

Analysis of Foreign Direct Investment in India using Machine Learning Techniques

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ABSTRACT - With FDI stocks constituting over 2 hundredth of world gross domestic product, FDI has are available in lime light-weight within the world economy. From a handful of years, capitalist confidence has soared within the rising market countries like China and Republic of India and that they became the foremost favored destinations for FDI. In 2005, China, Republic of India and Japanese European countries reached new heights of attractiveness as destinations for FDI as they competed for higher added investments, together with R&D. of these facts create this term project topic a decent suited the theoretical understanding we've developed within the course. during this project we tend to develop Associate in Nursing understanding of the ideas associated with FDI, analyze latest FDI trends in numerous countries and appearance at FDI in Republic of India in bigger detail.

KEYWORD - FDI, Sector, Growth rate.

I. INTRODUCTION

The attraction of foreign investment is one among the foremost vital methods rife in developing countries for enhancing capital formation, generating employment and therefore facilitating growth and development. Republic of India is AN rising country and in recent years has attracted a major share of foreign investment. sweetening in foreign investment within the last 3 decades has been attended with continuous growth of gross domestic product (GDP) in Republic of India. The key issue of this paper revolves round the impact of Foreign Direct Investment (FDI) on the economic performance and development of varied sectors of the Indian Economy.

FDI refers to AN investment created by multi-national enterprises or by a non-resident in AN enterprise of recipient (host) countries through that they earn returns and exercise management on. In India, FDI is taken into account as AN equity capital however in 2002 Government of Republic of India through the International Monetary Fund guidelines¹ (RBI, 2003) redefined FDI inflows and thus enclosed reinvestments and working capital conjointly.

OVERVIEW

Data analysis, conjointly called analysis knowledge |of information or data analytics, may be a method of

inspecting, cleansing, reworking, and modeling knowledge with the goal of discovering helpful data, suggesting conclusions, and supporting decision-making.

Foreign direct investment (FDI) in Asian country may be a major financial supply for economic development in India. Foreign corporations invest directly in quick growing non-public Asian countryn businesses to require edges of cheaper wages and dynamical business setting of India. Economic liberalization started in Asian country in wake of the 1991 economic condition and since then FDI has steady exaggerated in India, that after generated quite one large integer jobs. consistent with the monetary Times, in 2015 Asian country overtook China and therefore the North American country because the high destination for the Foreign Direct Investment. In half of the 2015, Asian country attracted investment of \$31 billion compared to \$28 billion and \$27 billion of China and therefore the North American country severally.

Data mining may be a specific knowledge analysis technique that focuses on modeling and data discovery for prophetic instead of strictly descriptive functions, whereas business intelligence covers knowledge analysis that depends heavily on aggregation, that specialize in business data. data processing uses many various techniques and algorithms to find the link in great amount of knowledge. it's thought-about one among the foremost necessary tool in data technology within the previous decades.

Regression algorithmic program is methodology we have a tendency to use to investigate the FDI information and helps in predicting the long run result supported the previous information sets. equally the K-means clump algorithmic program is use to seek out that sectors are just like one another considering FDI, and that sectors are safer have high rate of growth and low rate of growth, clustering algorithmic program was performed on the FDI dataset. we have a tendency to use the FDI datasets for our study. The information sets are downloaded from the web site data.gov.in. we have a tendency to collected information sets from 2001-2017. The analysis half involves the grouping the info and performing arts the statistics operation on the previous datasets and predicting the results of 2018.

II. LITERATURE SURVEY

A Literature survey may be a form of literary criticism wherever literature review may be an erudite paper which has the present data likewise because the theoretical and method contributions to a selected topic.

Mari Muthu KN, et.al. [2012] An Overview of Foreign Direct Investment in India. This paper tried to create an associate analysis of FDI in India and its impact on growth. It conjointly focuses on the determinants and desires of FDI, year-wise analysis, two-dimensional figure analysis and sources of FDI and reasons. One among the economic aspects of globalization is that the undeniable fact that increasing investments within the sort of foreign direct investments. Within the recent times thanks to the world recession most of the countries haven't been able to pull investments. India has been able to attract higher FDI's than the developed countries even throughout the crisis amount conjointly.

Bhavya Malhotra, et.al. [2014] Foreign Direct Investment: Impact on Indian Economy. With the initiation of economic process, developing countries, notably those in Asia, are witnessing a large surge of FDI inflows throughout the past 20 years. Despite the fact that Bharat has been an arrival to the FDI scene compared to different East Asian countries, its extended market potential and a liberalized policy regime has sustained its attraction as a positive destination for foreign investors. This analysis paper aims to look at the impact of FDI on the Indian economy, notably once 20 years of economic reforms, and analyzes the challenges to position itself favorably within the international competition for FDI. The paper provides the most important policy implications from this analysis, besides drawing attention on the complexities in deciphering FDI knowledge in Bharat.

Dr. M. Syed Ibrahim and A. Muthusamy, et.al. [2017] Role of Foreign Direct Investment (Fdi) in India's Economic Development-An Analysis. Foreign Direct Investment (FDI) plays a very important role in international business. It will give a firm with new promoting channels, cheaper production facilities, access to technology transfer, product, skills and finance. With the appearance of economic process and powerful governmental support, foreign investment has helped the Indian economy grow enormously. Republic of India has ceaselessly sought-after to draw in investment from the world's major investors. In 1998 and 1999, the govt. of Republic of India declared a variety of reforms designed to encourage and promote a good business setting for investors. Foreign investments within the country will absorb the shape of investments in listed corporations i.e.,

Yoon Jung Choi and JunghoBaek et.al. [2017] Does FDI extremely refer economic process in India? The most contribution of this text is to look at the productivity outcome effects from India's inward foreign direct investment (FDI), dominant for trade, within the framework of the co-integrated vector motorcar regression (CVAR). For this purpose, mistreatment the Solow residual

approach the mixture total issue productivity (TFP) in Asian nation is calculable to live FDI-induced spill overs. The results show that the flow of FDI to Asian nation so improves TFP growth through positive outcome effects. We have a tendency to conjointly notice that trade seems to possess a prejudice result on TFP growth in Asian nation.

Abhishek Vijay Kumar Vyas [2019] An analytical Study of FDI in India: Foreign Direct investment plays a awfully vital role within the development of the state. Generally domestically accessible capital is insufficient for the aim of overall development of the country. Foreign capital is seen as some way of filling in gaps between domestic savings and investment. Asian nation will attract abundant larger foreign investments than it's tired the past. This study has targeted on the trends of FDI Flow in Asian nation throughout 2000-01 to 2014-15 (up to Gregorian calendar month, 2015). The study conjointly highlights country wise approvals of FDI inflows to Asian nation and also the FDI inflows in numerous sector for the amount Gregorian calendar month 2000 to Gregorian calendar month 2015. The study supported Secondary knowledge that are collected through reports of the Ministry of Commerce and trade, Department of business Promotion and Policy, Government of Asian nation, banking company of Asian nation, and World Investment Report. The study concludes that Mauritius emerged because the most dominant supply of FDI causative. It's as a result of the Asian nation has Double Taxation turning away Agreement (DTAA) with Mauritius and most of the foreign countries prefer to invest in commission sector.

III. DATA AND METHODOLOGY

A. OVERVIEW

A regression formula is meant to search out the historical relationship between associate freelance and a variable to predict the long run values of the variable. A regression models the past relationship between variables to predict their future behavior.

K-means clump formula was wont to investigate the high and low-frequency FDI rates.

REGRESSION ALGORITHM

A regression algorithmic program is meant to search out the historical relationship between AN freelance and a variable to predict the long run values of the variable. A regression models the past relationship between variables to predict their future behavior. The Algorithm uses the linear regression techniques based on the data set collected for the project. The linear regression technique helps in predicting the result of FDI rate for 2020. The algorithm find the mean and variance value of the dependent variables, and apply the formula $Y=b_0+b_1*x$ to predict the future behavior.

Steps Involved:

1. Scan the transaction database and perform the operation on the missing values.

2. Calculate Mean and Variance.
3. Calculate Covariance.
4. Estimate Coefficients.
5. Make Predictions.
6. Predict Insurance.

K-MEANS CLUSTERING

K-means clustering algorithmic program was accustomed investigate the high and low-frequency gross domestic product locations. The algorithmic program follows an easy and simple thanks to classify a given information set through an explicit variety of clusters (assume k clusters) mounted a priori. the most aim is to outline k centroids, one for every cluster. M These centroids ought to be placed during a crafty method as a result of totally different location causes different result. So, the higher selection is to position them the maximum amount as potential isolated from one another. subsequent step is to require every purpose happiness to a given information set and associate it to the closest center of mass. once no purpose is unfinished, the primary step is completed associate degreed an early cluster age is completed. At now re-calculate k new centroids as new centers of the clusters ensuing from the previous step. once we've these k new centroids, a replacement binding must be done between constant information set points and therefore the nearest new center of mass. A loop has been generated. As a result of this loop we have a tendency to could notice that the k centroids modification their location step by step till now a lot of changes square measure done. Steps Involved:

1. Place K points into the space represented by the objects that are being clustered. These points represent initial group centroids.
2. Assign each object to the group that has the closest centroid.
3. When all objects have been assigned, recalculate the positions of the K centroids.
4. Repeat Steps 2 and 3 until the centroids no longer move. This produces a separation of the objects into groups from which the metric to be minimized can be calculated.

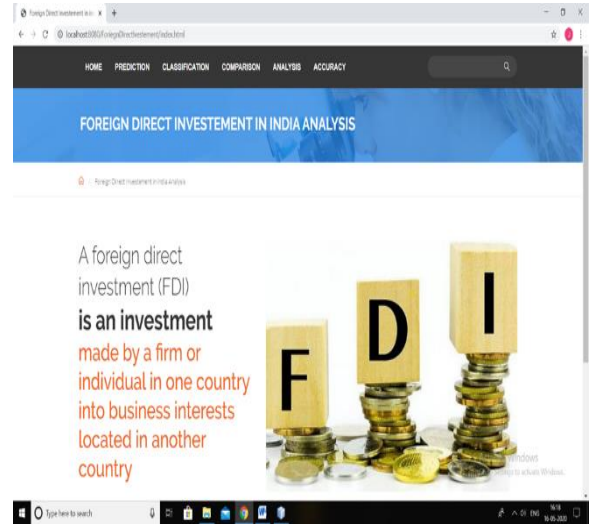
RESULT

The algorithms are implemented to fetch the result based on the parameters.

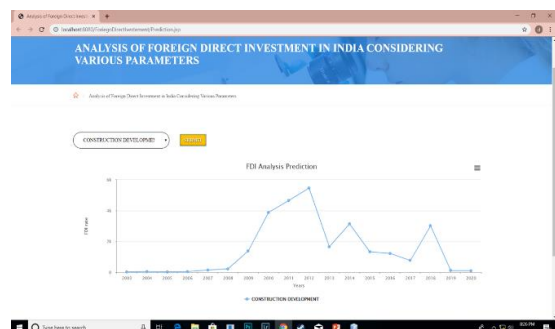
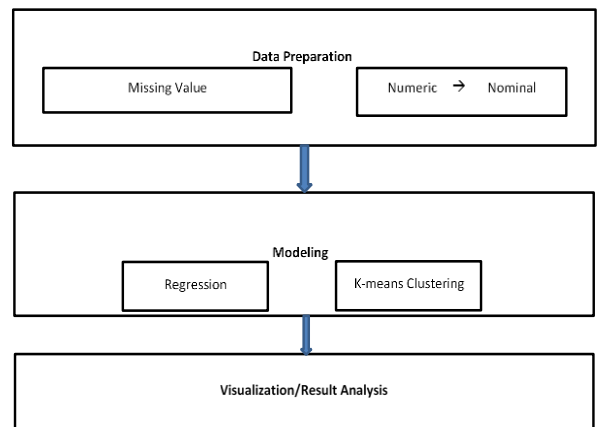
The regression algorithm helps in predicting the result for 2020 considering various parameters. The dashboard provides the selection of sectors and year, based on the

selection, the algorithm applies the statistical method to the previous data sets (2003- 2019) and predict the result of 2020.

K-means cluster rule was wont to investigate the high and low-frequency FDI rates. The centroid of clustering was calculated based on the total number of FDIs happens to the total number of sectors. Based on the average value the cluster of high and low sectors are displayed separately.



B. SYSTEM ARCHITECTURE



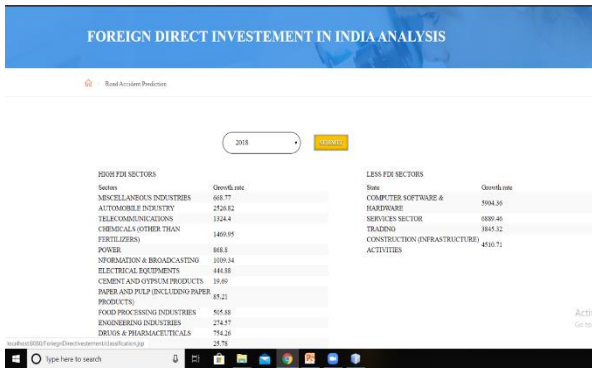


Figure 1: High-level design of FDI analysis prediction.

DATA PREPARATION:

Data preparation was performed before every model construction. All records with missing worth (usually delineate by zero within the dataset) within the chosen attributes were removed. All numerical values were regenerate to value per the information wordbook.

- **Missing Values:** Occurs when the no data value is stored for the observation.

MODELING:

We initially calculate many statistics from the knowledge set to indicate the essential characteristics of the FDI data, then applied Regression and agglomeration Relationships among the attributes and also the patterns.

RESULT ANALYSIS:

The results of our analysis embody association rules among the variables, bunch of sectors supported parameters, and classification of the regions as being high or low FDI rates. we tend to use a knowledge analytic tool like High charts to perform these analyses.

IV. PERFORMANCE EVALUATION

Snapshot 1: Home Page of FDI analysis.

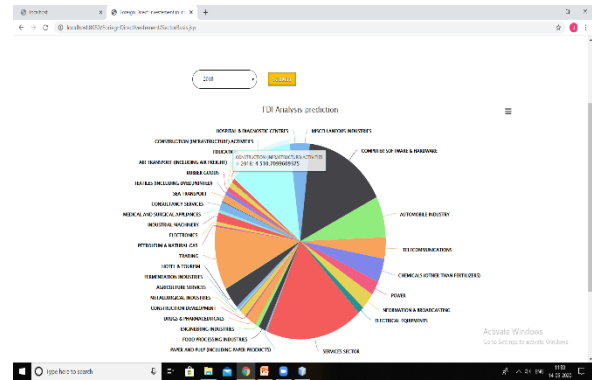
Snapshot 1 shows Home Page Where Prediction, classification and Comparison pages present and clicking there respective pages will open.

Snapshot 2: Prediction Page of construction development.

Snapshot 2 shows the Prediction page where user selects sector called construction development to which FDI of 2020 should be predicted and displays the 2020 FDI rate of that sector.

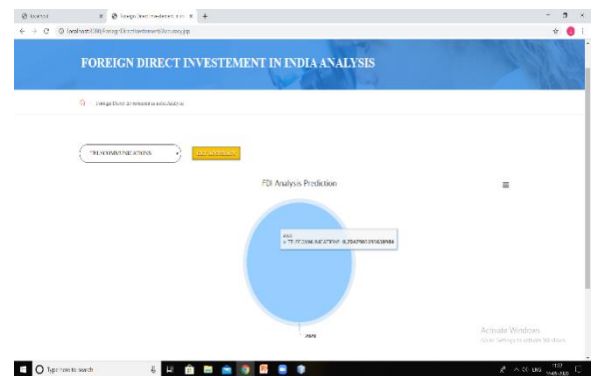
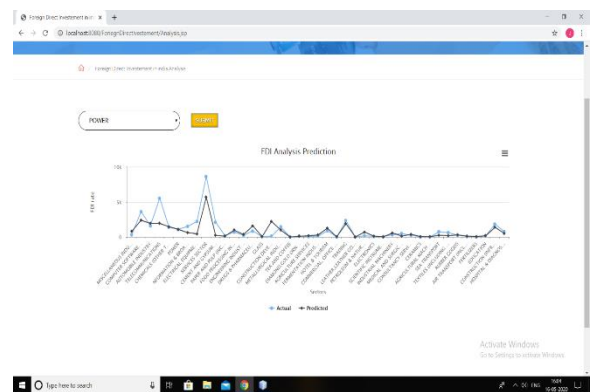
Snapshot 3: Classification Page based on FDI rates for the year 2018.

Snapshot 3 shows the Classification page where user selects Year then this page displays classified high and low FDI sectors in that selected year.



Snapshot 4: Comparison Page of sectors for the year 2018.

Snapshot 4 shows the Comparison page where user selects Year then this page compares each sector's FDI rates and displays in the pie chart form



Snapshot 5: Analysis Page of the sector Power.

Snapshot 5 shows the Analysis page where predicted 2019 FDI rate is analyzed with actual 2019 FDI rate of various sectors.

Snapshot 6: Accuracy Page of Telecommunication for the year 2020.

Snapshot 6 shows the Accuracy page where it displays predicted 2020 FDI rate of telecommunication sector in pie chart.

V. CONCLUSION

The developed application will help in predicting the result for 2020. Prediction algorithm called Linear Regression algorithms are applied on Foreign Direct Investment datasets (data sets are collected from the data.gov.in). Predictions are shown for every parameter which helps for government to take action. Sometimes datasets will be too large, in such cases using Polynomial Regression helps in minimizing the sum of square errors. K-Means Clustering algorithm helps in differentiating high and low FDI rate based on collected datasets. Because of COVID-19 the FDI could shrink by 5% to 15% globally. As seen in statistics, linear regression, the classification, the environmental factors like, Metallurgy Industries, Media, transport etc. have shown the predicted result, some results shows low FDI rate and some show high FDI rates.

VI. REFERENCE

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