Stock Prediction using ML

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2

Prediction of stock market returns is an important issue in finance.

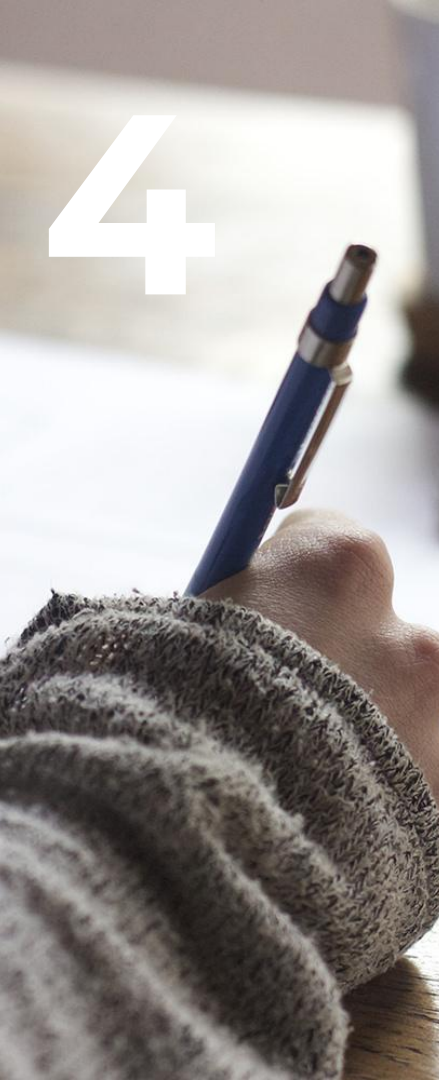
3

PROBLEM STATEMENT

The efficient market hypothesis suggests that stock prices reflect all currently available information.

Any price changes that are not based on newly revealed information thus are inherently unpredictable.

This project focuses on predicting stock price trend for a company in near future.



4

Proposed methods

- **Regression using SVM**:
  Soft margins are used for regression instead of Classification.

- **Artificial Neural Networks**:
  Inspired by biological neurons, decision is distributed throughout the system where components work in unison to solve one problem.

5 Regression using SVM

- In SVM, the error rate is minimized, but in SVR, error is tried is fit within a certain threshold.
- Best fit line used is the hyperplane that has maximum number of points.
- One more additional parameter ε is needed to compute the loss function.

6 Artificial Neural Network

➔ Neural network has input layer, hidden layers and output layer.

Input Layer: We have number of features equal to number on neurons in input layer

Hidden Layer: Set of neurons to store what was learned (can be modified accordingly)

Output Layer:Using only one output layer neuron as we are using it for regression problem.

7

Creating Indicator Functions

- A stock technical indicator is a series of data points that are derived by applying a function to the price data at time and study period.

- Technical indicators use statistical properties of the present and previous samples, so it can be considered as more related feature as it becomes easy to uptrend and downtrend.

8

RSI (Relative Strength Index)

- Measures speed and change of price movements.

- Oscillates between 0 and 100, we consider overbrought above 70 and oversold below 30 (generally)

- RSI = 100 – [100 / (1 + (Average of Upward Price Change / Average of Downward Price Change))]

9

MFI (Money Flow Index)

- Related to RSI but incorporates volume too where RSI considers prices only

- Typical Price = (High + Low + Close)/3

- Next, Money Flow (not the Money Flow Index) is calculated by multiplying the period's Typical Price by the volume.

- Money Flow = Typical Price * Volume

10

- If today's Typical Price is greater than yesterday's typical Price,it is considered Positive Money Flow.

If today's price is less, it is considered Negative Money Flow.

- Money Ratio = Positive Money Flow / Negative Money Flow.
- Finally money flow index is calculated using money ratio.

11

EMA (Exponential Moving Average)

- SMA = avg of price data, EMA = more weight to data which is more current.
- EMA is more sensitive to price movement
- EMA used to determine trend direction
- EMA = (K x (C - P)) + P

where, C = Current Price
P = Previous periods EMA (A SMA is used for the first periods calculations)
K = Exponential smoothing constant

12

Stochastic oscillator

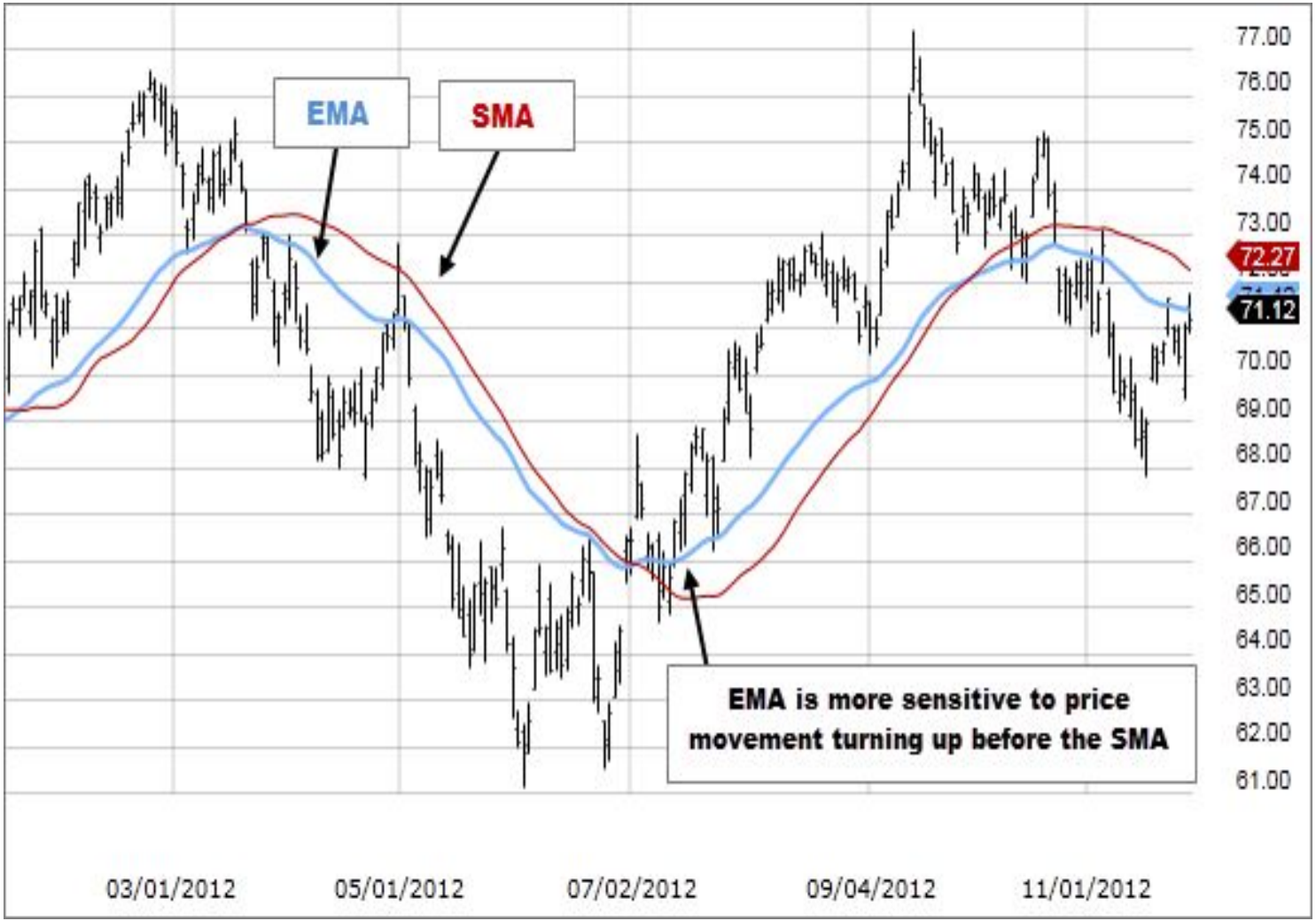
- Shows the location of the close relative to high-low range over a set number of periods.

- The default setting is 14 periods, which can be days,weeks,months or an intraday timeframe.

- K=100[(C-L5close)÷(H5-L5)]

C=the most recent closing price
L5=the low of the five previous trading sessions
H5=the highest price traded during the same five-day period

13

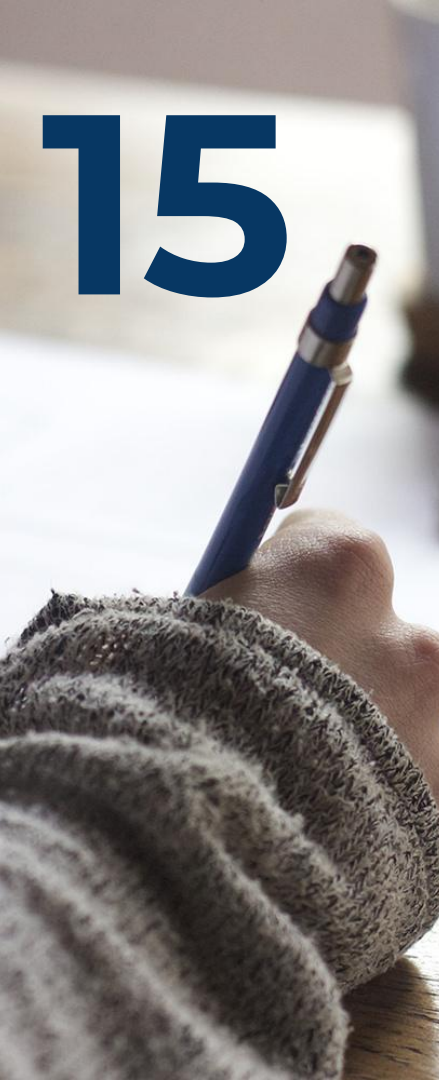

EMA
SMA
EMA is more sensitive to price movement turning up before the SMA
77.00
76.00
75.00
74.00
73.00
72.27
71.12
70.00
69.00
68.00
67.00
66.00
65.00
64.00
63.00
62.00
61.00
03/01/2012
05/01/2012
07/02/2012
09/04/2012
11/01/2012

14

Results

	Linear Regression		SVM regression		ANN	
STOCK	% error	Mean absolute error	%error	Mean absolute error	% error	Mean absolute error
NIFTY	1.29	81	0.64	54	0.70	59.69
PNB	1.96	1.55	1.80	2.66	1.89	2.72
Tata Motors	1.81	6.22	1.56	5.55	1.76	6.13
Axis Bank	1.74	8.66	1.51	6.19	1.62	6.74
Reliance	1.51	61.2	1.19	7	1.32	7.80
TCS	1.92	21.3	1.13	12.93	1.47	16
ITC	1.64	3.33	1.11	2.44	1.27	2.81
SBI	1.76	4.28	1.61	3.88	1.46	3.55

15



THANKS!