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CALCULATING RISK IN STOCK INVESTMENTS USING MODEL TESTING

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Abstract - *Now a days, risk management plays vital role in Information systems, currently there are various risk assessment techniques. When system is analyzing the source code, automatically some disputes may arise which depends on various reasons. These disputes may arise a number of the risks in data system which can results in loss of some data. To avoid that, during this paper we are implementing a model for source file analysis which is employed for brief assessment of risk, which incorporates guidance to risk minimization. It is useful to know how much risk is involved when investing money on the stock market. Value at Risk is an estimate of the loss a portfolio's value is likely to experience based on the movements in the prices of the assets in the portfolio.*

***Key Words*: Risk management, Risk Analysis, Model Testing, Stress Testing, back Testing**

1. INTRODUCTION

Individual traders, along with large financial institutions, often invest their money in various assets, such as stocks and options. A collection of these assets is called a portfolio. If someone is investing a large sum of money in a particular asset, or collection of assets, it is useful to know how much risk is associated with such an investment.

Financial institutions usually calculate risks for every market variable to which they are exposed. However, to provide a way of measuring the total risk the financial institution is exposed to, implementing financial risk estimation model is considered a better solution.

Financial risk estimation model, in essence, is a single number representing the total risk in a portfolio of financial assets. It is also used by treasurers of large corporations, fund managers and bank regulators to estimate the amount of risk in the portfolios they hold. In banking, VaR is used to decide how much money a bank should keep (a reserve) for the risks it is exposed to, in case there is a financial crisis and the bank needs to be able to pay off some of the money it holds from its investors.

One advantage of using financial risk estimate model as a measure of the risk in a portfolio is that it simplifies the risk as a single number which can be understood without the need for extensive knowledge about how it is calculated. However, this means that by decomposing the amount of risk a portfolio is exposed to into a single number, complicated aspects of risk which may have been important to know may be missed out.

1.1 VALUE AT RISK METHODS

As per Jorion (2001), "VaR measure is characterized as the most exceedingly terrible expected misfortune over a given skyline under typical economic situations at a given degree of certainty. For example, a bank may state that the everyday VaR of its exchanging portfolio is $1 million at the 99 percent certainty level. All in all, under ordinary economic situations, just a single percent of the time, the everyday misfortune will surpass $1 million." Truth be told the VaR just demonstrates the most we can hope to lose assuming no negative occasion happens.

Non-Parametric methods

The Non-parametric methodologies try to gauge a portfolio VaR without making solid suspicions about brings dissemination back. The substance of these methodologies is to allow information to represent themselves as much as could be expected under the circumstances and to utilize ongoing returns observational appropriation – not some expected hypothetical dissemination – to gauge VaR. All Non-parametric methodologies depend on the fundamental suspicion that the not-so-distant future will be adequately like the ongoing past for us to have the option to utilize the information from the ongoing past to figure the danger soon. The Non-parametric methodologies incorporate (a) Historical Simulation and (b) Non-parametric thickness assessment techniques.

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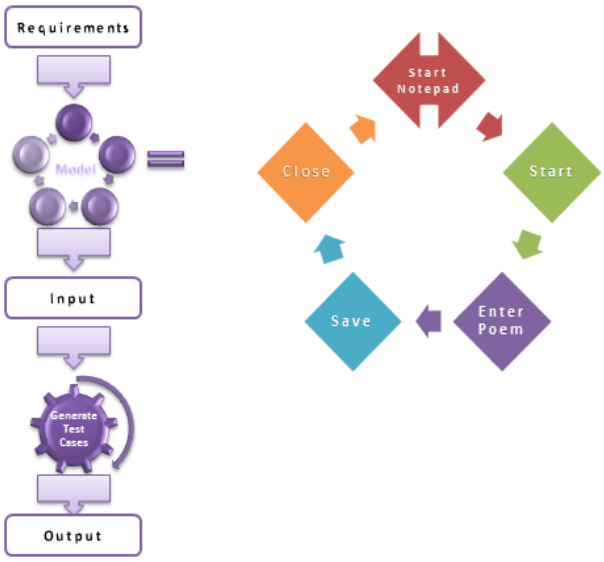
2. ModelTesting

As with most models that are implemented to develop a solution, it is necessary to analyse the validity of its solutions and outputs. It is important here to note that model testing and software testing are different techniques concerning different entities. Software testing of the Value at Risk program. For a model that estimates Value at Risk, it is important to know how well it performs in terms of how good its estimations of Value at Risk are. One of the approaches to test the validity of a VaR model is to test its estimations of VaR against real world data. This is known as Backtesting.



2.1 Model Testing techniques: Back Testing

Back testing is conducted by measuring the number of times the actual loss in the value of a portfolio exceeded the Value at Risk estimate from data over a specified time period. Using historical stock price data for a portfolio, a number of VaR estimations are made for a number of subsequent days.

For some models, it is necessary to use some of the historical data to infer the volatility of the individual stocks so that some future possible losses can be estimated according to the stocks' volatility. In order to Back test a VaR model efficiently it is necessary to be able to accurately estimate the volatility of the stocks in the portfolio and to have a good amount of historical data. These estimations of VaR are then compared with the actual losses in value experienced by the portfolio using historical stock data for the days we have estimated VaR for. A count of the number of times the VaR estimation was exceeded by the actual loss (an exception) is kept tracking the performance of the VaR model under test.

As VaR is usually estimated with a confidence level from 99% downwards, it is expected that there will be a certain number of times where the estimation of VaR will be exceeded by actual losses. In order to gauge the reliability of the model, it is possible to compare the number of exceptions that occurred with the number of exceptions that are expected. For example, if VaR was estimated with 99% confidence

After the text edit has been completed, the paper is ready for the template. Duplicate the template file by using the Save As command, and use the naming convention prescribed by your conference for the name of your paper. In this newly created file, highlight all of the contents and import your prepared text file. You are now ready to style your paper. It is acceptable for the model to underestimate VaR in 1% of cases. This is because, by the definition of VaR 2.4, for a 99% confidence estimation there should be a 1% chance of the losses exceeding the estimation of VaR. If VaR was estimated daily for 100 days, the model is reliable if the actual losses exceeded the estimation once. For 95% confidence, the number of acceptable exceptions would be 5% of the cases, and so on. If the number of exceptions is greater than the expected amount, it is necessary to analyze the VaR estimation model and find out why it is underestimating the VaR and whether the excess exceptions may have happened by chance. This can be done by computing the 'p-value' of such an event, as covered in section 5.3. Back testing VaR models for a large number of days and over a variety of confidence levels can lead to a good assessment of how good those models are at estimating VaR.

2.2 Stress Testing

Stress testing for software involves analyzing its robustness when operated beyond the limits of its usual operation. Stress testing of VaR models follows a similar approach. The stock market does not satisfy the assumptions made by some algorithms for estimating VaR.

For example, the Monte–Carlo Simulation algorithm assumes that stock prices follow a normal distribution, and while Monte–Carlo methods are used to estimate VaR for stocks and options, sudden changes in the market are not in the scope of such methods. This means that VaR estimation models cannot predict sudden large losses in the value of a portfolio which can be disastrous for an organization if they did not have enough capital in reserve to account for such a situation. To account for such situations, Stress testing is often used to complement the Backtesting of VaR models. Stress testing is conducted by measuring what changes our portfolio would have experienced under some of the extreme market moves, which are unlikely but plausible, over the past few decades.

3. CONCLUSIONS

The research on the risk management process helped us to propose a software Risk assessment Framework, which is cost-effective and assessing the risk from a Source code perspective. In this model, the Lines of code will be measured and the Performance of the source code is

calculated in the form of complexity. One Information system was taken and the complexity value is calculated by the proposed assessment model which produces accurate risk reports.

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