

# Forecasting of stock price of Hindustan Bio Science Ltd using hybrid model of PCA, SVR and PSO

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**Abstract:** Stock market is one of exciting and demanding monetary activities for individual investors, and financial analysts. The stock market is an inter-connected important economic international business. Prediction of stock price has become a crucial issue for stock investors and brokers. The stock market is able to influence the day to day life of the common people. The stock price is based on the state of market stability. As the dormant high noises in the data impair the performance, reducing the noise would be competent while constructing the forecasting model. To achieve this task, integration of Principal component analysis (PCA), Support vector regression (SVR) with particle swarm optimization (PSO) is proposed in this research work. PCA is able to remove the unnecessary and unrelated factors, and reduces the dimension of input variables and time complexity. The feasibility and efficiency of this proposed hybrid PCA-SVR-PSO model was applied to forecast the daily open prices of stock index of Hindustan Bio Science Ltd. The performance of the proposed approach is evaluated with 3543 daily transactional data of Hindustan Bio Science Ltd (13<sup>th</sup> December 2001 to 4<sup>th</sup> December 2020) stocks price from Bombay Stock Exchange (BSE). Empirical results show that the proposed model enhances the performance of the prediction model and can be used for taking better decision and more accurate predictions for financial investors.

**Keywords:** *Hindustan Bio Science Ltd, Financial time series forecasting; Principal component analysis; Support vector regression; Particle swarm optimization.*

## 1. Introduction

This paper is aiming to anticipate the upcoming stock price using machine learning based optimization techniques. The evolution of computing power, database technology, and machine learning algorithms helps to predicts stock market index more accurately. However, high volatility in stock prices makes it difficult to predict the stock market movements. Though many specialized techniques of machine learning such as neural networks, support vector machine, genetic algorithms are already established, there are still scope for developing innovative models or systems which can cater the rising needs of investors. The dimension reduction technique PCA is implemented to SVR-PSO to predict the stock price of Tata Motors. Here PCA extracted the relevant features from the data sets which improve the prediction accuracy.

A supervised machine learning task undergoes two main steps, i.e., training and testing phase. During training phase, the model is constructed and same is tested during the testing phase. Then the selected data of Hindustan Bio Sciences are being divided into training (2654) and testing (889) dataset. Now, before entering into the training phase, the dataset undergoes a data pre-processing phase of feature extraction. Then the learning algorithm is selected and its parameters are initialized. In order to end the training process, termination criteria are set.