Predictive Analytics on NAVs of Selected Mutual Fund Schemes
[Large Cap, Mid Cap and Flexi Cap Funds]

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Abstract- *The single most powerful asset we all have is our mind. It can create enormous wealth when properly trained. All individuals live their life with a main objective to create wealth and peace. It is not that easy for anyone to create more wealth instantly. As new opportunities are opening up in every field all over the world, it is helping individuals to fulfill their desire of creating wealth. Wealth creation can be achieved when there are financial discipline, knowledge and active mindset. This study aims at predicting the future NAVs of the selected mutual funds; Large cap funds of SBI and ICIC, Mid cap funds of HDFC and Kotak and Flexi cap funds of HDFC and Kotak. The Large cap funds focus on investors look for stable and steady long-term capital appreciations in their investment, Mid cap funds for higher returns and who are moderate to aggressive risk takers and Flexi cap funds for those who look for balance in risk and return. By studying the large cap, mid cap and flexi cap funds, this study covers the investors looking for stable return, higher return and balanced return. The funds selected for the study are launched on 1-Jan-2013. Through this we have taken the funds that are in existence for more than a decade and all the funds risk factor is very high. It considers the risk factors, various ratios like Sharpe ratio, Treynor's ratio, Jenson's ratio and Sortino ratio of the mutual funds. The study mainly focuses on checking whether Linear Regression model is best suitable for medium- term predictions. For the study purpose, we have taken historical NAVs of last 5 years [16th Jul 2021 to 16th Jul 2025] and predicting the NAVs for next 2 years. The reason behind considering past 5 years data is ensure that market cycles are included. Through 2 years prediction we are able show the model capability and accuracy.*

I. INTRODUCTION

Investment can be termed commitment to gain value over a period of time. Any individual will always want to save some part of their earnings through investing in various avenues to meet their future events. Earlier days, people with higher income would think of investing in various instruments and only handful people had the knowledge about investments and its importance. But as the days passed, people got the awareness about investments and started investing with a very small amount. There are multiple factors which influences investment decision:

1. Individuals risk tolerance capability.
2. Economic conditions like GDP, inflation, etc.
3. Financial goals of individuals.
4. Earning capacity.

The investment process helps picking the right instrument, in right time, right amount to be invested etc. The 5 steps involved in investment process are:

1. Establishment of investment policy.
2. Detailed analysis of securities.
3. Valuation of securities.
4. Construction of portfolio.
5. Evaluating the portfolio.

Investments generally involve uncertainty and risk. Investors who have thorough knowledge about the market conditions, performance of company's securities, business cycle, economic conditions etc. will be able to make right investment decisions where the risk is minimized and profits are optimized. Investing is both science and art, involving individuals who seek to grow their capital, earn dividends from company profits, and generate income from their investments. Investments in stock markets are very risky yet high profitable.

1. Stock market is very dynamic in nature.

2. There is always a risk of uncertainty.
3. Possible to generate large profits despite risk.
4. Stock market is volatile and unpredictable.

The most commonly used ways to save money by many individuals are as below:

1. Savings A/c.
2. Fixed Deposit.
3. Gold and jewellery.
4. Real Estate.
5. Stock-Market.

Every investment involves 3 factors; Time, Risk and Return.

1. Time tells about the duration of investment horizon. When an investment is made for longer duration of time assuming greater risk, the returns from such investments will usually be higher.
2. Risk proposes on uncertainty and potential losses that are involved.
3. Return denotes the profits achieved from an investment.

II.   REVIEW OF LITERATURE

1. Rohit Kumar Sachan, Shabanam Kumari, Vipul Khandelwal & Tarun Kumar (2024), has done research entitled 'Machine Learning Approach for Predicting the NAV of Mutual Funds based on Portfolio Holdings.' The research was carried on Axis Blue-chip Fund. In this research article, we get to know about the diversification of portfolio in mutual funds. The article spotlight on the role of AI based algorithms that are preferred by Mutual Fund experts to pick out the suitable investment portfolios. It also gives information about the various algorithms that can be used to predict NAVs. They have used Linear Regression model to predict the NAVs and R-Square (R2) statistical measure to determine the goodness of the model. The accuracy of the model was 0.86.
2. Ananya Narula, Chandra Bhanu Jha & Ganapati Panda (2015), in their research article entitled 'Development and Performance Evaluation of Three Novel Prediction Models for Mutual Fund NAV Prediction', studies the performance of 3 adaptive models Functional Link Artificial Neural Network, Multi-Layered Perceptron (MLP) and Radical Basis Function (RBF) for predicting net asset value. This study focuses on HDFC top 200 Mutual Fund for 300 consecutive trading days from 15-Oct-2012 till 2-Jan-2014 and the data is normalized with maximum value at 0.9. The result says, FLANN is accurate for predicting NAVs for 15 days ahead and higher whereas RBF model yields better results in case of short-range predictions

3. T Kusuma & J P Senthil Kumar (2023), in the article entitled 'Predicting NAVs of Mutual Funds using the ARIMA model', they aim to predict the NAV of Axis Mutual Fund through ARIMA model. The time series data of daily closing NAV values from 1-Jan-2021 to 31-Dec-2021 was taken into consideration. According to this study, the model was effective in predicting the NAV values for next 12 days. The study also confirmed that ARIMA model predicts the future time series in the short run.

4. Jesmine Mary Antony & Sundaram Natarajan (2024), conducted research entitled 'Influence of Artificial Intelligence on Forecasting Net Asset Value and Return Volatility in Indian Mutual Fund.' This study collected 5 different equity sectoral technology mutual fund direct growth plans from Jan 2013 to Dec 2022. This study compares 3 ML and Dl models; Linear Regression, deep long short-term memory recurrent neural network (DLSTM-RNN) and ARIMA and uses MAPE to test the accuracy. The result of the research was LSTM neural network was consistent in Nav prediction.

Research Gap

Predictive analytics stood out in financial research. There are many existing studies on mutual fund performance focusing on short-term forecasts or broad market indices rather than medium-to-long-term NAV predictions. There are many literatures that often emphasizes ARIMA or advanced machine learning models, leaving a gap in evaluating the effectiveness and practicality of simpler regression approaches using historical NAV data. So, this study focuses on exploring the applicability of Linear Regression in forecasting mutual fund NAVs over a medium-term horizon of two years.

III. RESEARCH METHODOLOGY

Statement of Problem

Is Linear Regression model best fit for predicting the mutual funds NAVs for a medium-term horizon?

Need for the study

This study focuses to view whether Linear Regression model is fit for medium-term predictions. The study also targets the model's strength and limitations in capturing market volatility.

Objective of the study

1. To predicts the NAVs of Mutual Fund schemes like large cap, mid cap and flexi cap funds using past performance.
2. To examine the performance of mutual funds schemes on the basis of their Sharpe ratio, Treynor's ratio and Jenson's ratio.
3. To examine the Linear Regression model's applicability for medium-term period.

Scope of the study

In order to know what would be the future NAVs of the selected mutual fund schemes and compare the same with each other whose AUM is above 50,000Cr and analyze which fund will be having better NAV and help the unit holders to take correct investment decision. This analysis also checks the accuracy of the model using statistical measure to check whether this model is good fit for future predictions.

Research Methodology

The research methodology used for this study is Descriptive Research Methodology as the data used to describe the fit of Linear Regression for data that is extracted from the AMFI website for the selected mutual fund schemes.

The data from 16-Jul-2021 to 16-Jul-2025 is taken for the purpose of analysis. After collecting the data from AMFI website, the data was loaded to the machine learning algorithm i.e. Linear Regression and the required libraries were imported with the statistical metrics to measure the goodness of the model. The data was sent for training and testing and obtained the predicted values for historical data. Later on, we predicted the future NAV for next 2 years and checked for the score or accuracy of the model using R-Square (R2) statistical measure.

Limitation of the study

1. The study just targets on selected mutual fund schemes i.e. Large Cap, Mid Cap and Flexi Cap Funds.
2. It takes into consideration only funds that has AUM of above 50,000Cr.
3. This study uses only Linear Regression algorithm for the purpose of prediction.
4. It considers only the funds that has very high risk i.e. Risk-o-meter.
5. The data collection pertains to a specific time period. The analysis has been conducted using the available information.

IV. ANALYSIS AND INTERPRETATION

Before getting into analysis and interpretation of the study, let us understand the meaning of some of important terminologies that are considered for this study.

- Net Asset Value: Net Asset Value (NAV) refers to the value of an entity's assets minus the value of liabilities. When it comes to mutual fund, NAV is the market value of a mutual fund's securities divided by the total number of units. The value of NAV differs on daily basis.

Formula: NAV = (Total Assets – Total Liabilities) / Total outstanding shares.

- Sharpe Ratio: It measures the adjusted return i.e. how much excess return an investment generates for each unit of risk taken compared to the risk-free investment.

Formula: Sharpe Ratio = Expected Return of portfolio – Risk-free Return / Standard Deviation of portfolio or $(Rp – Rf) / SDp$.

- Treynor's Ratio: This ratio assesses how much excess return the fund has generated per unit of systematic risk i.e. Beta.

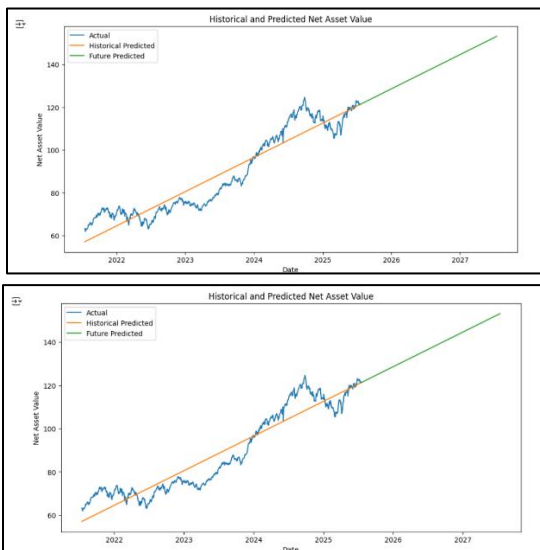Formula: Treynor Ratio = (Rp – Rf) / Beta of portfolio.

- Jensen's Alpha or Jensen's ratio: It determines the excess return generated by the fund compared to what was expected based on its level of risk.

Formula: Jensen Ratio = Rp – [Rf + Beta * (Rm – Rf)] Were, Rm – Market return.

- Sortino Ratio: This ratio tells us how much return a fund generates for the level of negative volatility it experiences i.e. the potential losses.

Formula: Sortino Ratio = Rp – Rf / SD(d). Were, SD(d) – Standard deviation of negative returns (downside).

I. Large Cap Funds

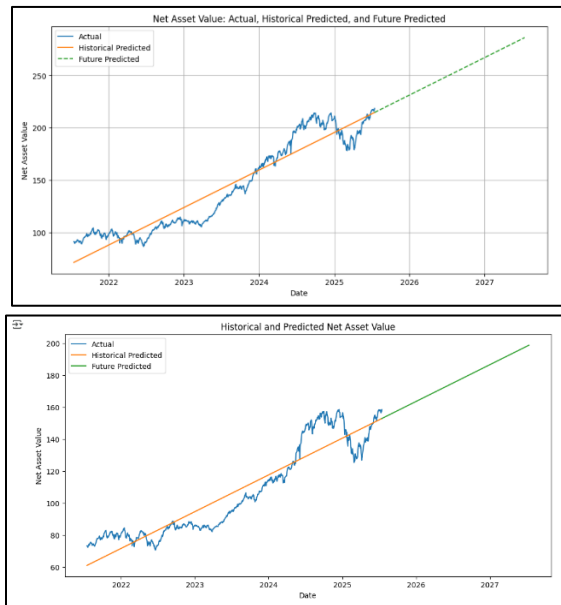*ICICI Prudential Large cap fund SBI Large cap fund*

ICICI Large cap fund- The blue line (actual) tells that the funds NAV has seen growth over the years. The orange line (historic predicted) shows the long-term growth of the funds NAV but doesn't consider the short-term volatility, whereas the green line (future predicted) continuous to show the growing trend of ICICI large cap funds NAV. The fund is expected to reach 153 NAV in next 2 years. The R-Square (R2) score of the model for this fund is 0.87 i.e. 87%. This indicates that the model's prediction is 87% true.

SBI Large cap fund- The Linear Regression model has predicted that the fund's NAV is expected to have growing trend in the next two years irrespective of the fund having very high-risk factor. But the model excludes the short-term volatility while predicted the future NAVs. This fund is expected to have 124 NAV in next 2 years. The R-Square score of this fund is 0.87 i.e. 87%. This signifies that the model's predicting is correct up to 87%.

	ICICI Prudential Large Cap Fund	SBI Large Cap Fund	Category Average
Sharpe Ratio (%)	1.22	0.92	0.86
Treynor's Ratio (%)	0.14	0.11	0.1
Jensen's Ratio (%)	4.7	2.04	1.15
Sortino Ratio (%)	1.82	1.39	1.16

ICICI large cap fund's ratios are higher when compared with both Category average and SBI large cap fund. This could be because ICICI large cap fund's AUM is much greater than that of the SBI large cap fund. The strategy and techniques used by the ICICI fund house is more effective when compared with SBI Mutual fund. Therefore, it is expected that the ICICI Prudential Large Cap Fund is going perform well in the future and generate better risk adjusted return.

II. Mid Cap Funds

HDFC Mid cap fund Kotak Mid cap fund

HDFC Mid cap fund: According to the Linear Regression model, the HDFC Mid Cap Fund's NAV is predicted to have growing trend in the next 2 years. But the model considers on the long-term trend excluding the short-term market fluctuations. The funds NAV is expected to reach 285 in 2 years. The R-Square score of this fund is 0.89 i.e. 89%. This indicates that the model's NAV predictions are correct up to 89%.
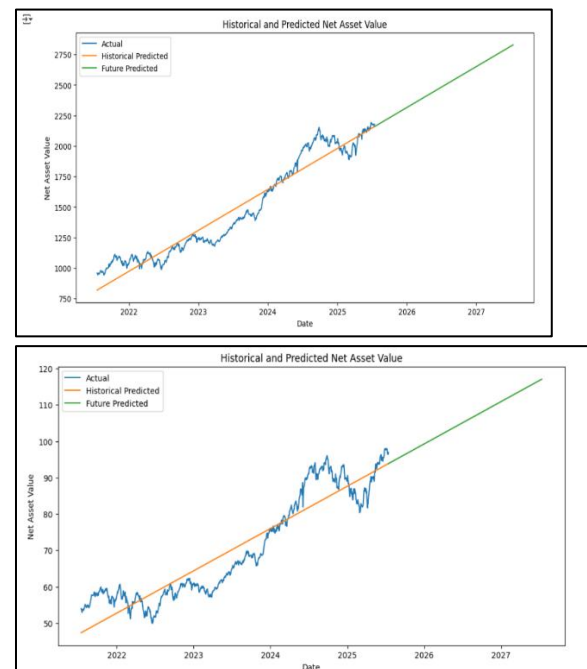
Kotak Mid cap fund: The Linear Regression model has predicted that the Kotak Mid Cap Fund will have increasing trend in the next 2 years but the historic predicted values when compared when actuals have variations. This is because the model does not consider the short-term market fluctuations. The NAV is expected to reach 198 in next 2 years. The R-Square score for this fund's model prediction is 0.85 i.e. 85%. This signifies that the predictions done by model is accurate up to 85%.

	HDFC Mid Cap Fund	Kotak Mid Cap Fund	Category Average
Sharpe Ratio (%)	1.56	1.28	1.18
Treynor's Ratio (%)	0.23	0.19	0.18
Jensen's Ratio (%)	4.54	1.09	0.46
Sortino Ratio (%)	2.03	1.39	1.49

After detailed analysis and interpretation, the HDFC mid cap fund is much better when both HDFC fund and Kotak fund is compared to category average. The AUM of HDFC mid cap fund is greater. The techniques selected by the HDFC mid cap fund in their investments have made the fund have good ratios when compared to the category average. Kotak fund should change their strategies to improve their ratios.

III. Flexi Cap Fund

HDFC Flexi cap fund Kotak Flexi cap fund

HDFC Flexi cap fund: The Linear Regression model has predicted that the HDFC Flexi cap fund is going to show increasing trend in their NAV for next 2 years. But the model has considered only the long-term trend while predicted and has not taken into consideration the volatility that the fund has in the short run. This fund is expected to reach 2800 NAV by next 2 years. The R-Square score for this fund's prediction using

Linear Regression model is 0.92 i.e. 92%. This indicates us that the prediction is 92% accurate.

Kotak Flexi cap fund: Kotak flexi cap fund has seen increase and decrease of NAV values in 2022 and 2023. From 2024, the fund's NAV has seen growth. The model has predicted that the fund will have growing trend in NAV for next 2 years. But the model ignored the short-term fluctuations. It has looked only into long-term performance. The funds NAV is expected to reach 117 by 2027. The R-Square score of this fund's model prediction is 0.84 i.e. 84%. The predictions made by this model is 84% accurate for Kotak flexi cap fund.

	HDFC Flexi Cap Fund	Kotak Flexi Cap Fund	Category Average
Sharpe ratio (%)	1.63	1	0.97
Treynor's ratio (%)	0.2	0.12	0.12
Jensen's ratio (%)	7.25	0.98	0.95
Sortino ratio (%)	2.15	1.44	1.16

Overall, when we compare HDFC flexi cap fund and Kotak flexi cap fund with the category average, the HDFC fund ratios are the highest. Henceforth, HDFC fund is generating better risk adjusted return.

IV. FINDINGS AND CONCLUSION

Findings

Large Cap Funds: The predictive analysis done by the Linear Regression model for ICICI Prudential Large Cap Fund and SBI Large Cap Fund tells us that both the funds will be having growing trend in their NAVs for the next 2 years. The result given by the statistical measure (R-Square) to check the goodness of the model for both ICICI and SBI large cap fund is 87%.

Mid Cap Funds: The Linear Regression model has predicted that the HDFC Mid Cap Fund and Kotak Mid Cap Fund will continue to have growing trend in the NAVs for next 2 years. The goodness fit of the model for HDFC and Kotak mid cap funds are 89% and 85% respectively.

Flexi Cap Funds: The predictions made my Linear Regression model for both HDFC Flexi Cap Fund and Kotak Flexi Cap fund indicates that the funds NAVs are going to experience increasing trend in next 2 years. The score for the model's goodness of fit for HDFC and Kotak flexi cap funds are 92% and 84% respectively.

After thorough analysis and interpretation of the model's predictions of NAVs for next 2 years of selected large cap funds, mid cap funds and flexi cap funds using past 5 years data, it is discovered that the Linear Regression model is considering the long-term growing trend of the funds.

Conclusion

From the study that is done to check whether the Linear Regression model is the best fit to conduct predictive analytics for medium-term horizon, it can be said that the model is considering only the long-term trend ignoring the short-term volatility. The model's goodness of fit is checked using R-Square statistical measure. The score given by this statistical measure for selected large cap, mid cap and flexi cap funds are above 0.80 i.e. 80%. This indicates that the predictions made by the Linear Regression model for these funds are correct and accurate above 80%. Despite having 80% and above accuracy score, the model fails to take into consideration the short-term volatility. The model is considering only the long-term growing trend that the funds are experiencing. Therefore, this model is not completely fit for medium-term horizon predictions as it ignores the short-term volatility that the funds are experiencing because of market uncertainties.

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