for Comparison
If \( Zri > Zfi \)
Decision = ”Y” \( Y=”Yes” \)
else
Decision = ”N” \( N=”No” \)

3.1.2 Comparison of Yearly Data:

For \( i = 0 \text{ to } i < N \)
If Decision (2008) & Decision (2007) = ”Y” then
CFD Decision= ”Y” ‘Combined Final Decision
else
CFD Decision=”N”
END

4. Experimental Analysis and Findings

The followings experiments were conducted to analyze our idea.

4.1 Description of Figure 2

Median of currency data on weekly basis. Figure 2 below depicts that, it is more likely to have good business if someone buys CAD currency on Wednesday and sell it for GPB on Thursday [10]. The statistical figures from the year 2008 shows that less profit will be gained in a week, if he buys on Thursday and sells it on Wednesday coming week. So this graph can be proved very beneficial for those who deal in CAD and GBP currency conversion business. Similarly, same graphs with good decision perception can achieved if we have at least one year minimum data.
Figure 2 describes various features according to our algorithm Rise and Fall. The first column is about the factual data retrieved from the bank of Canada [6] for year 2008. The second and third column shows the number of rises and falls in data with respect to previous one on daily basis. The fourth and fifth column are special columns based on our algorithm [7]. It progressively moves by one day to accumulate one week number of rises or falls respectively. Sixth column shows the decision column based on the higher sum value of progressive weekly rise with respect to progressive weekly fall.

![Figure 2: Median of Currency Rates (1 CAD Vs GBP) on weekly basis.](image)

4.2 Description of Figure 3
Figure 3 shows a weekly progressively increasing summation for rises in GBP (Great Britain Pound) for 1 CAD (Canadian Dollar). The benefit of the below graph is to take help regarding decision. The more number of Rises more probability to decide in “Y” rather than “N”.

```plaintext
<table>
<thead>
<tr>
<th></th>
<th>Median of Currency Rates (1 CAD Vs GBP) on weekly basis.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.509</td>
</tr>
<tr>
<td>2</td>
<td>0.508</td>
</tr>
<tr>
<td>3</td>
<td>0.507</td>
</tr>
<tr>
<td>4</td>
<td>0.506</td>
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<tr>
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<td>0.505</td>
</tr>
<tr>
<td>6</td>
<td>0.504</td>
</tr>
<tr>
<td>7</td>
<td>0.503</td>
</tr>
</tbody>
</table>
```

44
4.3 Description of Figure 4

Figure 7 shows the final decision, whether to buy currency in specific month or week or day in a year based on the previous year data and statistics. This graph gives clue to investors to make decision, which currency to buy and which currency to sell. This graph will benefit more on monthly basis rather than week or day.

It can be proved more accurate for week level and day level, if 20 to 30 years data are taken and performed same Rise and Fall test and then compare it with yearly data with each other concurrently.

4.4 Comparison of Data of Year 2007 & 2008

The comparison gives more accuracy in decision with respect to overlap. It means that if both decision in year 2007 and year 2008 are “Yes”, we make it yes as a comparison tool.

Based on the results the following approach is adopted as shown in Table 1.

<table>
<thead>
<tr>
<th>Decision Data For 2007</th>
<th>Decision Data For 2008</th>
<th>Results Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Y</td>
<td>Yes</td>
</tr>
<tr>
<td>Y</td>
<td>N</td>
<td>No</td>
</tr>
<tr>
<td>N</td>
<td>Y</td>
<td>No</td>
</tr>
<tr>
<td>N</td>
<td>N</td>
<td>No</td>
</tr>
</tbody>
</table>

Table 1: Boolean Comparison of Yearly Data

4.5 Yearly Probability of Yes “Y” & No “N” (For Year 2007)

Sum of Total Number of “Y” = 114
Total Sample Space = 253

Probability of “Y” = 0.450592885
Probability of “N” = 1 - Probability of “Y” = 0.549407115

4.6 Year Probability of Yes “Y” & No “N” (For Year 2008)

Sum of Total Number of “Y” = 109
Total Sample Space = 250

Probability of “Y” = 0.436
Probability of “N” = 1 - Probability of “Y” = 0.564

5. Conclusions

This type of business is already in progress but it fits/suits only for the big investors, whereas our approach is for a small scale investors/business. The big currency exchanges holding the market and play with the rates of currencies according to their own interest.

Besides the monetary benefits it will help the community and government to create jobs and reduce the crime rate due to involvement of human power in a proper earning place. In short this
approach for self employment with less investment will yield high results. The main reason is that human movement, business, education, health care, food etc., all these depends on economy and cannot be stop by any means. In the present conditions those who plan and work on these issues they will survive others will eventually vanish from the surface of earth. Our software can be efficiently used by all those who wish to start a small business with a profitable income. We guarantee them to successfully launch their businesses.

6. Related Work
Everyone has the right to live and earn legally. For example, everyone cannot erect a 4 or 5 star hotel and even every one cannot afford to live in such hotels, so what is the solution for such an issue. The same goes to other walks of life as well. Therefore, if a person cannot reach to the Dow Jones, Nikkei, Ham Sung, etc., that does not means to stop thinking. But other alternates must be explored/looked at to find the way out from present economical crisis. Such efforts are put forward while working on the project.

7. Future Work
The algorithm presented in this paper can be implemented in software in any desired tools i.e. VB.Net & Oracle or ASP.Net & Microsoft SQL Server. This will enhance our algorithm with respect to establish a Micro Currency Exchange data ware house.

8. Acknowledgements
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Figure 4: Exact High Level Decision in “Yes” or “No” for inverters in Currency Exchange (Year 2008)
References


[3] Yunus, M., "Dr. Muhammad Yunus is founder and managing director of Grameen Bank in Dhaka, Bangladesh”. Link: http://www.abanet.org/irr/hr/winter08/yunus_winter08.htm


