INTERNSHIP PROJECT REPORT

PROJECT TITLE-

PREDICTING LIFE EXPECTANCY USING MACHINE LEARNINNG

SUBMITTED BY:

DIKSHA SINGH

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1. INTRODUCTION

1.1 Overview

Life expectancy is a measure of the average time a person is expected to live. These predictions and expectations are calculated based on several factors like:

- Regional Variation
- Economic Circumstances
- Sex Differences
- Mental Illness
- Physical Illness
- Education
- Birth Year, etc.

It will require a sophisticated system that will consider all the above-mentioned factors. Machine Learning services has made this much easier and more possible.

1.2 Purpose

The goal for the project is to create a machine learning model to predict or calculate the average expected lifespan of people given certain factors.

2. LITRETURE SURVEY

2.1 Existing Problem

On one hand, predicting lifespan of people may have benefits for policy making, and help optimise an individual's health, or the services they receive.

Life expectancy is the key metric for assessing population health. It focusses solely on mortality at a young age, life expectancy captures the mortality along the entire life course.

There is a need of an application which will predict the Life Expectancy factors, as;

- Social
- Economic
- Mortality
- Immunization Factors.

The application must give prediction accurately, within fractions of second.

Predicting life expectancy is not a new concept. Experts do this at a population level by classifying people into groups, often based on region or ethnicity.

2.2 Proposed Solution

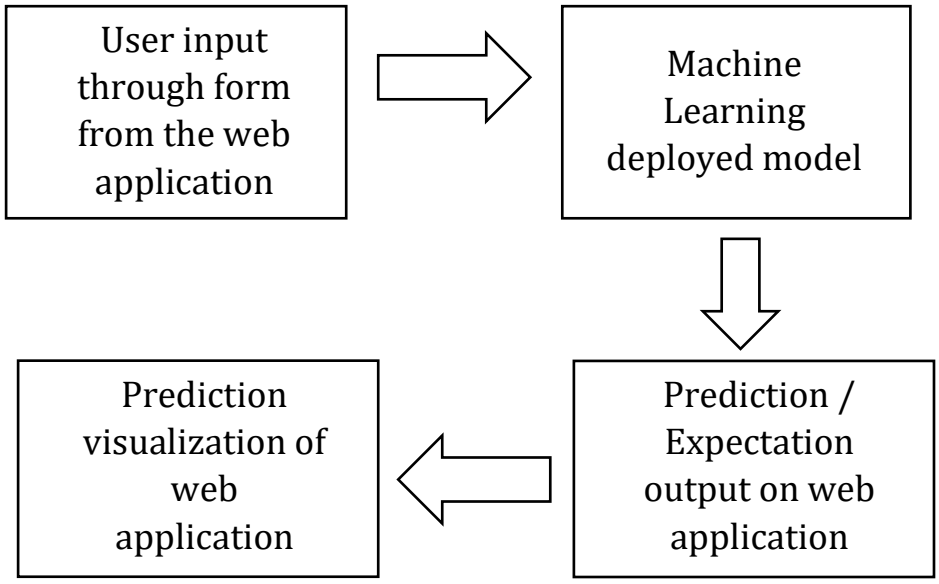
A regular machine learning project that processes data to predict insights into the future of the expected lifespan of a person. The problem statement is targeted to predict the Life expectancy rate of a country given with the various factors.

For the project of this life expectancy, user must give the input values of the various features and on the analysis of these features, the model created using the machine learning will give its predictions to the user and also will tell the user that if the predicted life expectancy value is safe or the country / region needs to improve its living factors.

Calculating a life expectancy would require a sophisticated system that considers factors of environmental, geographic, genetic and lifestyle factors all of which have influence.

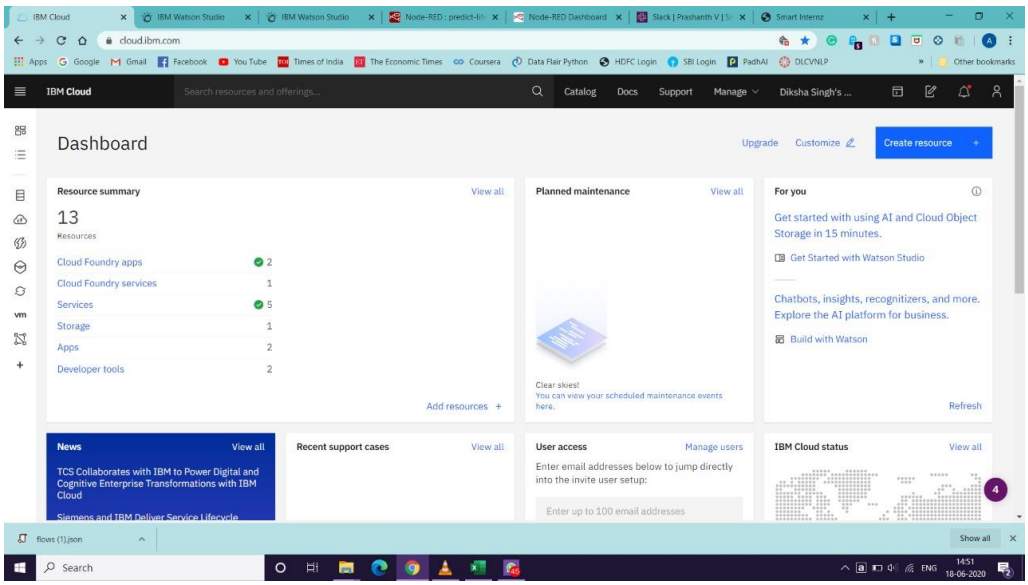
3. HARDWARE SURVEY

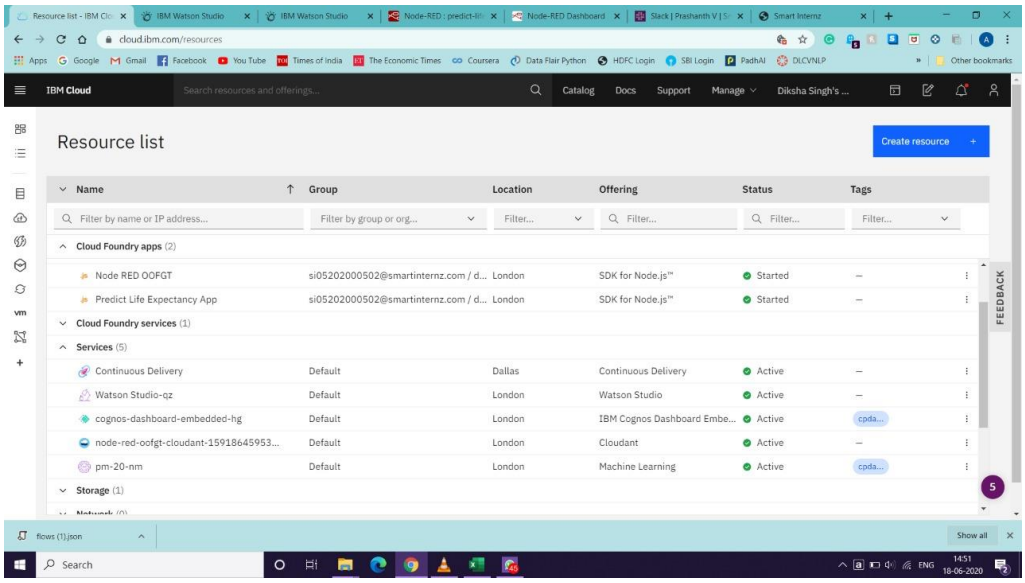
3.1 Block Diagram

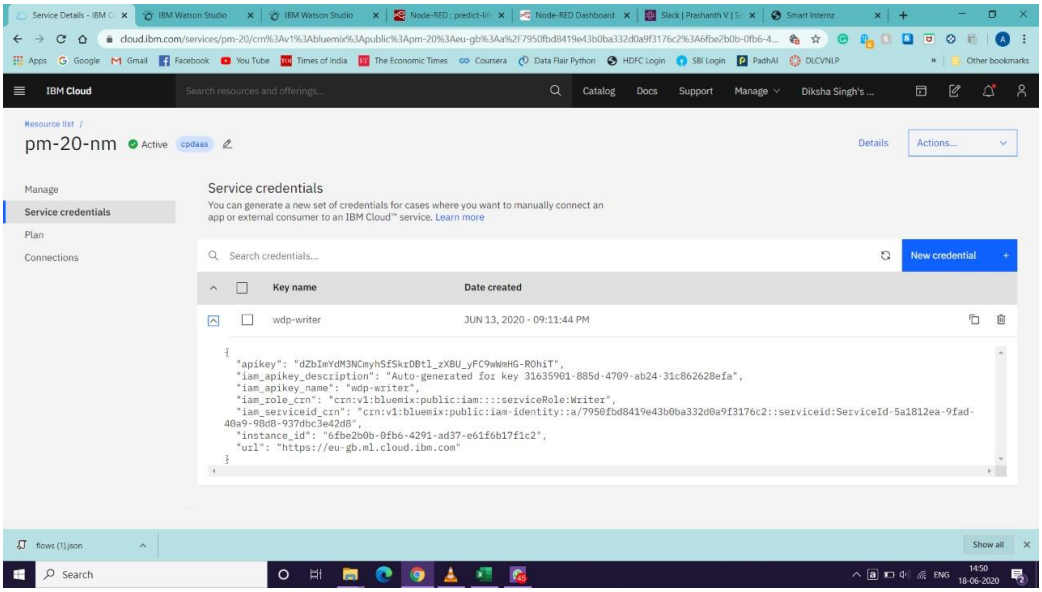


3.2 Hardware / Software Designing

In this machine learning project model, the soul usage is of the software model, hence there is no special hardware involved in this project.




IBM Cloud
Catalog
Docs
Support
Manage
Resource list
Create resource
Name
Group
Location
Offering
Status
Tags
Cloud Foundry apps (2)
Node RED OOFGT
Predict Life Expectancy App
Cloud Foundry services (1)
Services (5)
Continuous Delivery
Watson Studio-qz
cognos-dashboard-embedded-hg
node-red-oofgt-cloudant-15918645953...
pm-20-nm
Storage (1)
FEEDBACK


IBM Cloud
Catalog
Docs
Support
Manage
pm-20-nm
Active
Details
Actions...
Manage
Service credentials
Plan
Connections
Service credentials
You can generate a new set of credentials for cases where you want to manually connect an app or external consumer to an IBM Cloud™ service. Learn more
Search credentials...
New credential
Key name
Date created
wdp-writer
JUN 13, 2020 - 09:11:44 PM
"apikey": "dZbImYdM3NCmyhSfSkrDBtl_zXBU_yFC9wWmHG-ROhiT",
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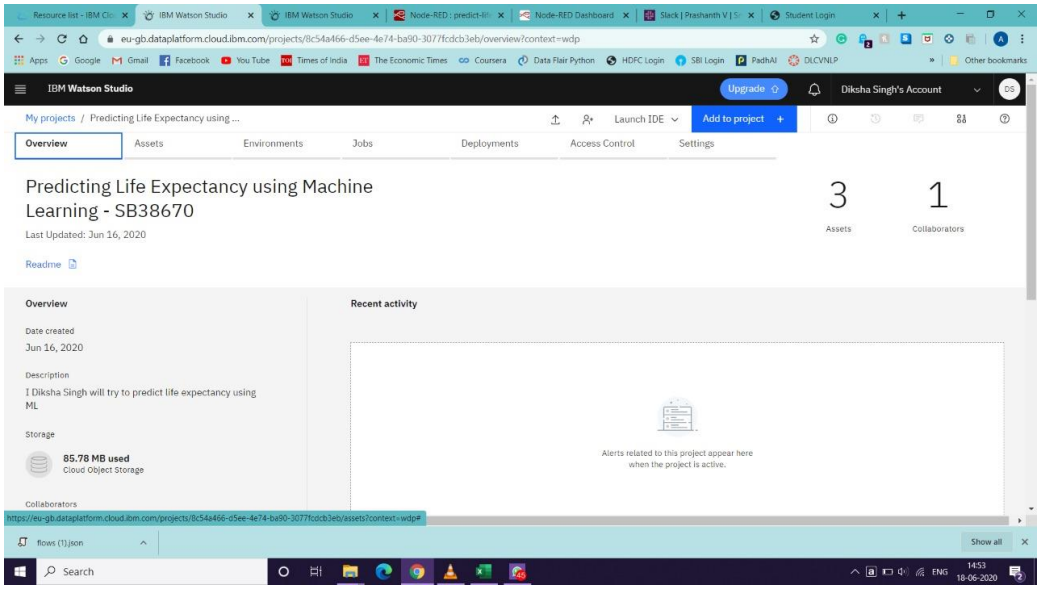
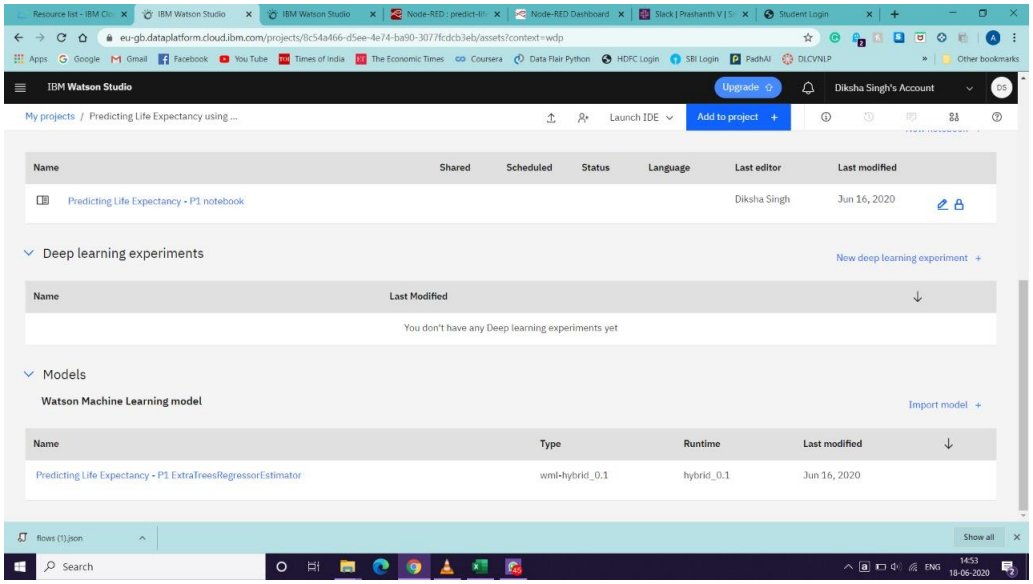
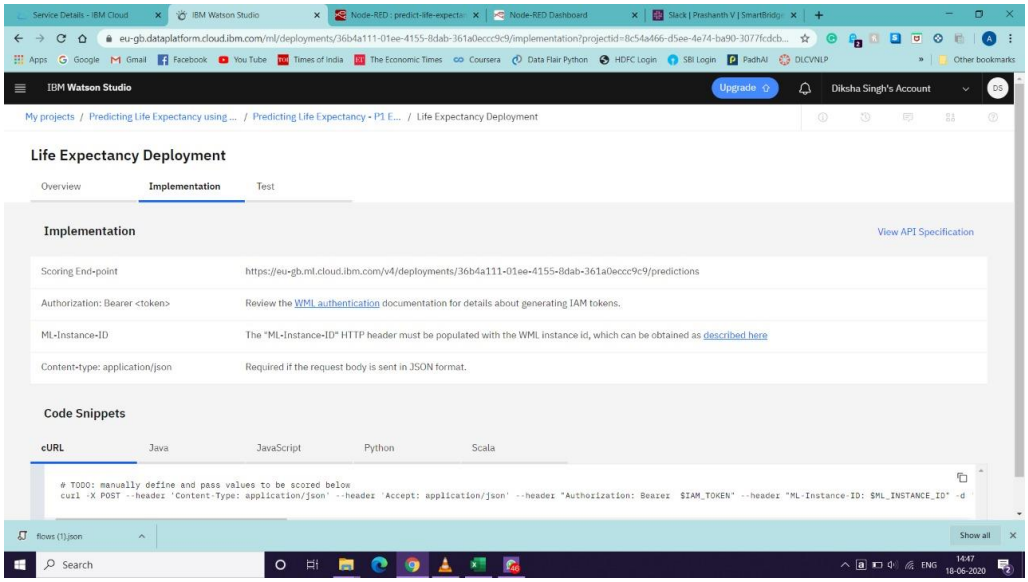
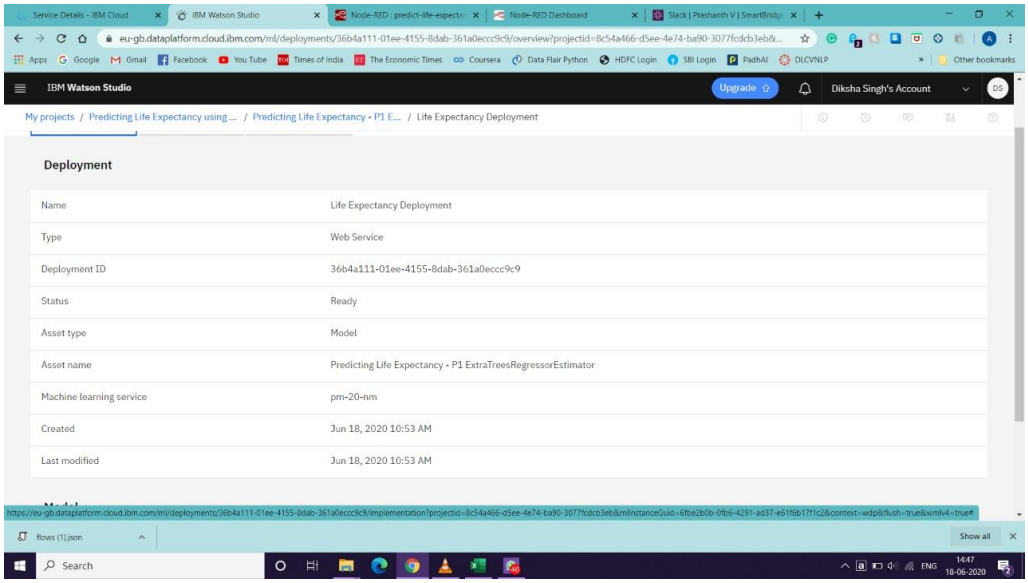
The web application created consists of the IBM Watson Machine Learning as the backend service and Node-RED for the development of the user interface.

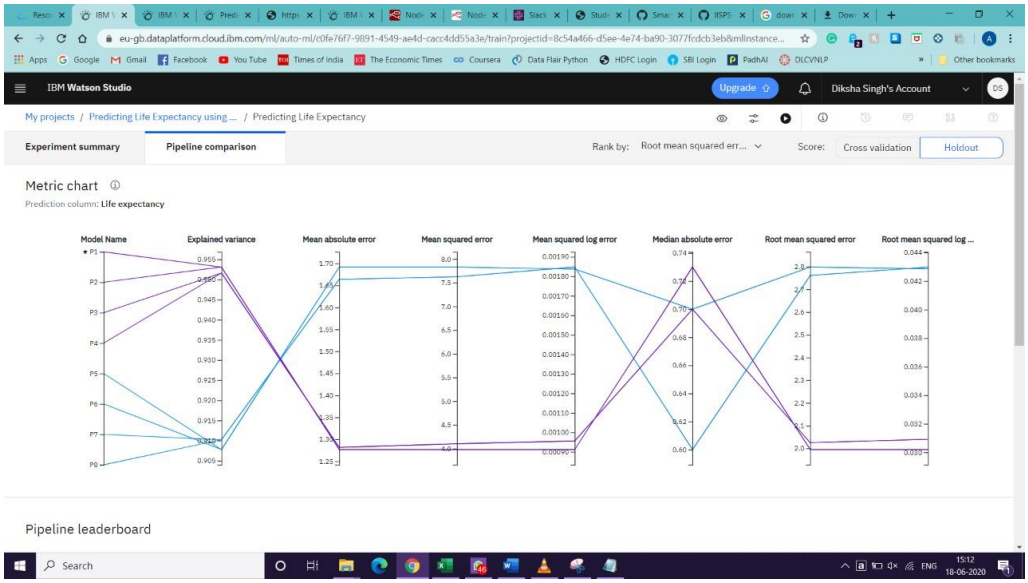


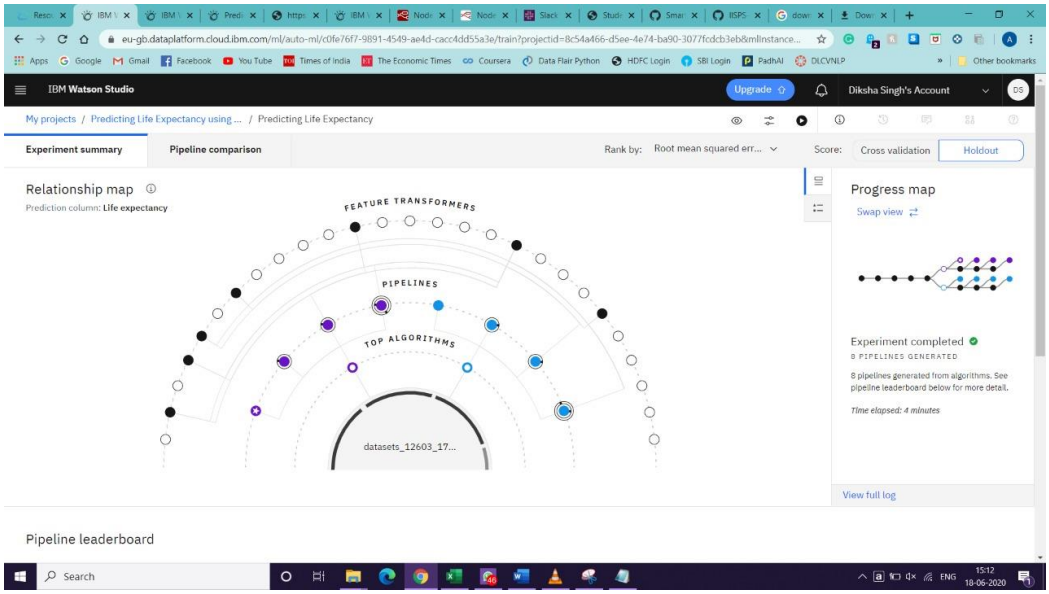



IBM Watson Studio
Upgrade
Diksha Singh's Account
My projects / Predicting Life Expectancy using ... / Predicting Life Expectancy - P1 E... / Life Expectancy Deployment
Life Expectancy Deployment
Overview
Implementation
Test
Implementation
View API Specification
Scoring End-point
https://eu-gb.ml.cloud.ibm.com/v4/deployments/36b4a111-01ee-4155-8dab-361a0eccc9c9/predictions
Authorization: Bearer <token>
Review the WML authentication documentation for details about generating IAM tokens.
ML-Instance-ID
The "ML-Instance-ID" HTTP header must be populated with the WML instance id, which can be obtained as described here
Content-type: application/json
Required if the request body is sent in JSON format.
Code Snippets
cURL
Java
JavaScript
Python
Scala
TODO: manually define and pass values to be scored below
curl -X POST --header 'Content-Type: application/json' --header 'Accept: application/json' --header "Authorization: Bearer $IAM_TOKEN" --header "ML-Instance-ID: $ML_INSTANCE_ID" -d


IBM Watson Studio
Upgrade
Diksha Singh's Account
My projects / Predicting Life Expectancy using ... / Predicting Life Expectancy - P1 E... / Life Expectancy Deployment
Deployment
Name
Life Expectancy Deployment
Type
Web Service
Deployment ID
36b4a111-01ee-4155-8dab-361a0eccc9c9
Status
Ready
Asset type
Model
Asset name
Predicting Life Expectancy - P1 ExtraTreesRegressorEstimator
Machine learning service
pm-20-nm
Created
Jun 18, 2020 10:53 AM
Last modified
Jun 18, 2020 10:53 AM

Auto AI Experiment:





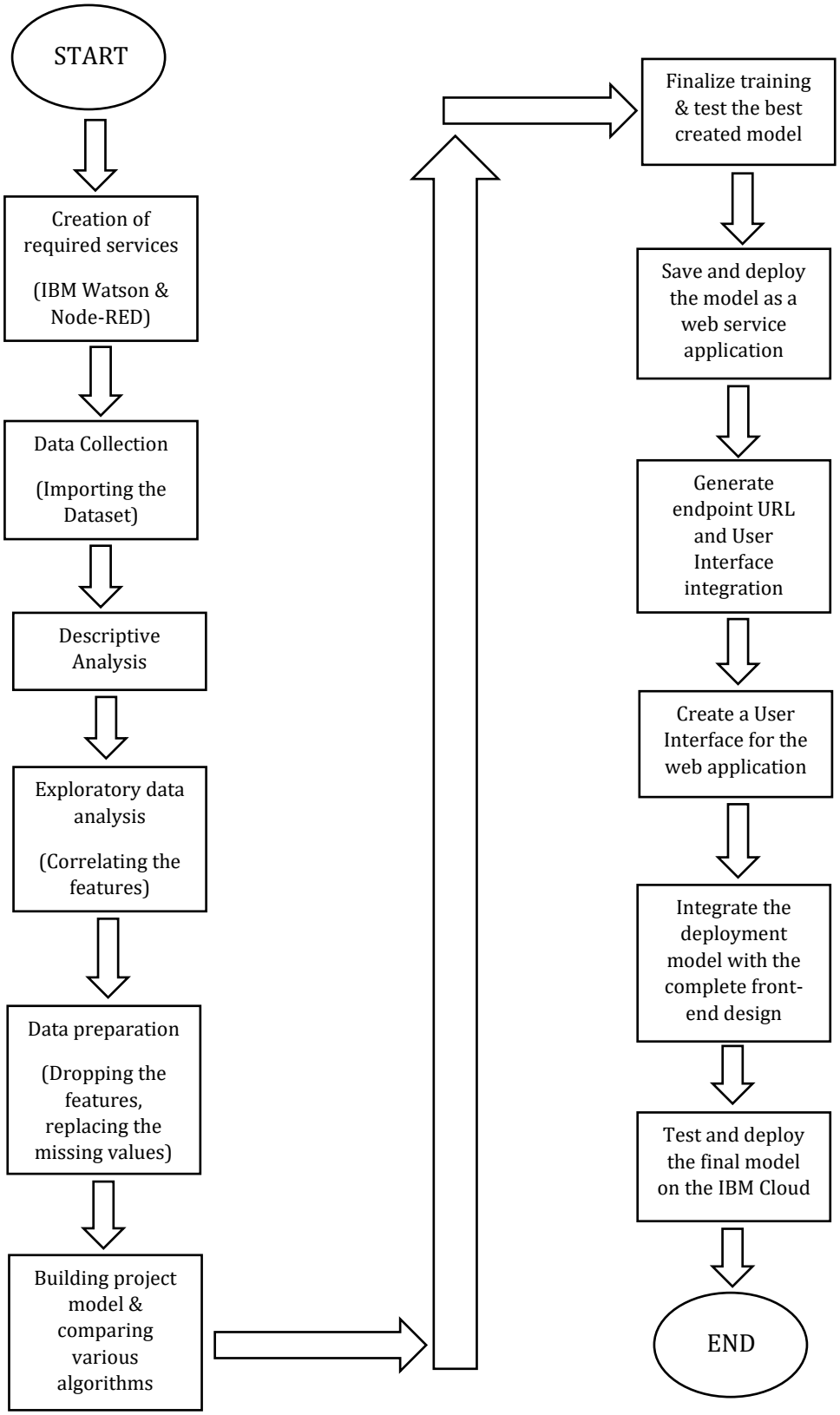
4. EXPERIMENTAL INVESTIGATIONS

Firstly, the data is collected from the given data set of *Kaggle*. Then a model is built on the IBM Watson studio machine learning to predict the life expectancy for the people of the country. For that, an account is to be created on the IBM Watson studio then a project is added with the auto AI option. Then the data set is uploaded and the best possible way to predict the life expectancy is chose. Finally, the model is executed and tested with the various data, factors and different circumstances.

Then a cloud foundry application is created from the Node-RED, and created a Node-RED flow. At last an API key is added with an ID and URL. And with the execution of the model the User Interface can be seen from the dashboard.

The data of the given dataset had to be updated with some the information as the available dataset had some missing information due to which the outcome was dropped from the data frame due to which the model was unable to learn from the missing values. The missing values were filled with the mean value of the respective feature for the particular country.

5. FLOWCHART


START
Creation of required services
(IBM Watson & Node-RED)
Data Collection
(Importing the Dataset)
Descriptive Analysis
Exploratory data analysis
(Correlating the features)
Data preparation
(Dropping the features, replacing the missing values)
Building project model & comparing various algorithms
Finalize training & test the best created model
Save and deploy the model as a web service application
Generate endpoint URL and User Interface integration
Create a User Interface for the web application
Integrate the deployment model with the complete front-end design
Test and deploy the final model on the IBM Cloud
END

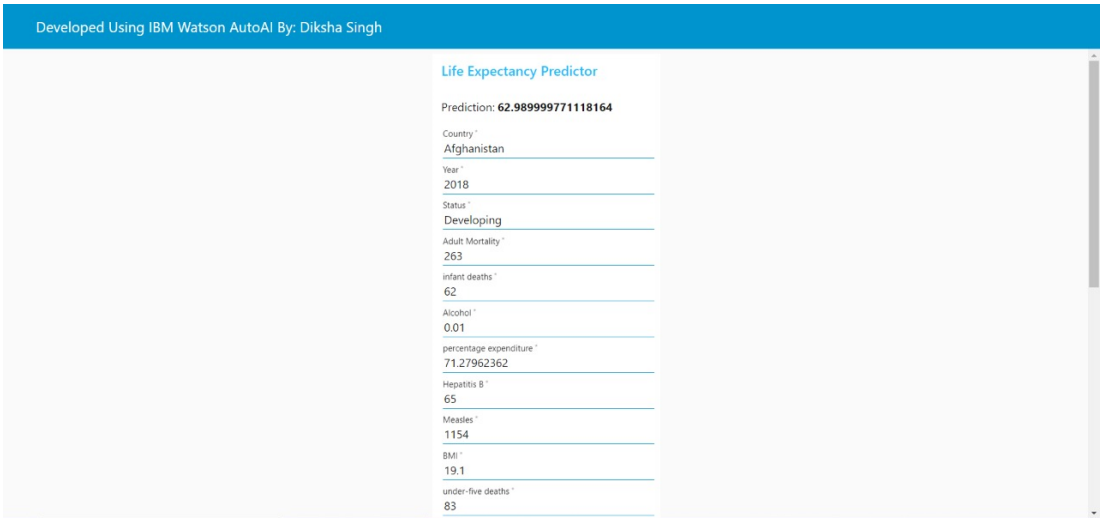
6. RESULT

The web application is created successfully with good and appropriate results.

The model is working properly as expected and fulfil all the given circumstances and it properly manages and process all the factors provided and give away the required result.
As factors the model takes the values for: Country Name, Year, Status, Adult Mortality, Infant Deaths, Alcohol, Percentage Expenditure, Count of some particular disease cases, And basic education status, etc.

The web application is available in the following link:

https://predict-life-expectancy-app.eu-gb.mybluemix.net/ui/#!/0?socketid=69UTQl9vfJ4xPDv6AAAm



7. APPLICATION

The project is very useful and can have many applications in several fields, some the best applications according to me are listed below:

- **General health awareness among the people:**

  This model can help people to get more and more aware of their own general health and can change their lifestyle according to that prediction results.

- **Efficiency in limited resources:**

  These predicted results can help the government and other social teams to arrange their limited resources efficiently according to the requirement. The excess supply can be provided to the region with the high expectancy values, this can minimise the wastage of the available supply.

- **Health Policy:**

  This model can widely help the policy making companies as in they can optimize any individual's health status and life expectancy and can provide the person with the best suited policy.

8. CONCLUSION

This internship with Smartbridge turned out to be a great opportunity for me, as I get to learn much about the machine learning and GitHub, etc. I had a chance to do a professional practice in the field of Machine Learning.

Still I have a lot left to learn about the topic but this internship program was great for me. This helped me know my skills and weaknesses and also what skills do I have to work on for my personal development in the field of Machine Learning. I got to learn about the IBM Cloud and its machine learning model creation.

With the proper help and guidance from the Smartbridge team, I was able to build a successful working model for the given task. The project was well designed and established. There still are many improvements in the current model but I believe the current model fulfil all the requirement of the given project task.

9. BIBLIOGRAPHY

- https://www.youtube.com/watch?v=GeN7g4bdHiM
- https://developer.ibm.com/tutorials/how-to-create-a-node-red-starter-application/
- https://github.com/SmartPracticeschool/llSPS-INT-1942-Predicting-Life-Expectancy-using-Machine-Learning?files=1
- https://my15.digitalexperience.ibm.com/b73a5759-c6a6-4033-ab6b-d9d4f9a6d65b/dxsites/151914d103d2-48fe-97d9-d21166848e65/
- https://www.youtube.com/watch?v=K7g4D4sdBEQ
- https://www.kaggle.com/kumarajarshi/life-expectancy-who