**STOCK PRICE ANALYSIS AND FORECASTING**

PREPARED By

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FACULTY GUIDE

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**CERTIFICATE**

This is to certify that the project work entitled “**Stock price analysis and forecasting**” submitted by**Anamika Agrawal(2017BtechCse203)**is completed by them under my supervision and guidance. In my opinion, the submitted work has reached a level required for being accepted for Project – 1 of the course Computer based numerical & statistical techniques.

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Sincerely yours,

Anamika Agrawal (2017BtechCse203)

# 

# ABSTRACT

Identifying trends is important. But how do you spot a trend? It's difficult, as the market never moves in a straight line.A stock will never fall continuously on a given day and rise on another. Also the stock prices on weekends and leaves are missing which can have a significant effect on the data of week days. In this project we aim to find the missing values on weekend days and leaves for 1 financial year for a particular organization and also forecast unknown values and find the error.

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# INTRODUCTION

Stock market prediction is the act of trying to determine the future value of a company stock or other financial instrument traded on an exchange. The successful prediction of a stock's future price could yield significant profit. The efficient-market hypothesis suggests that stock prices reflect all currently available information and any price changes that are not based on newly revealed information thus are inherently unpredictable. Others disagree and those with this viewpoint possess myriad methods and technologies which purportedly allow them to gain future price information.

## Problem Statement

We need to find the missing values in stock data of the financial year 2017-18 using interpolation.

## Objectives

OBJECTIVE 1: To find the missing values i.e, on leaves and weekends in the stock data for the financial year 2017-18 using interpolation.

OBJECTIVE 2: To forecast the value on 2.04.2018 of the next financial year and then find the error.

## Company Profile

MILKFOOD

Incorporated in 1973, Milkfood Limited is located in Patiala, at the heart of a milk-producing region. It is a part of the Jagatjit Group of Industries, with its base at Hamira in Jalandhar (Punjab) and its corporate office in the National Capital, Delhi.Milkfood Limited has Ultra Modern Machinery, Plant Engineering by Expert Professionals in the Dairy Field, Fully Automated & PLC controlled plants, a Fully Equipped Integrated Laboratory dedicated to R&D and continuous improvement of product lines.

Milkfood Limited emphasizes on the importance of making ethical decisions for the benefit of our shareholders, consumers, employees and business as a whole because their trust and confidence is vital for our success.

The company is engaged in the manufacturing and sales of dairy products, such as pure ghee, skimmed milk powder, whole milk powder, casein, de-mineralized whey powder and dairy whitener. The Company offers skimmed milk powder in a range of specifications, such as STANDARD GRADE, EXTRA GRADE and ADPI EXTRA GRADE.Its full cream milk powder is used in milk chocolate, ice-cream, yogurt, cottage cheese and bakery products. The Company's Edible Grade Acid Casein is used in analog cheese, coffee whiteners, whipped toppings, ice cream and frozen desserts, confectionary, milk substitute in processed foods, and noodles, chocolates and sweets. Its de-mineralized whey powder is used in clinical foods, baby foods and milk-based soft drinks. It also offers dairy creamer, which is used for adding flavor in tea and coffee.

The Company's plants are located in Patiala; Hamira (Jalandhar, Punjab), and Moradabad (Uttar Pradesh). MFL Trading Private Limited is the subsidiary of the Company. The company came out with a convertible debenture offer in Feb.91 to part-finance normal capital expenditure, to repay loans and for long-term workingcapital.Brooke Bond Lipton India has acquired the marketing and distribution rights of the Milkfood range of ice-creams.

Milkfood has over 2000 vending outlets predominantly in Delhi and Punjab.During the year 1999-2000, an amount of Rs.328.21 lacs was paid towards final instalment of redemption of debentures. From the intial installed capacity of 80 MT of milk processing per day at Patiala during 1974 the Company at has enhanced the processing capacity from time to time and the present milk processing capacity of all Plants is 1500 MT per day.

In the year 1987 the company commissioned its second plant at Gurgoan in the State of Haryana for the manufacture of Cultured Desserts like Long Life Yoghurts, UHT Milk , Juices etc. and Frozen Desserts Yoghurts like Ice Creams. The Ice Cream brand 'Milkfood 100% Ice cream' still conjurs up memories even years after it's sale to Hindustan Lever.The company has taken on lease a Dairy Plant in 2003 at Hamira, Distt. Kapurthala, in the State of Punjab to supplement the production capacities by 200 MT of milk processing per day. The capacity has since been enhanced to 500 MT of Milk Processing per day.

In 2005, the company has taken expansion plans further to the State of Uttar Pradesh where a fully modernised facility has been set up at Village Agwanpur, Tehsil Moradabad to add capacity of 500 MT of milk processing per day. Whey Protien Concentrates has been initiated at the Bahadurgarh facility, which is likely to be commissioned by end of 2006. Capacity expansion will enable the Bahadurgarh plant to process 700 MT of milk per day.

# DATA COLLECTION AND METHODOLOGY ADOPTED

## 2.1 Data Collection

The data has been collected for the company Milkfood for the financial year 2017-18

from the site Yahoo finance.

## 2.2 Methodology Adopted

1. **Methodology adopted for Objective 1:**

OBJECTIVE 1: To find the missing values i.e, on leaves and weekends in the stock data for the financial year 2017-18 using interpolation.

**Interpolation**

Interpolation,the determination or estimation of the value of f(x), or a function of x, from certain known values of the function. If x0 < … < xn and y0 = f(x0),…, yn = f(xn) are known, and if x0 < x < xn, then the estimated value of f(x) is said to be an interpolation.

**Linear Interpolation**

Linear interpolation involves estimating a new value by connecting two adjacent known values with a straight line.

Let us say that we have two known points x1,y1 and x2,y2.

Now we want to estimate what y value we would get for some x value that is between x1 and x2. Call this y value estimate — an interpolated value.

Two simple methods for choosing y come to mind. The first is see whether x is closer to x1 or to x2. If x is closer to x1 then we use y1 as the estimate, otherwise we use y2. This is called nearest neighbor interpolation.

The second is to draw a straight line between x1,y1 and x2,y2. We look to see the y value on the line for our chosen x. This is linear interpolation.

It is possible to show that the formula of the line between x1,y1 and x2,y2 is:

Equation for linear interpolation

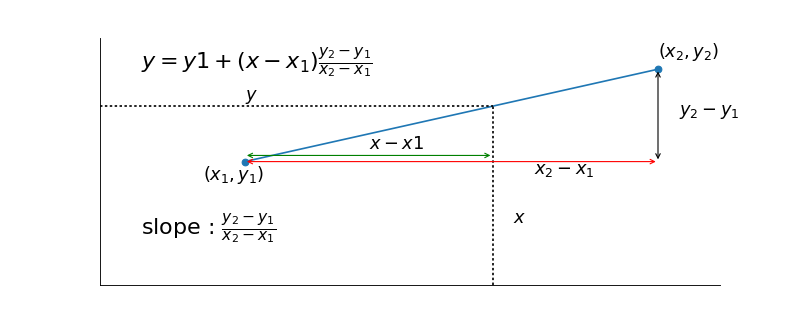


Figure 1 Linear Interpolation

1. **Methodology adopted for Objective 2:**

OBJECTIVE 2: To forecast the value on 2.04.2018 of the next financial year and then

find the error.

**Extrapolation**

Extrapolation is a way to make guesses about the future or about some hypothetical situation based on data that you already know. You’re basically taking your “best guess”.

For example, let’s say your pay increases average $200 per year. You can extrapolate and say that in 10 years, your pay should be about $2,000 higher than today.

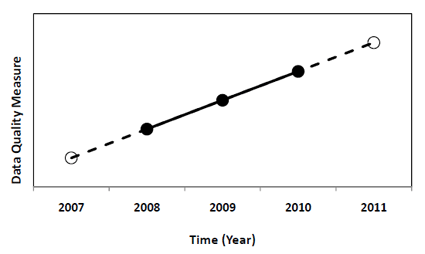


Figure 2 Extrapolation

The formula is given by :-

y2 = (x-x1) + y1

Extrapolation can mean several things in statistics, but they all involve assumption and conjecture :

The extension of a statistical method where you assume similar methods will be used.

The projection, extension, or expansion of your known experience into an area that you do not know or that you haven’t experienced yet.

The use of equations to fit data to a curve. You then use the equation to make conjectures. This is known as curve fitting or regression, which can get quite complex, with the use of tools like the Correlation Coefficient.

**Tool used :** MS-Excel

Excel is a commercial spreadsheet application produced and distributed by Microsoft for Microsoft Windows and Mac OS. It features the ability to perform basic calculations, use graphing tools, create pivot tables and create macros.

Excel has the same basic features as all spreadsheet applications, which use a collection of cells arranged into rows and columns to organize and manipulate data. They can also display data as charts, histograms and line graphs.

Excel permits users to arrange data so as to view various factors from different perspectives. Visual Basic is used for applications in Excel, allowing users to create a variety of complex numerical methods. Programmers are given an option to code directly using the Visual Basic Editor, including Windows for writing code, debugging and code module organization.

**Formulation in Excel****:**

Missing value = A+(A-B)/h

Where, A is the Previous known value

B is the Next known value

And h is the Step size

# MISSING VALUES

**3.1 INTERPOLATED VALUES**

Graph 1.1 Graph for missing values in April

Graph 1.2 Graph for missing values in May

Graph 1.3 Graph for missing values in June

Graph 1.4 Graph for missing values in July

Graph 1.5 Graph for missing values in August

Graph 1.6 Graph for missing values in September

Graph 1.7 Graph for missing values in October

Graph 1.8 Graph for missing values in November

Graph 1.9 Graph for missing values in December

Graph 1.10 Graph for missing values in January

Graph 1.11 Graph for missing values in February

Graph 1.12 Graph for missing values in March

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Date | 01-04-2017 | 02-04-2017 | 04-04-2017 | 08-04-2017 | 09-04-2017 | 14-04-2017 |
| h=x1-x0 | 3 | 2 | 2 | 3 | 2 | 4 |
| x-x0 | 1 | 1 | 1 | 1 | 1 | 1 |
| ∆y0= | -7.149994 | -9.533325 | 3.399994 | 8 | 10.666667 | 1.75 |
| u= | 0.3333333 | 0.5 | 0.5 | 0.3333333 | 0.5 | 0.25 |

Table 1.1 Table for missing values in April

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Date | 15-04-2017 | 16-04-2017 | 22-04-2017 | 23-04-2017 | 29-04-2017 | 30-04-2017 |
| h=x1-x0 | 3 | 2 | 3 | 2 | 4 | 3 |
| x-x0 | 1 | 1 | 1 | 1 | 1 | 1 |
| ∆y0= | 2.1875 | 2.9166667 | -5.733337 | -5.733337 | 7.300003 | 9.1250038 |
| u= | 0.3333333 | 0.5 | 0.3333333 | 0.5 | 0.25 | 0.3333333 |

Table 1.2 Table for missing values in April

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | 01-05-2017 | 06-05-2017 | 07-05-2017 | 13-05-2017 |
| h=x1-x0 | 2 | 3 | 2 | 3 |
| x-x0 | 1 | 1 | 1 | 1 |
| ∆y0= | 12.166672 | -1.300003 | -1.733337 | 3.949997 |
| u= | 0.5 | 0.3333333 | 0.5 | 0.3333333 |

Table 1.3 Table for missing values in May

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date | 14-05-2017 | 20-05-2017 | 21-05-2017 | 27-05-2017 | 28-05-2017 |
| h=x1-x0 | 2 | 3 | 2 | 3 | 2 |
| x-x0 | 1 | 1 | 1 | 1 | 1 |
| ∆y0= | 5.2666627 | 2 | 2.6666667 | -1.099991 | -1.466655 |
| u= | 0.5 | 0.3333333 | 0.5 | 0.3333333 | 0.5 |

Table 1.4 Table for missing values in May

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date | 03-06-2017 | 04-06-2017 | 10-06-2017 | 11-06-2017 | 17-06-2017 |
| h=x1-x0 | 3 | 2 | 2 | 3 | 2 |
| x-x0 | 1 | 1 | 1 | 1 | 1 |
| ∆y0= | 4 | 5.3333333 | 4.949997 | 6.599996 | 0.199997 |
| u= | 0.3333333 | 0.5 | 0.5 | 0.3333333 | 0.5 |

Table 1.5 Table for missing values in June

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | 18-06-2017 | 24-06-2017 | 25-06-2017 | 26-06-2017 |
| h=x1-x0 | 2 | 4 | 3 | 2 |
| x-x0 | 1 | 1 | 1 | 1 |
| ∆y0= | 0.2666627 | -2 | -2.5 | -3.333333 |
| u= | 0.5 | 0.25 | 0.3333333 | 0.5 |

Table 1.6 Table for missing values in June

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date | 01-07-2017 | 02-07-2017 | 08-07-2017 | 09-07-2017 | 15-07-2017 |
|  |  |  |  |  |  |
| h=x1-x0 | 3 | 2 | 3 | 2 | 3 |
| x-x0 | 1 | 1 | 1 | 1 | 1 |
| ∆y0= | 3.350006 | 4.4666747 | 12 | 16 | -2.300003 |
| u= | 0.3333333 | 0.5 | 0.3333333 | 0.5 | 0.3333333 |

Table 1.7 Table for missing values in July

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date | 16-07-2017 | 22-07-2017 | 23-07-2017 | 29-07-2017 | 30-07-2017 |
| h=x1-x0 | 2 | 3 | 2 | 3 | 2 |
| x-x0 | 1 | 1 | 1 | 1 | 1 |
| ∆y0= | -3.066671 | 7.25 | 9.6666667 | 0 | 0 |
| u= | 0.5 | 0.3333333 | 0.5 | 0.3333333 | 0.5 |

Table 1.8 Table for missing values in July

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date | 05-08-2017 | 06-08-2017 | 11-08-2017 | 12-08-2017 | 13-08-2017 |
| h=x1-x0 | 3 | 2 | 4 | 3 | 2 |
| x-x0 | 1 | 1 | 1 | 1 | 1 |
| ∆y0= | 1 | 1.3333333 | -2.850006 | -3.5625075 | -4.75001 |
| u= | 0.3333333 | 0.5 | 0.25 | 0.3333333 | 0.5 |

Table 1.9 Table for missing values in August

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Date | 15-08-2017 | 19-08-2017 | 20-08-2017 | 25-08-2017 | 26-08-2017 | 27-08-2017 |
| h=x1-x0 | 2 | 3 | 2 | 4 | 3 | 2 |
| x-x0 | 1 | 1 | 1 | 1 | 1 | 1 |
| ∆y0= | -6.75 | 0 | 0 | -0.899994 | -1.1249925 | -1.49999 |
| u= | 0.5 | 0.3333333 | 0.5 | 0.25 | 0.3333333 | 0.5 |

Table 1.10 Table for missing values in August

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date | 02-09-2017 | 03-09-2017 | 09-09-2017 | 10-09-2017 | 16-09-2017 |
| h=x1-x0 | 3 | 2 | 3 | 2 | 3 |
| x-x0 | 1 | 1 | 1 | 1 | 1 |
| ∆y0= | -40.75 | -54.33333 | 5.399994 | 7.199992 | 8.75 |
| u= | 0.3333333 | 0.5 | 0.3333333 | 0.5 | 0.3333333 |

Table 1.11 Table for missing values in September

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | 17-09-2017 | 23-09-2017 | 24-09-2017 | 30-09-2017 |
| h=x1-x0 | 2 | 3 | 2 | 2 |
| x-x0 | 1 | 1 | 1 | 1 |
| ∆y0= | 11.666667 | 7.75 | 10.333333 | -4.5 |
| u= | 0.5 | 0.3333333 | 0.5 | 0.5 |

Table 1.12 Table for missing values in September

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date | 01-10-2017 | 02-10-2017 | 07-10-2017 | 08-10-2017 | 14-10-2017 |
| h=x1-x0 | 3 | 2 | 3 | 2 | 3 |
| x-x0 | 1 | 1 | 1 | 1 | 1 |
| ∆y0= | -5.625 | -7.5 | 7.899994 | 10.533325 | 0.150009 |
| u= | 0.3333333 | 0.5 | 0.3333333 | 0.5 | 0.3333333 |

Table 1.13 Table for missing values in October

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Date | 15-10-2017 | 20-10-2017 | 21-10-2017 | 22-10-2017 | 28-10-2017 | 29-10-2017 |
| h=x1-x0 | 2 | 4 | 3 | 2 | 3 | 2 |
| x-x0 | 1 | 1 | 1 | 1 | 1 | 1 |
| ∆y0= | 0.200012 | 8.899994 | 11.124993 | 14.833323 | 1.75 | 2.3333333 |
| u= | 0.5 | 0.25 | 0.3333333 | 0.5 | 0.3333333 | 0.5 |

Table 1.14 Table for missing values in October

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | 04-11-2017 | 05-11-2017 | 11-11-2017 | 12-11-2017 |
| h=x1-x0 | 3 | 2 | 3 | 2 |
| x-x0 | 1 | 1 | 1 | 1 |
| ∆y0= | 0.5 | 0.6666667 | 3 | 4 |
| u= | 0.3333333 | 0.5 | 0.3333333 | 0.5 |

Table 1.15 Table for missing values in November

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | 18-11-2017 | 19-11-2017 | 25-11-2017 | 26-11-2017 |
| h=x1-x0 | 3 | 2 | 4 | 3 |
| x-x0 | 1 | 1 | 1 | 1 |
| ∆y0= | -2.949997 | -3.9333293 | -6.5 | -8.666667 |
| u= | 0.3333333 | 0.5 | 0.25 | 0.3333333 |

Table 1.16 Table for missing values in November

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date | 02-12-2017 | 03-12-2017 | 09-12-2017 | 10-12-2017 | 16-12-2017 |
| h=x1-x0 | 3 | 2 | 3 | 2 | 3 |
| x-x0 | 1 | 1 | 1 | 1 | 1 |
| ∆y0= | 3 | 4 | -11.55002 | -15.40002 | -61.45001 |
| u= | 0.3333333 | 0.5 | 0.3333333 | 0.5 | 0.3333333 |

Table 1.17 Table for missing values in December

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Date | 17-12-2017 | 23-12-2017 | 24-12-2017 | 25-12-2017 | 30-12-2017 | 31-12-2017 |
| h=x1-x0 | 2 | 4 | 3 | 2 | 3 | 2 |
| x-x0 | 1 | 1 | 1 | 1 | 1 | 1 |
| ∆y0= | -81.93335 | -39.45001 | -49.31252 | -65.75002 | 9.149994 | 12.199992 |
| u= | 0.5 | 0.25 | 0.3333333 | 0.5 | 0.3333333 | 0.5 |

Table 1.18 Table for missing values in December

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | 06-01-2018 | 07-01-2018 | 13-01-2018 | 14-01-2018 |
| h=x1-x0 | 3 | 2 | 3 | 2 |
| x-x0 | 1 | 1 | 1 | 1 |
| ∆y0= | 4.050018 | 5.400024 | -4.100006 | -5.466675 |
| u= | 0.3333333 | 0.5 | 0.3333333 | 0.5 |

Table 1.19 Table for missing values in January

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | 20-01-2018 | 21-01-2018 | 26-01-2018 | 27-01-2018 |
| h=x1-x0 | 3 | 2 | 3 | 2 |
| x-x0 | 1 | 1 | 1 | 1 |
| ∆y0= | 12.75 | 17 | 8.75 | 10.9375 |
| u= | 0.3333333 | 0.5 | 0.3333333 | 0.5 |

Table 1.20 Table for missing values in January

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | 03-02-2018 | 04-02-2018 | 10-02-2018 | 11-02-2018 |
| h=x1-x0 | 3 | 2 | 3 | 2 |
| x-x0 | 1 | 1 | 1 | 1 |
| ∆y0= | -2.25 | -3 | -51.85001 | -69.13334 |
| u= | 0.3333333 | 0.5 | 0.3333333 | 0.5 |

Table 1.21 Table for missing values in February

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | 17-02-2018 | 18-02-2018 | 24-02-2018 | 25-02-2018 |
| h=x1-x0 | 3 | 2 | 3 | 2 |
| x-x0 | 1 | 1 | 1 | 1 |
| ∆y0= | 20.5 | 27.333333 | 1.900024 | 2.5333653 |
| u= | 0.3333333 | 0.5 | 0.3333333 | 0.5 |

Table 1.22 Table for missing values in February

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | 02-03-2018 | 03-03-2018 | 04-03-2018 | 10-03-2018 |
| h=x1-x0 | 4 | 3 | 2 | 3 |
| x-x0 | 1 | 1 | 1 | 1 |
| ∆y0= | 18.949982 | 23.687478 | 31.583303 | 1.25 |
| u= | 0.25 | 0.3333333 | 0.5 | 0.3333333 |

Table 1.23 Table for missing values in March

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date | 11-03-2018 | 17-03-2018 | 18-03-2018 | 24-03-2018 | 25-03-2018 |
| h=x1-x0 | 2 | 3 | 2 | 3 | 2 |
| x-x0 | 1 | 1 | 1 | 1 | 1 |
| ∆y0= | 1.6666667 | 10.449982 | 13.933309 | 3 | 4 |
| u= | 0.5 | 0.3333333 | 0.5 | 0.3333333 | 0.5 |

Table 1.24 Table for missing values in March

**3.2 FORECASTING VALUE**

**Finding the equation of line**

y = mx+c

Comparing with the equation for Linear Extrapolation

y2 = (x-x1) + y1

we get,

m = x = x-x1 c=y1

**Forecasted value at 02.04.2018**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Values of y1 , y2 , intercept m and constant c | | | | | |
|  |  |  |  |  |  |
| x1 | 01-03-2018 | **y1** | 528.34998 |  |  |
| x2 | 28-03-2018 | **y2** | 456.29999 |  |  |
| m= | -2.668518 | **x-x0=** | 32 | **c=y1** | 528.35 |
|  |  |  |  |  |  |
| y2= mx+c (Forecasted value) | | | **442.9574** |  |  |

Table 1.25 Values of y1,y2,intercept m,constant c

Original value at 2.04.2018 = 465.4500

Error = | |

Error % = \* 100

**Error at 02.04.2018**

Error = || = 0.048324447

Error % = \*100 = 4.832444686

**CHAPTER 4 : CONCLUSION AND FUTURE**

**SCOPE OF WORK**

## 4.1Conclusion

The missing values for the financial yea r 2017-18 have been found using interpolation.

Interpolation is applied using the tool MS – Excel and graphs have been plotted for each month highlighting the missing values. Also the value for 2.04.2018 has been forecasted using extrapolation by finding the equation of line from the graph.

## 4.2 Recommendations

Using Time Series Analysis

Using Moving averages

Using Artificial Neural networks

## 4.3 Future Scope of Work

Potential improvement can be made in data collection and analysis method.

Future research can be done with possible improvement in the analysis using time series analysis and moving averages.

Implementations of discussion forum and economic news portal for better collection of data.

Machine learning algorithms using artificial neural networks can also be used for forecasting data.

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