Predicting life expectancy using machine learning

Predicting Life Expectancy using ML

Project Descriptions:

Category: Machine Learning

Aim: Predecting the Life Expectancy of humans in the upcoming future by taking some dependent features into consideration

1. In this project we will create a Machine Learning model by using the historical data (data which is collected by origination in past years) to predict the future.
2. As the output is numerical value (Life expectancy in years) theMachine Learning Model must be aregression.

Famous Regression Models are

a. Linear Regression
b. Polynomial Regression
c. Decision Tree Regression
d. Random Forest Regression

Project Requirments:

The scope of this project is to predict the Life Expectancy of Humans in future we can't predict the future easily by taking simple assumption , Because as the Technology increasing for most of the

deseases we have treatment ,At the same time passes environment is polluting day by bay because of our technology ,By this we cant easily predict Life Expectancy in future, for that we need a model which can do our work in more efficient way by analysing collected data in past
To do this we need Data Data Analysing Tools

Technical Requirements:

1. Gathering data from different resources and storing them in single file in an organized manner (json,csv)

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2. We will use python language for creating our model as Python has a huge range of pre defined packages in different domains such as (Data Scienct ,AI,ML,NLP.)
3. we need a Computer with an internet connection and python with preinstalled packages as follow

   Numpy
   pandas
   jupyter
   matplotlib
   seaborn
   sklearn
   scipy

These are the basic packages required for creation of ML - Model using python

4.To Deploy our model we need Cloud Support

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Category - Machine Learning
Time period - 30 days
Data - WHO data sheet from kaggle expectancy with 22 features from 193 countries and 2398 records (2000-2015) year data
Tools - python , whatson studio, node red app, IBM cloud.

Project submitted by - ANKIT PAUL

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1. INTRODUCTION

a. OverView

This Project is done under the guidelines from SmartInterz Team.
This helped me to start learning Machine Learning. I'm going to use a huge data and some IBM Cloud
Tools to complete our project.

I think it one of My grate Opportunities
In this project we are going to work on Huge data set
with python to handle that data

b. Purpose

Purpose of this project is to predict life expectancy of a country by using some dependent features .

This will help Government and other Non-Governmental Organizations to take most effective steps to increase the life expectancy of Humans

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2. LITERATURE SURVEY

a. Existing Problems on LifeExpectancy

The most important causes of death in Western industrialized countries are cardio and cerebrovascular diseases and malignancies. For instance, in Germany in 2008, 68.6% of all women and 65.9% of all men died from thesediseases.

The third most frequent cause of death are respiratory diseases which cause less than 10% of deaths each year.

Not only because of diseases even climatic changes, natural disaster, human mistakes in huge industries where many people work

b. ProposedSolution

Regular physical activities reduces the risk and improves many diseases including arterial hypertension, diabetes , obesity, coronary heart disease, chronic heart failure, and chronic obstructive pulmonary disease .

In addition, the risk of colon , breast ,lung diseases, and pancreatic cancer is reduced, Even there physical Fitness will help them towithstand the natural disaster and climatic changes.

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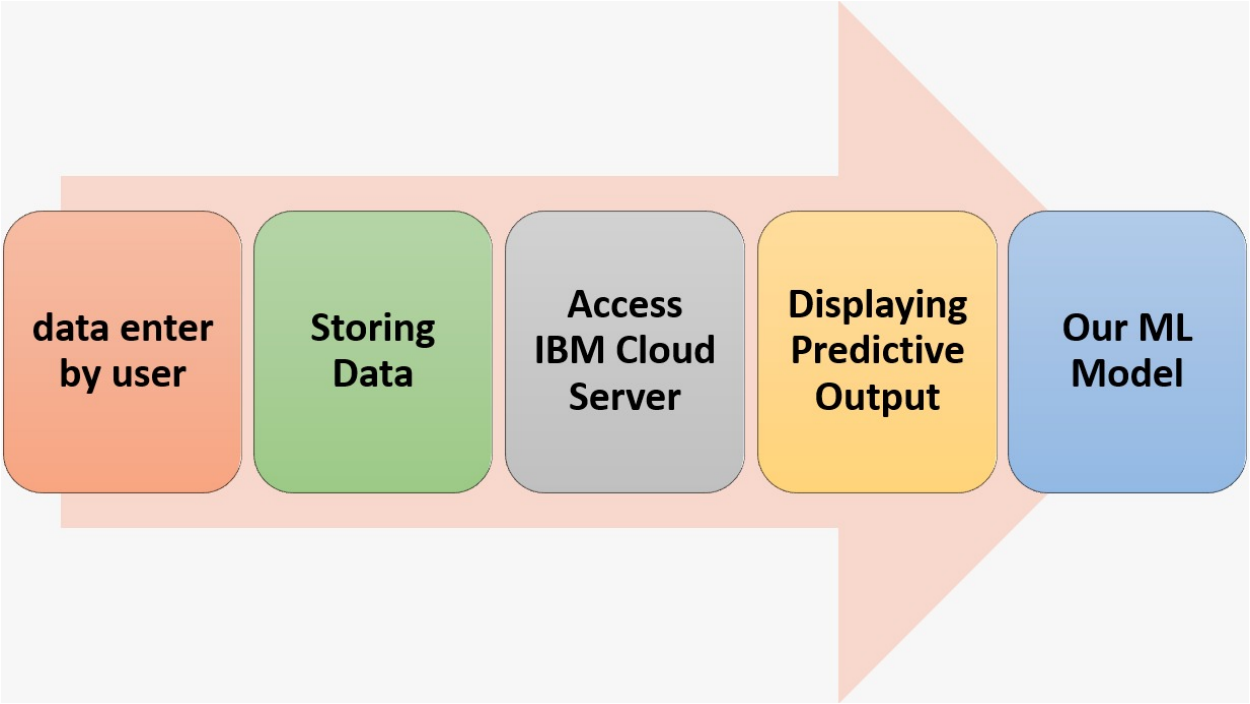
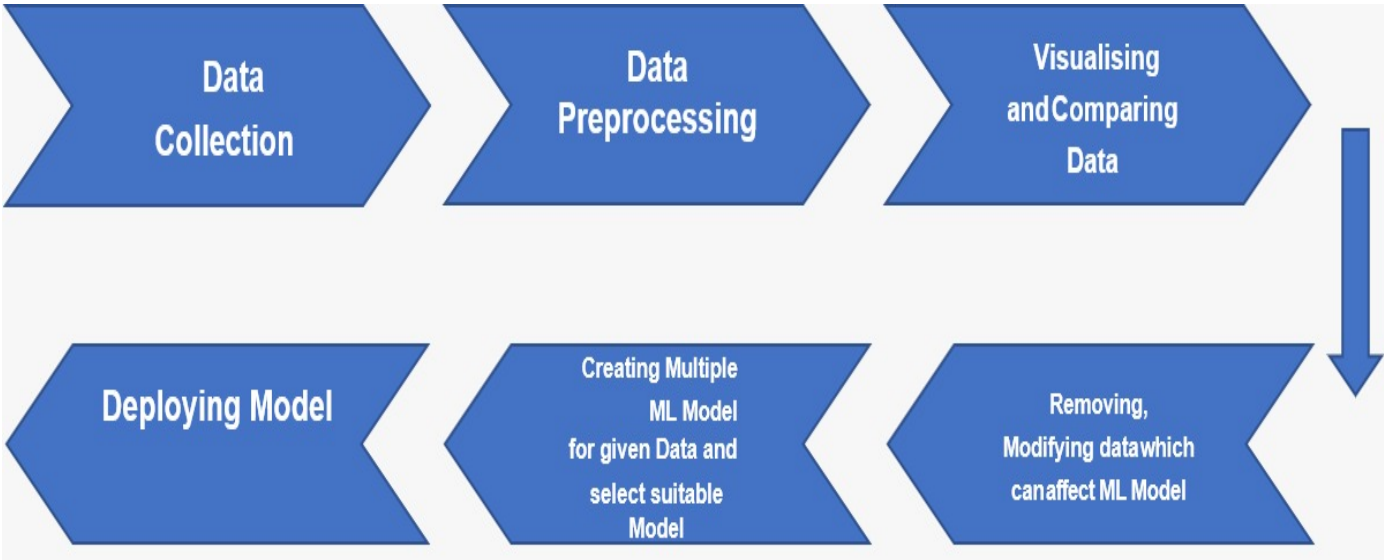
3. Theoretical analysis

3.1.1 Block diagram



3.1.2 Machine learning model



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3.2 Software and Hardware

Software from IBM

1. **IBM Cloudservice**
2. **Watson Studio :** To create our model using jupyternotebook
3. **Machine learning service :** Deploying the createdmodel
4. **Node red app :** Creating dashboard for our MLmodel

Hardware

5. **IBM cloudstorage**
6. **IBM cloudserver**

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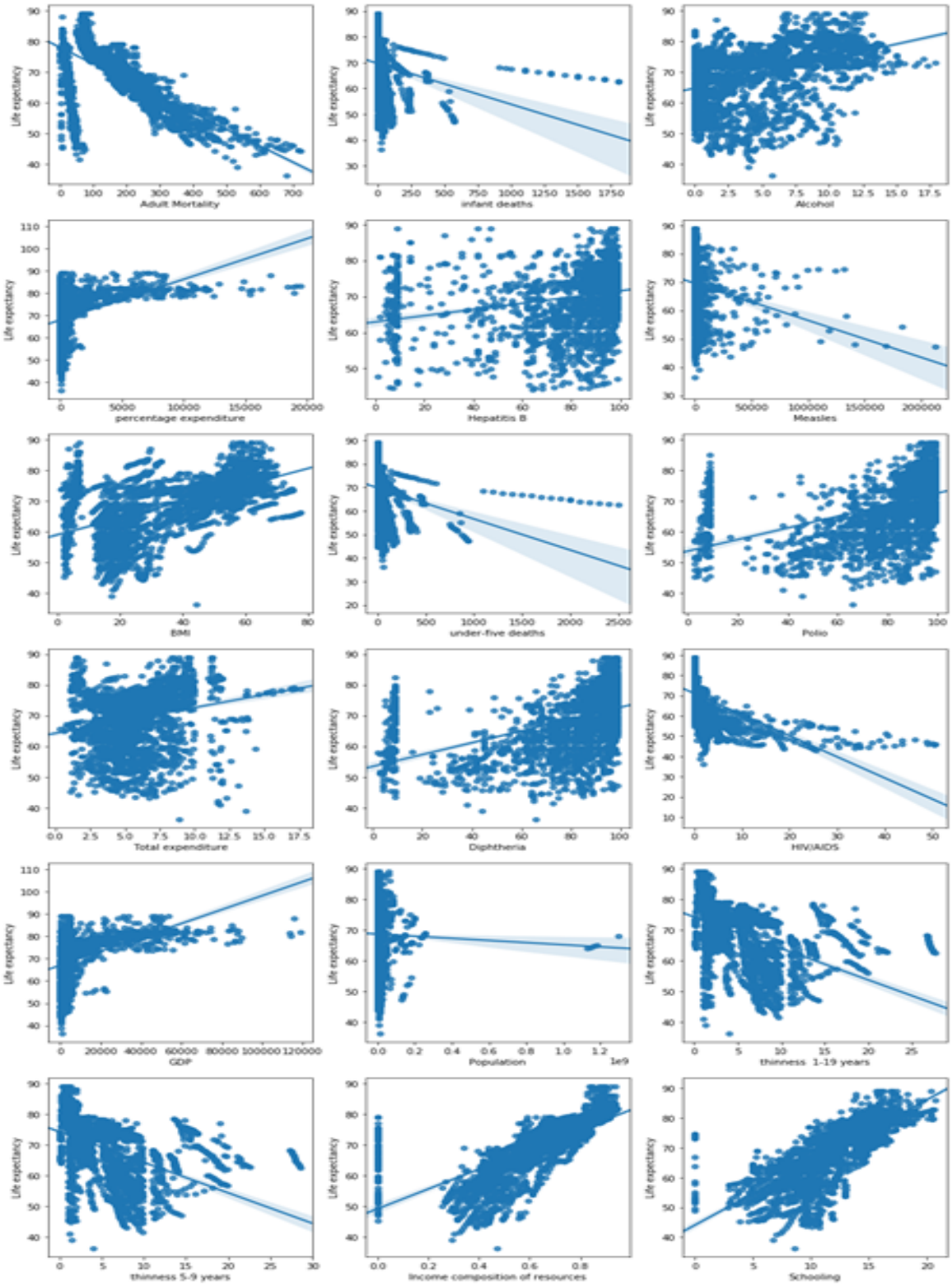
4. Experimental investigation

4.1 Comparing life expectacy with other features



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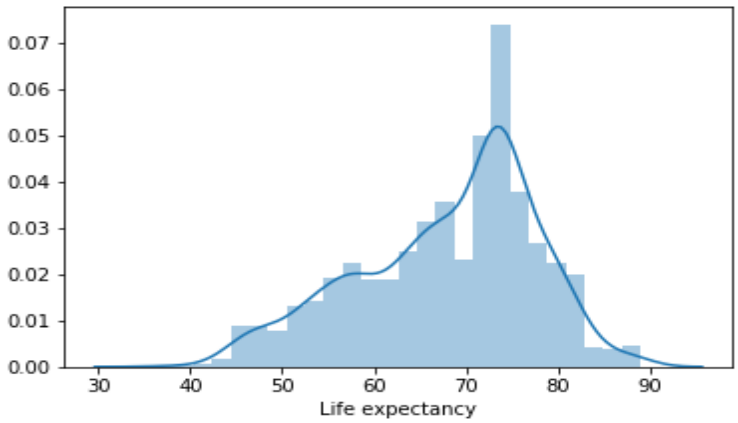
In above graphs we can see some regular pattern in between Life Expectancy and other features
Some of the important features based on the above graph are

1. AdultMortality
2. Alcohol intake
3. Schooling
4. PercentageExpenditure
5. HIV/AIDS
6. Income composition of resources

4.2 Life Expectancy Plot



In above graph we can view that most of the countries having Life Expectancy in between 70 -80 years

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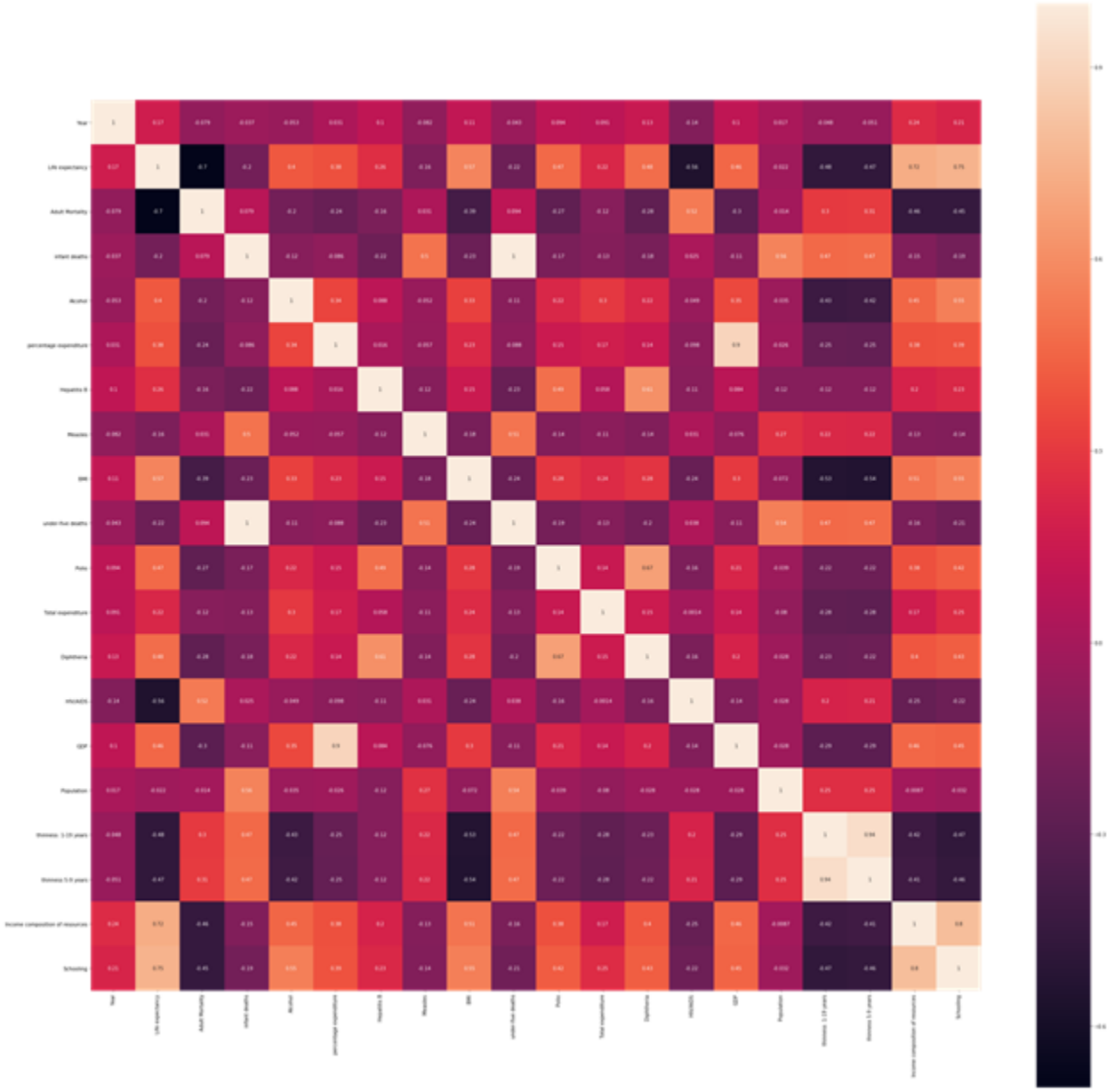
4.3 Correlation between attribute visualizing using Heat-map



1. Correlation to check how strong the attributes are dependent to each other.
2. In the above graph , light color are show highly dependent attributes and dark are show less dependent attributes.

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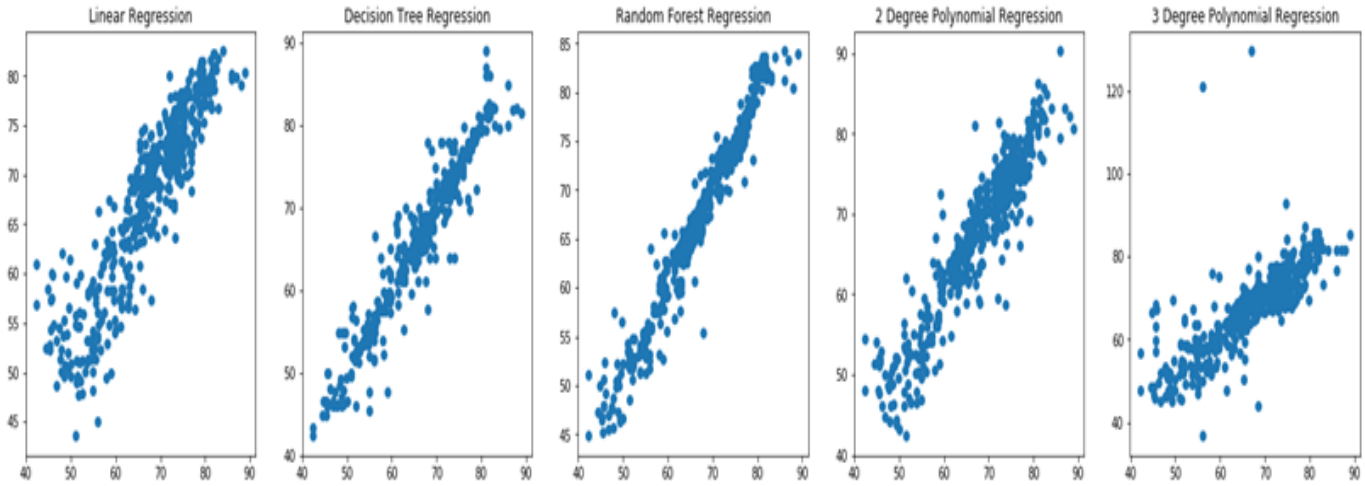
4.4 Visualizing which model is most efficient



Here I used five models :

Linear regression model

Decision tree model

Random forest regression model

2-degree polynomial regression

3-degree polynomial regression

From above graph we can see that Random Forest Regression is most effective model for our data

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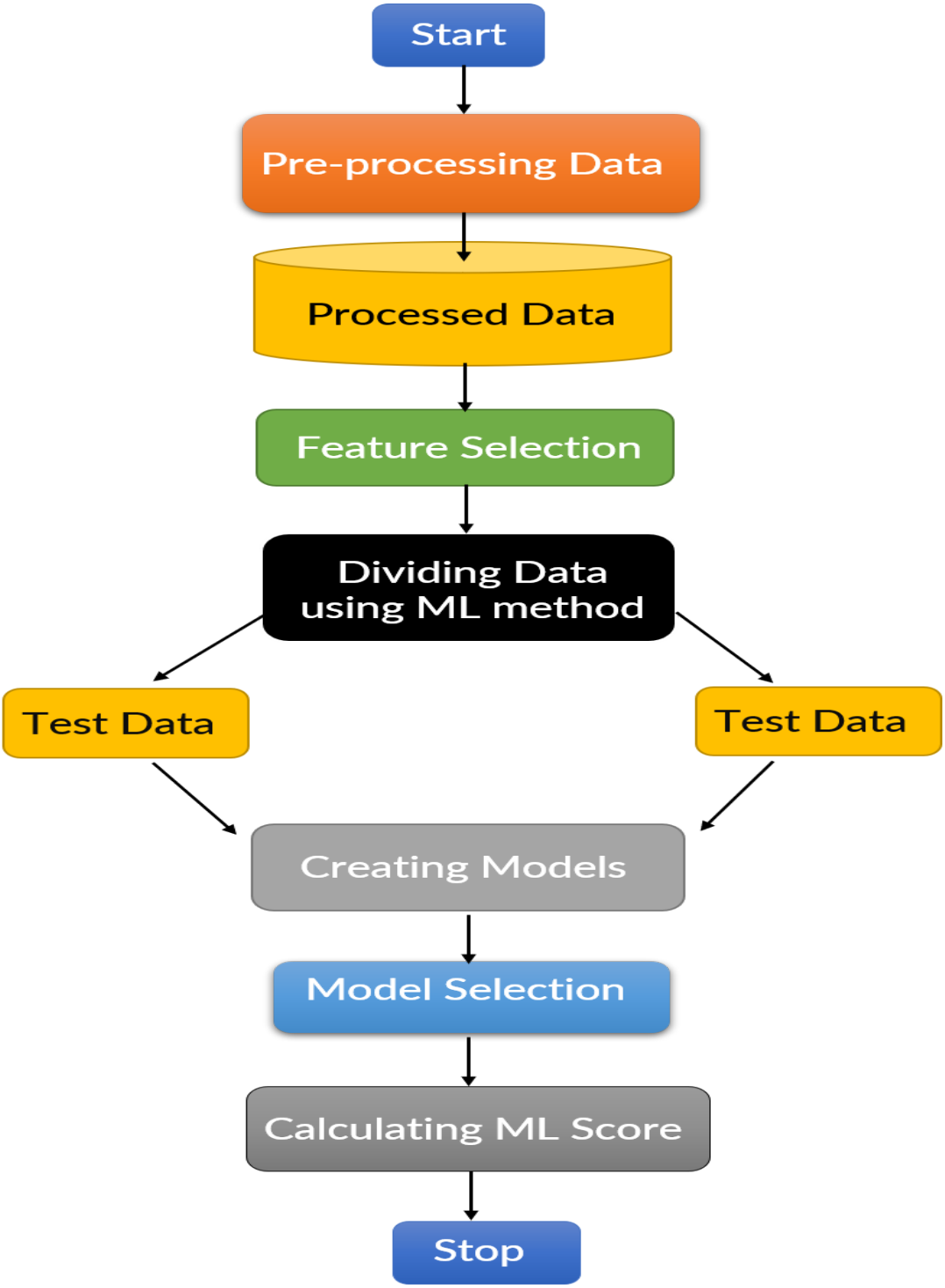
5. Flow chart



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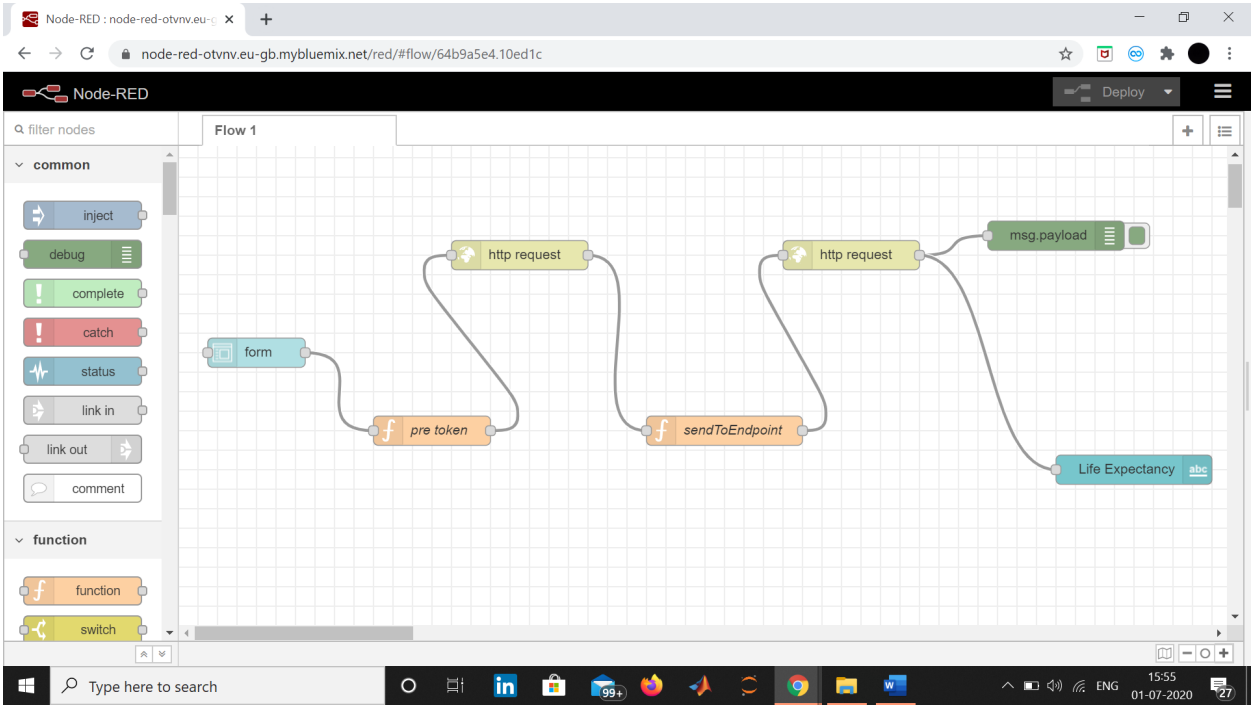
Node Red flow



Explanation:

1. We are using form Node for taking input from user in the form Format
2. Set token is a function which is used convert local variables in to global and creating a MSG for HTTP request to get access from IBM cloud
3. Token function is used to create msg.header from token, instance id and data in the format of json object
4. In Second HTTP request we are sending the json object to the model and getting predicted Life Expectancy from it
5. Edit text node is used to print the predicted values on dashboard

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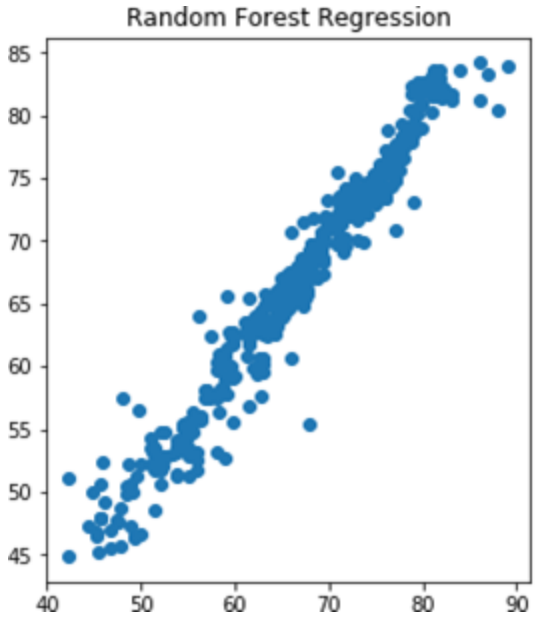
6. Result



Graph between predicting and actual value

Mean absolute error : 1.2867203219315895

Mean Square Error : 3.8028237424547293

Root Mean Square Error : 1.9500830091190295

For This Record = {Afghanistan, 2015, Developing, **65** , 263, 62 ,0.01, 71.2796236, 65, 1154 , 19.1 ,83 ,6 ,8.16 ,65 ,0.1 ,584.25921 ,33736494 ,17.2,17.3,0.479 ,10.1}

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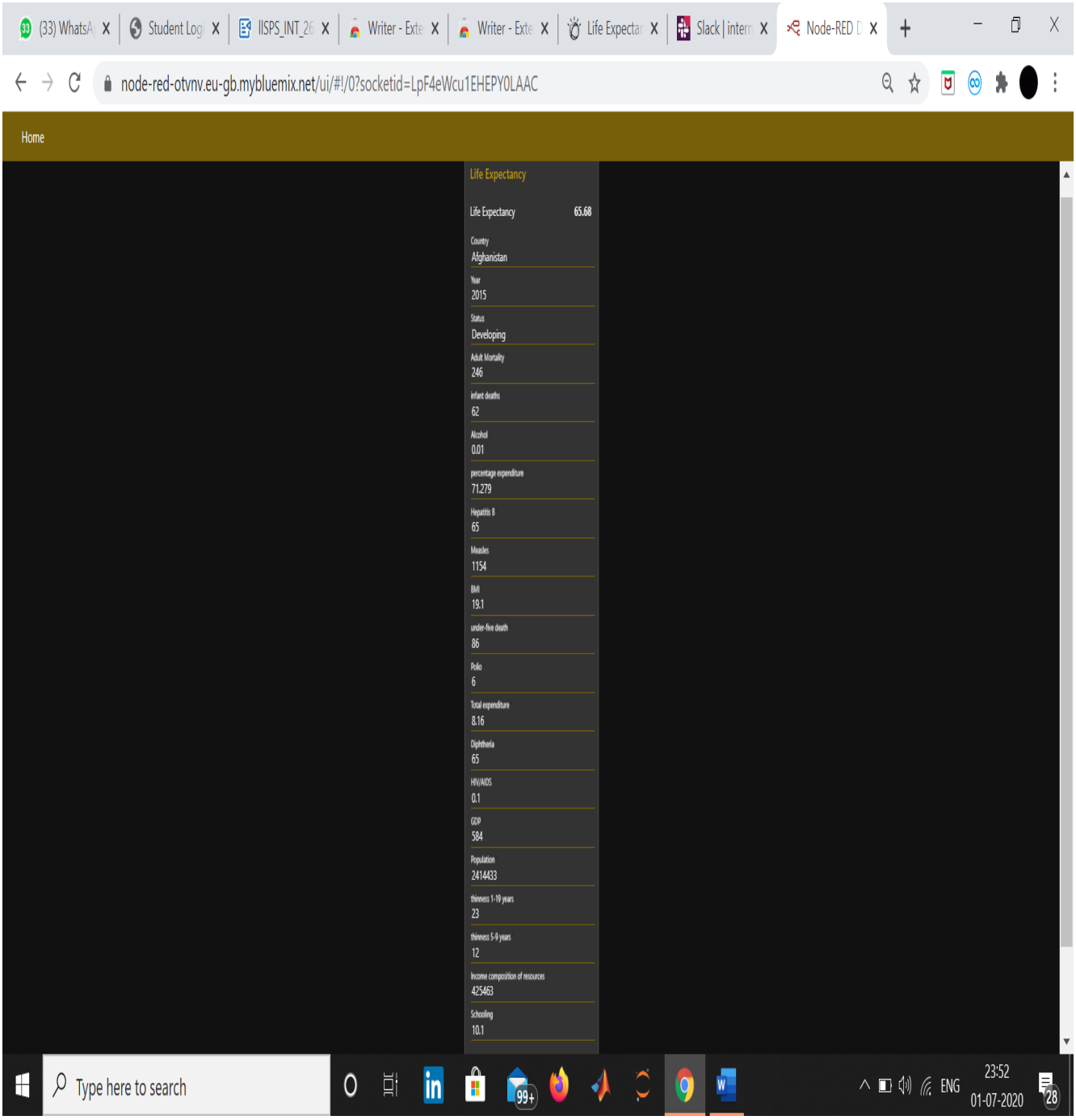
6.2 Dashboard



1. In the above example is the same input but change adult mortality value, by decreasing it the Life Expectancy value in increasing.

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7. Advantages and disadvantages

7.1 Advantages :

Predicting life Expectancy will help us to monitor the health of the people

By predicting it, we can improve our health condition and public health care center

We can compare things and make decisionfor the future to increase life span of humans

7.2 Disadvantages :

1) If our predictions are wrong that may leadto wrong judgement for future.
2) People may get upset by looking at the result,If the results are published.
3) Some people make decisions by looking theage of the person, If the age of the personexceeds over Life Expectancy then there is a chance of under caring of him/her .

8. Applications :

i. By using this model we can create App
ii. Life-tables and Demographic applications
iii. This type of thing may increase awareness on there lives
iv. We can create applications like sharing which typeof activities will increase the life Expectancy

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9. Conclusions :

Predicting life expectancy will help to improve
our living conditions and lifestyle
These type of applications will
increase the awareness among
people.
It is clear that some of our habits will affects
ourlife.
Education is also required to increase life span of humans.

10. Bibliography :

Dashboard link :

https://node-red-otvnv.eu-gb.mybluemix.net/ui/#!/0?socketid=LpF4eWcu1EHEPY0LAAC

I sincerely thank all my Mentors of smartinternz who really helped me alot in deploying my ML model and creating dashboard of my project.