Abstract: The immigration to Canada impacts the government in different manner like increase in population, waste, fossil fuel and it also benefits like increase economic growth, trade which will increase the GDP value of Canada, increase in workforce of country, open market, globalization, technologies and adapt to different cultures, food, and people[1]. These would result in a decrease in discrimination and awareness about their rights and duties. The immigrants are more interested in entrepreneurship than others[2]. Which would impact increase in development in the country. The work explores the impact of immigration to Canada from all around the world. The top 5 countries that immigrate to Canada is analyzed by using Jupyter notebook. The prediction is done only for the top 5 countries that immigrate to Canada by analyzing the previous immigrants from 1980 - 2013. The multiple linear regression is used to analyze the data.

Keywords: Entrepreneurship, Multiple Linear Regression, Globalization, Workforce.

I. INTRODUCTION

The intention of this research is to analyze the data and visualized the immigrants to Canada from top 5 countries (India, China, United Kingdom, Philippines and Pakistan). The data is analyzed by Jupyter notebook and creating of feature set. The data is reshaped and reworked to obtain the data as requested to do further changes. Plotting of graph for the model obtained by analyzing the data using multiple linear or multiple nonlinear regression it can be performed by numerous ways like by using Azure Machine Learning Studio or by Jupyter notebook.

II. DATA WRANGLING & SCRUTINIZE

The data gathered for Canada immigration from all 197 countries is in the form of raw data, the data is filled in an excel file and that is converted to an .csv file. The .csv file is uploaded in Jupyter notebook by using NumPy, Pandas, matplotlib library files. The is modify to be very effective to use.

A. Source of Data

1. United Nation department of economic and social affairs.
   Dataset features:
   1. Type
   2. Coverage
   3. Country name
   4. Area
   5. Area name
   6. Region
   7. Region name
   8. Dev
   9. Dev name
   10. 1980 - 2013 Years
   Years holds the number of immigrants to Canada from each country.

World bank open data
   Dataset features:
   1. Population growth
   2. Education growth
   3. Income
   4. CO2 damage
   5. Natural resources
   These data are taken for India, China, United Kingdom, Philippines and Pakistan because they are the top 5 countries immigrate to Canada by the analysis made using jupyter notebook.

Structure: The raw data is in the form of text document with comma (’,’) as separator between each attribute and the new entry record is separated by new line. The raw data is converted to .csv by using excel with comma (’,’) as separator with the attributes. The .csv file is uploaded to Jupyter notebook by using library file like NumPy, pandas and matplotlib. The top 5 countries that immigrate to Canada are found using multiple linear regression.

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B. Top 5 Countries

III. REGRESSION

There is more than one technique to do this operation. The data can be branched into two groups 1. Unsupervised technique, 2. Supervised technique. The Unsupervised technique is used for clustering, dimension reduction, density estimation, market basket analysis. The data in unsupervised are all unlabeled and the model works by its own to unrevealed new information. The supervised technique is used for classification and regression models, there are used to predict the future data by analysis the vast amount of previous data. The work uses regression model to predict the data instead of classification model because in our data it is not classifying anything like whether the developing countries or developed countries are immigrating. The work focuses only on predicting the increase number of immigrants to canada for top 5 countries.

The model of multi-variable linear regression can be represented by the following:

\[ Y = a_1X_1 + a_2X_2 + a_3X_3 \ldots a_nX_n + b \]

The work used the multiple regression model because it is using multiple independent variable to predict one dependent variable

IV. MULTIPLE REGRESSION

The multiple regressions can be done easily using microsoft excel sheets instead of using jupyter notebook. The data of the top 5 countries that immigrated to canada from 1980 - 2013. The data separate the countries into 5 different feature sets and for each country adding 6 new parameters.

For all top 5 country feature set:
1. Years [ 1980 - 2013]
2. Population growth
3. Education growth
4. Income
5. Nature expense
6. CO2 damages
7. Number of immigrants to Canada

V. EXCEL OPERATION

The work is using excel to do multiple regression both linear and nonlinear models. By the model it is able to find the accuracy of the model to predict for future data by using the independent variables. Before doing multiple regression in excel the work need to check it have the necessary data

VI. METHODOLOGY

The number of immigrants to canada from each country will be analyzed and will provide us the accuracy and error of the model. If the error is more the model will be useless to predict the number of immigrants to canada from that country.

Error > 5000, The standard error is the average standard variance of the population. So the standard error should be less if there are more 5000 variances between the points, then we assume it will have high error. Then the model is not useful, if the error is more than 5000 with that huge difference the work can’t predict the number of immigrants to canada with high accuracy.
VII. RESULT AND DISCUSSION

The work analyses the population growth, education growth, CO2 damage, income, years and natural resources are the independent variables, which are used to predict the dependent variable number of immigrants to Canada from the top 5 countries, they are India, China, United Kingdom, Philippines and Pakistan.

A. India – Canada Immigration

India is a developing country with vast population. There are 1.1 billion people and it will increase in the upcoming years. The huge growth of population has led to be the main reason for increase in immigrants. The prediction is made for number of immigrants to Canada from India. The prediction results as can out it looks very good.

![Normal Probability Plot](image1)

Fig. 3. Percentile vs Percentile India Immigration

1. Accuracy (r) - 94.8%
2. Error - 3175 (less)

Table I. India Statistic Output

<table>
<thead>
<tr>
<th>Regression Statistics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple R</td>
<td>0.9579341594</td>
</tr>
<tr>
<td>R Square</td>
<td>0.9176378537</td>
</tr>
<tr>
<td>Adjusted R Square</td>
<td>0.8993351545</td>
</tr>
<tr>
<td>Standard Error</td>
<td>3175.102009</td>
</tr>
<tr>
<td>Observations</td>
<td>34</td>
</tr>
</tbody>
</table>

B. China – Canada Immigration

China is the most populated country in the whole world. It has over 1.3 billion people with 5 time zones. China is growing 0.5% of population per year. By this growth rates the number of youngsters also increases with great skills and intelligence. China is becoming more powerful day by day on military, developments and technology. Asian’s are becoming more influential for future technologies. These made other countries to hire or work with them because of their hardworking skills and intelligence. These job offers from multinational companies are increasing and getting a greater paycheck.

![Normal Probability Plot](image2)

Fig. 4. Percentile vs Percentile China Immigration

1. Accuracy (r) - 96.3%
2. Error - 3634 (less)

Table II. China Statistic Output

<table>
<thead>
<tr>
<th>Regression Statistics</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Multiple R</td>
<td>0.9701973613</td>
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<tr>
<td>R Square</td>
<td>0.9412829198</td>
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<tr>
<td>Adjusted R Square</td>
<td>0.9282346798</td>
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<tr>
<td>Standard Error</td>
<td>3634.800136</td>
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<tr>
<td>Observations</td>
<td>34</td>
</tr>
</tbody>
</table>

C. United Kingdom – Canada Immigration

United Kingdom is a developed country where there was a time when people immigrated to Canada. The immigrants to Canada from the great Britain were so high that was even named “Great Migration of Canada”. At that time over 800,000 people were immigrated to Canada from Europe. At present the immigrants to Canada is decreasing each year.

![Normal Probability Plot](image3)

Fig. 5. Percentile vs Percentile United Kingdom Immigration

1. Accuracy (r) - 72.02%
2. Error - 7122 (high)

Table III. United Kingdom Statistic Output

<table>
<thead>
<tr>
<th>Regression Statistics</th>
<th></th>
</tr>
</thead>
<tbody>
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<td>Adjusted R Square</td>
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<td>Standard Error</td>
<td>7122.666829</td>
</tr>
<tr>
<td>Observations</td>
<td>34</td>
</tr>
</tbody>
</table>

D. Philippines – Canada Immigration

Philippines is overpopulated country with a small amount of surface area. Philippines has become the 3rd biggest groups in Canada. There was a tremendous increase in immigration to Canada from 1970’s due to instability of economic and difficulties in government. So, people tended to immigrate to Canada and it will continue to increase in the future too.
The immigration to Canada from the top 5 countries has been analyzed and found that the immigration from India is going to be increasing with an accuracy of 94.8%. The immigration from China will be increasing with accuracy of 96.3%. The immigration from the United Kingdom will be increasing with less accuracy of 72.02%. The immigration from Philippines will increase with accuracy of 91.01%. The immigration from Pakistan will also increase with accuracy of 87.3%. The accuracy is found using multiple regression and the top 5 countries are found using jupyter notebook with operations like NumPy, pandas and matplotlib. The growth of immigrants to Canada will result in an increase in the workforce, technology, economic growth, open markets, globalization and it is a win-win for both the people and the country.

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