Project Report

"One Year Life expectancy post thoracic surgery Using IBM Watson"

Category- Machine Learning

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1) INTRODUCTION

Future, a gauge of the quantity of residual long stretches of life an individual has, is a significant thought for settling on clinical choices in essential consideration. Anticipating Life Expectancy examines the normal life expectancy of the individual which helps in settling on pivotal wellbeing choices.

One of the normal reason for malignant growth passings in overall today is Lung Cancer. The frequency of lung malignant growth has expanded extensively and has gone to be the most broadly perceived disease in men in a large portion of the countries. Diseases are caused when the cells create with no control. These ailments are known as malignant growth. Lung disease happens when these uncontrolled cells creates in lungs. It can begin with one or both the lungs. Lung disease can welcome issues with vision and shortcoming on one side of the body in the event that it is spread to the mind. Indications of lung malignant growth incorporate blood hack, wheezing, fever, weight reduction, chest torment, bone agony and clubbing of fingernails. One of the significant reason for lung malignancy is smoking. It comprises of 4,000 synthetic substances or more, where the majority of them have been recognized as causing malignancy. " Person who smokes more than one pack of cigarettes for every day has a 20-25 times more serious danger of creating lung malignant growth than somebody who has never smoked". Roughly 85% of lung malignant growth develop because of use of tobacco. Anyway different variables like radon gas, air contamination, asbestos might be helping for the reason for lung malignant growth. Thoracic medical procedure has existed as a specific careful train for longer than a century. From the outset, its essential fixation was medical procedure for tuberculosis and bronchiectasis. Quick development has been made in medical procedure for lung malignancy. Thoracic medical procedure addresses the careful part in rewarding illnesses of the lungs and the chest.

1.1 Overview

Coordinating PC applications into the clinical field have legitimately affected the efficiency and exactness of specialists these days.

Estimating well being results is one of these applications. Unmistakably, there is a developing job for well being results in the buying and the board of medicinal services. Nowadays malignant growth is one of the significant reasons for death in the most nations. As of now, lung malignant growth is the most successive prognostication for thoracic medical procedure. Scientists applied different methodologies, for example, assessment in beginning phase, to distinguish the kind of malignancy before the development of manifestations. Besides, new strategies for the early forecast of malignancy treatment result have been created .

With the raise of new methods in the field of medication, gigantic datasets of malignant growth have been gathered and now accessible to specialists in the clinical field .However, the most testing task is foreseeing a sickness result precisely .So, the momentum research efforts inspect the utilization of AI procedures for find and recognize models and connections between them, from huge datasets, the information is examined to separate helpful data that bolsters illness divination, and to improve models that anticipate patients wellbeing all the more precisely.

1.2 Purpose

Patients who get thoracic medical procedure for lung malignancy do as such with the desire that their live will be drawn out for an adequate measure of time a while later , and whether they made due inside a one year time period . The issue to explain is whether there is an approach to decide post-usable future of lung malignant growth patients traits in the informational collection.

In the event that there is an example to be perceived with the properties and whether the patients don't endure the one year point , this would support doctors and patients settle on an increasingly instructed choices on whether they ought to continue forward with medical procedure. On the off chance that doctors feel the medical procedure will just impede the patients personal satisfaction with a perceived high danger of death inside one year time span , then the two players can settle on a choice to finish on medical procedure or choose to discover elective treatment strategies for palliative consideration.

In addition to the fact that this would impact doctors and patients , this data could be used by medical coverage organizations and national wellbeing associations with regards to settling on choices on accounts for thoracic medical procedure including lung disease. Additionally clinical analysts could unite any valuable discoveries with other information research discoveries to scan for new examination territories.

2) LITERATURE REVIEW

2.1 Existing Problem

Past investigations have uncovered a ton of work in the field of anticipating future of an individual. In the wake of looking into existing works and procedures in the forecast of human Life Expectancy, lastly arrived at a resolution that it is conceivable to foresee an Average Life Expectancy for people utilizing propelling advances and gadgets, for example, huge information, AI, AI methods, and PHD's, wearable and versatile well being checking gadgets, IOT. It is seen that the assortment of information is a colossal test because of the security and government strategy contemplation, which will require coordinated effort of different bodies in the well being business. The entomb working of a heterogeneous well being system is likewise a test for information assortment. Regardless of these difficulties, a chance of anticipating Life by proposing a methodology of information assortment and application by cell phone, in which clients can enter their data to get to the cloud server to get their own anticipated Lifespan dependent on the given sources of info.

To confirm the exactness of PLE forecast and approval of information quality, huge information methods and investigation calculations should be created and tried in a genuine circumstance with a few example gatherings. As man-made reasoning innovation is developing and being applied quickly, achievability might be expanding to gather well being information from general society just as existing well being organizations, for example, unified well being servers.

2.2 Proposed Solution

AI is a part of artificial insight which uses measurable, streamlining and probabilistic methods that permits PCs to "learn" from past models and to identify hard-to-recognize designs from enormous, loud or complex informational indexes. These strategies have become a well known device in clinical analysis, which can find and distinguish models and connections between them from enormous, uproarious or complex datasets. The data sources are the data about the patient's

age, sexual orientation, past clinical history, past clinical methodology, family clinical history and current indications , while marks are the sicknesses.

All the more as of late, it has been generally applied in the field of malignant growth forecast and visualization which are differ from disease recognition and analysis. There are three kinds of malignant growth forecast and guess: One of them is expectation of disease receptivity. In this sort,

one is attempting to foresee the likelihood of malignant growth movement before event of the infection.

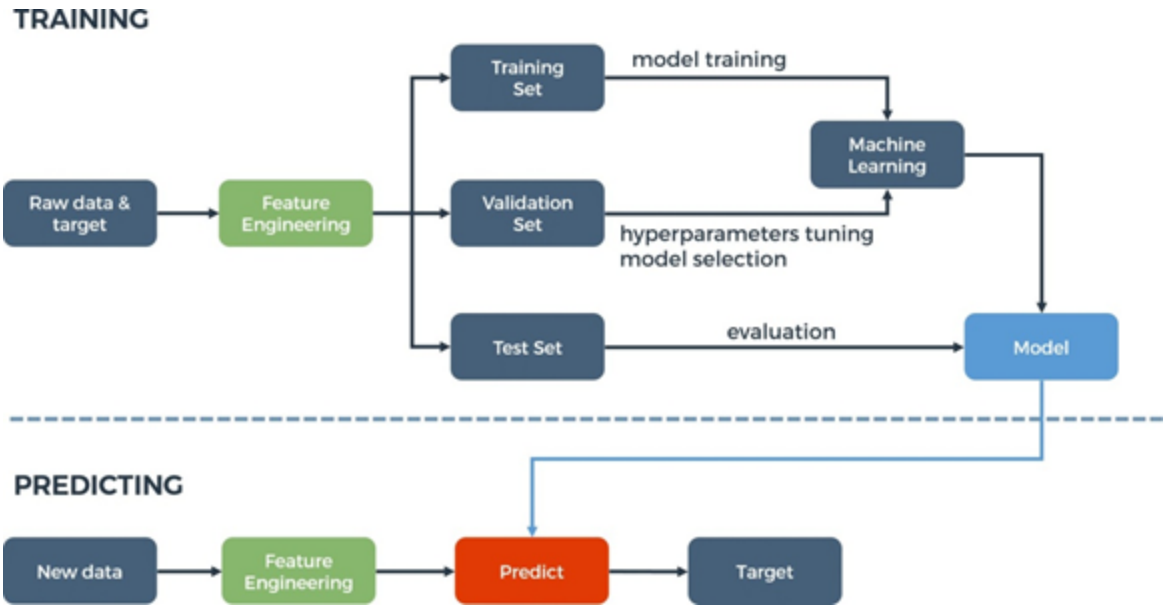
Second sort is the forecast of malignant growth repeat by attempting to anticipate the likelihood of redeveloping disease after treatment and after a timeframe during which the disease can't be identified.

Third sort is the forecast of malignant growth survivability by attempting to foresee a result which for the most part alludes to future, survivability, movement and tumor-sedate affectability.

The model of " One Year Life hope post thoracic medical procedure utilizing IBM Watson" utilizes IBM Cloud administrations, which assists with maintaining a strategic distance from any capacity issues. The UI Presented to the clients is a site URL for example on clients fingertips.

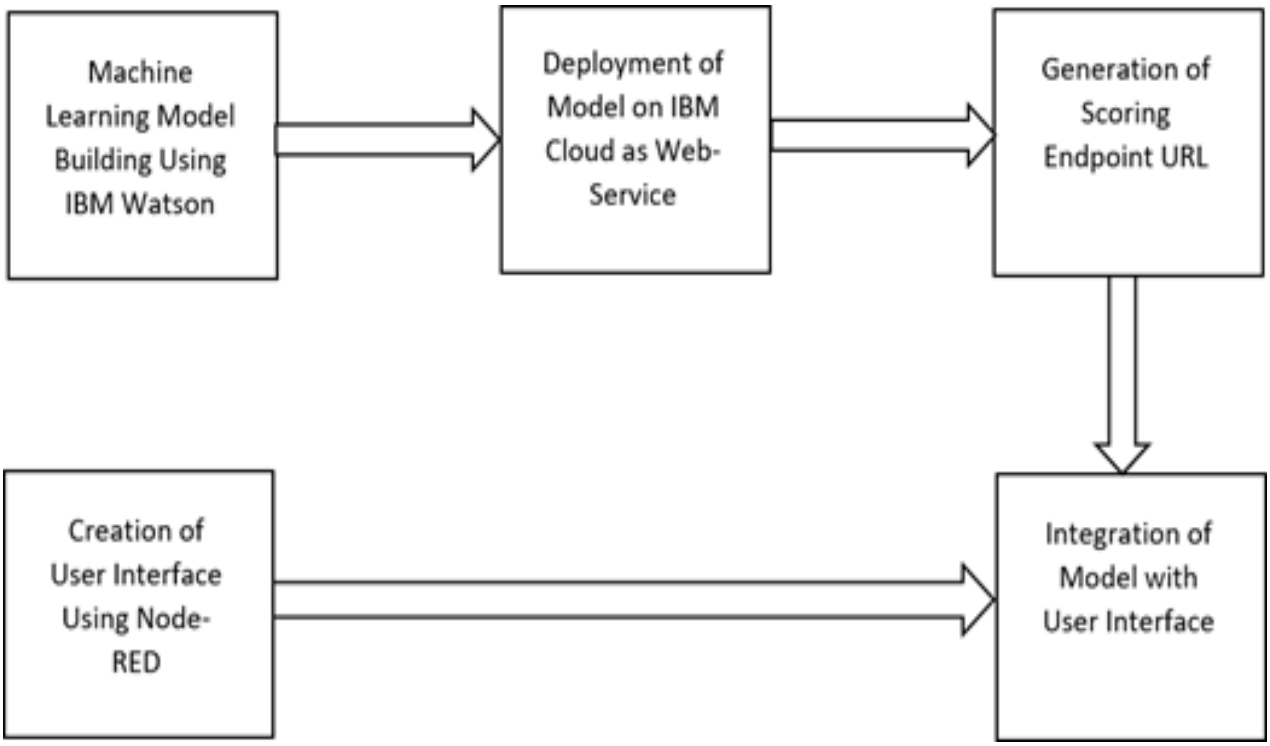
3) THEORITICAL ANALYSIS

3.1 Block diagram

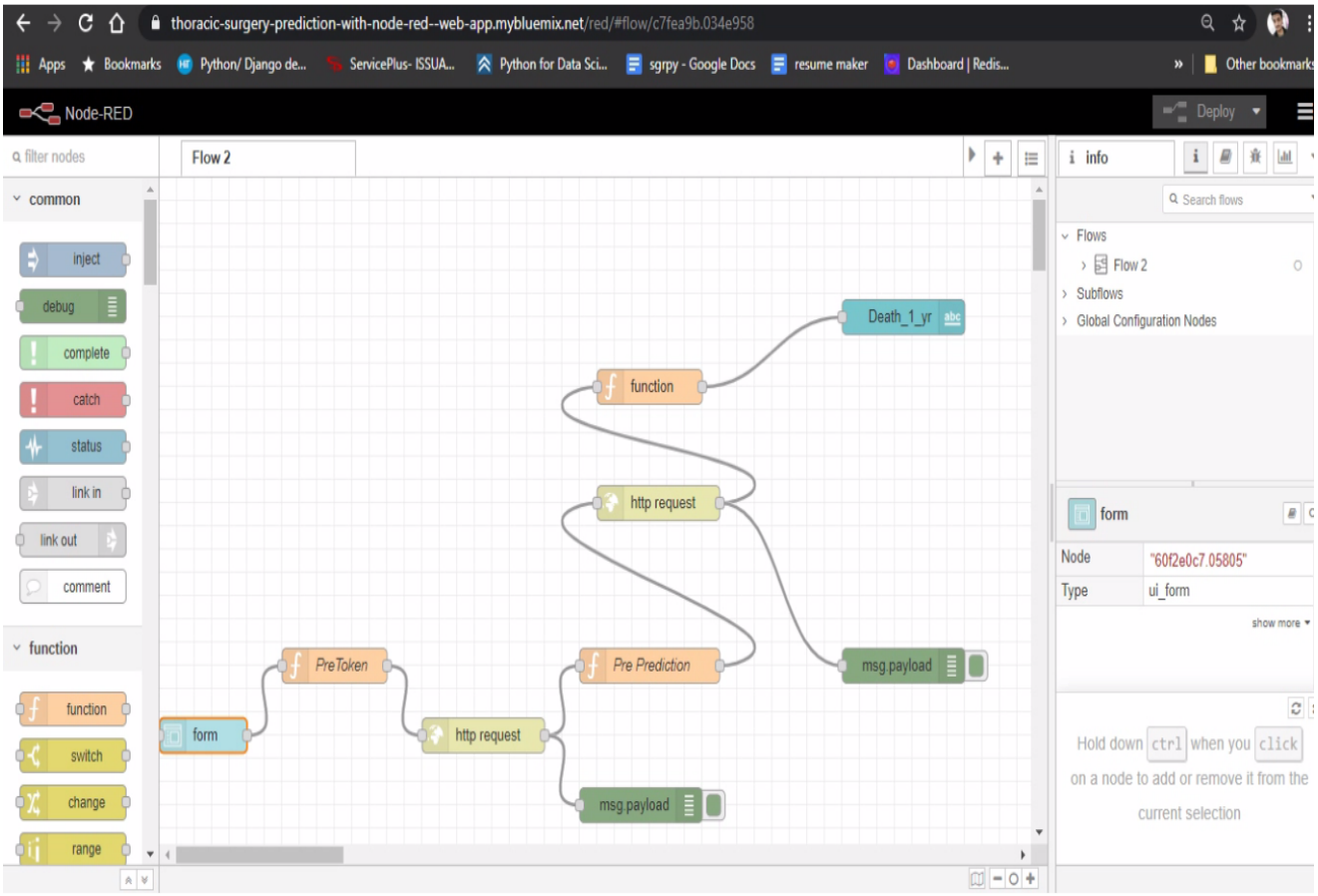


3.2 Hardware / Software designing

There is no Hardware involved as such. The web-app has IBM Watson Machine Learning as its backend service and Node-RED for the User Interface development. The web-app has been deployed on IBM Cloud as a Web Service. Basic Flow is as follows:

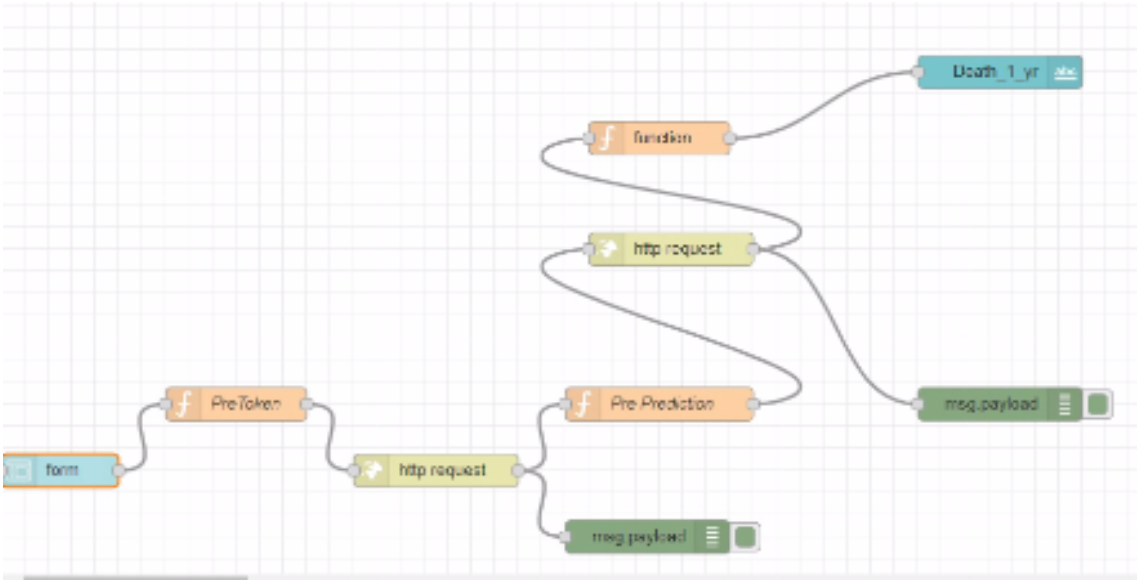


A node red flow is made for the prediction of life expectancy. Which is as shown below,

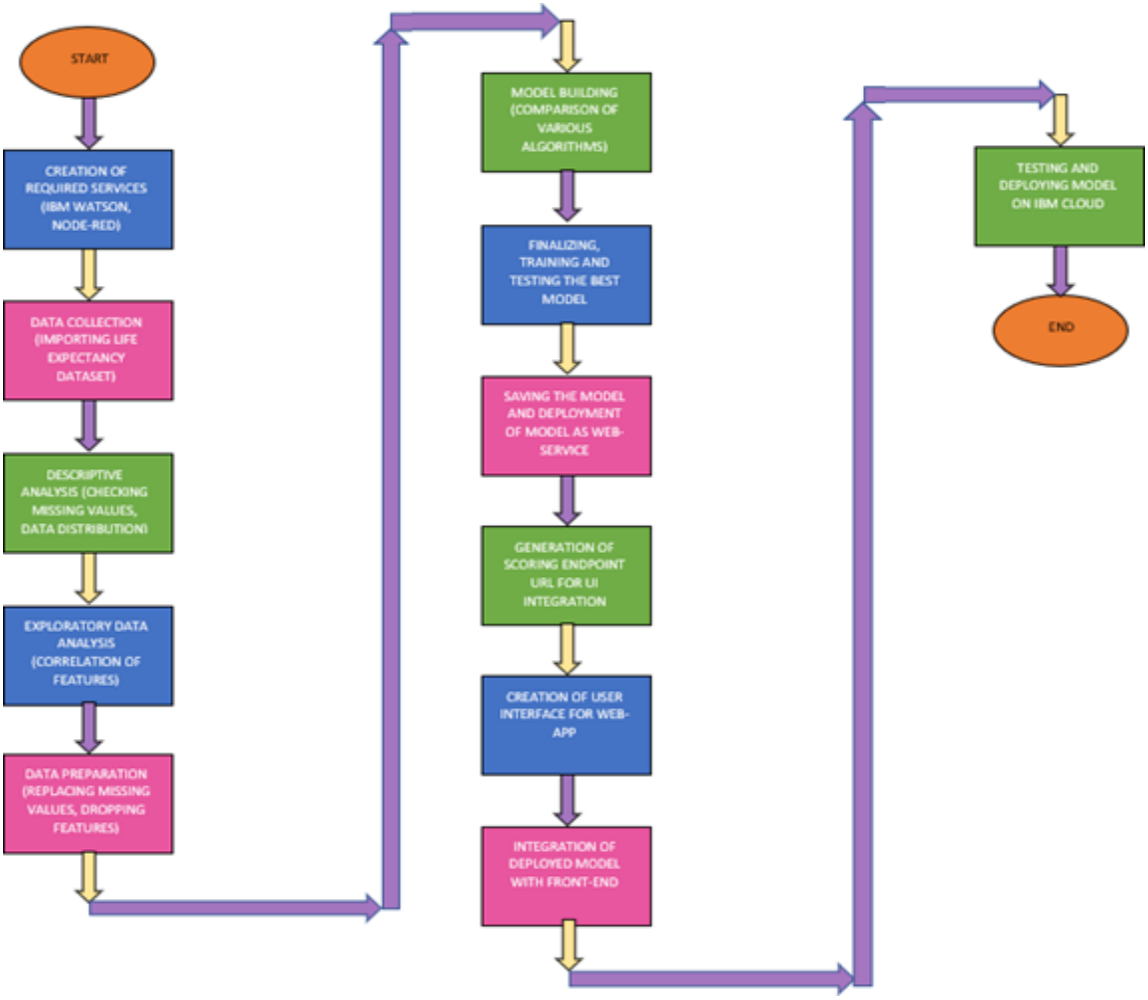


4) EXPERIMENTAL INVESTIGATIONS

- On IBM Watson studio machine learning using auto AI build a model to predict life expectancy.
  - To do so first create account on IBM Watson studio.
  - Using Add to project choose auto ai.
  - Then upload data set
  - Choose best way to predict.
  - Save as a model which is on the top
  - Deploy the model.
  - Test the model.
  - Create service credential
  - Build node red flow

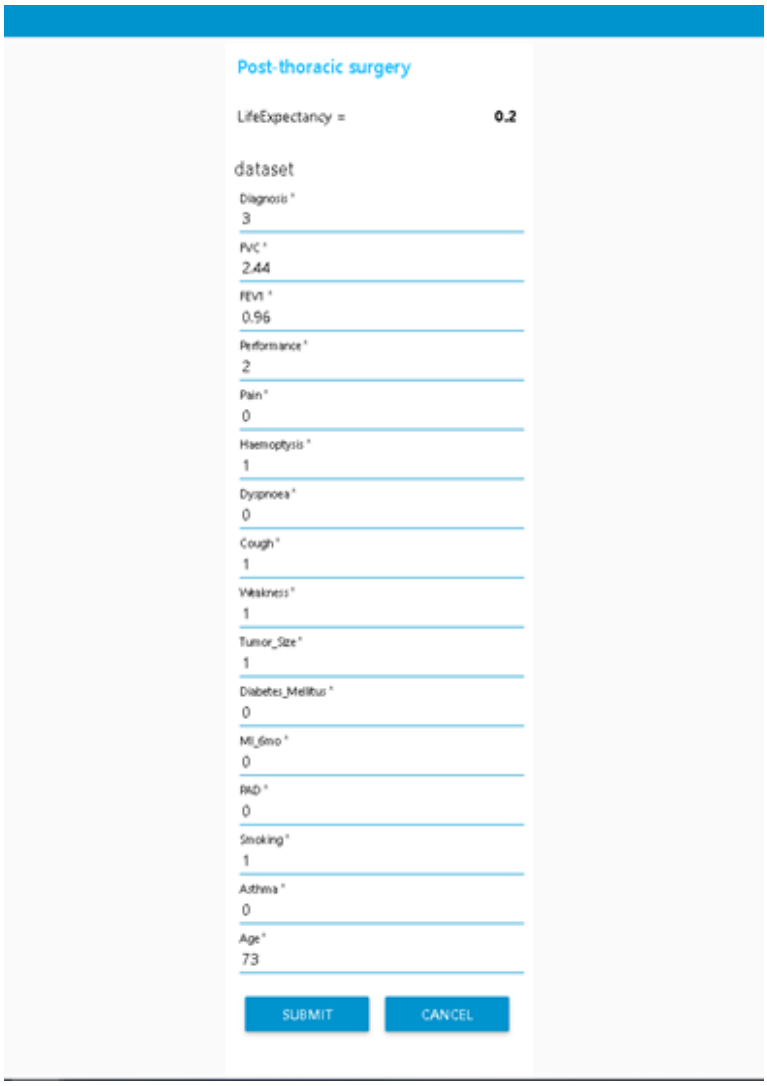


5) FLOWCHART


START
CREATION OF REQUIRED SERVICES (IBM WATSON, NODE-RED)
DATA COLLECTION (IMPORTING LIFE EXPECTANCY DATASET)
DESCRIPTIVE ANALYSIS (CHECKING MISSING VALUES, DATA DISTRIBUTION)
EXPLORATORY DATA ANALYSIS (CORRELATION OF FEATURES)
DATA PREPARATION (REPLACING MISSING VALUES, DROPPING FEATURES)
MODEL BUILDING (COMPARISON OF VARIOUS ALGORITHMS)
FINALIZING, TRAINING AND TESTING THE BEST MODEL
SAVING THE MODEL AND DEPLOYMENT OF MODEL AS WEB-SERVICE
GENERATION OF SCORING ENDPOINT URL FOR UI INTEGRATION
CREATION OF USER INTERFACE FOR WEB-APP
INTEGRATION OF DEPLOYED MODEL WITH FRONT-END
TESTING AND DEPLOYING MODEL ON IBM CLOUD
END

6) RESULT

The user friendly Graphical User interface is shown in Figure. This GUI is connected to the trained machine learning model present in the backend. The user has to fill in the inputs accordingly and click on the “Predict” button present at the end of the form. On clicking the “Predict” button, the user will be displayed the predicted life expectancy at the predict label, based on the inputs provided as shown in Figure.



7) ADVANTAGES AND DISADVANTAGES

Advantages:

7.1.1 Advantages of utilizing IBM Watson:

- Processes unstructured information
- Fills human confinements
- Acts as a choice emotionally supportive network, doesn't supplant people
- Improves execution + capacities by giving best accessible information

- Improve and change client care
- Handle gigantic amounts of information
- Sustainable Competitive Advantage

2. Simple for clients to communicate with the model through the UI.
3. Easy to use.
4. Simple to construct and send
5. Doesn't require a lot of extra room.

Disadvantages:

7.2.1 Disadvantages of utilizing IBM Watson:

- Only in English (Limits regions of utilization)
- Seen as problematic innovation
- Maintenance
- Doesn't process organized information straightforwardly
- Increasing pace of information, with constrained assets

2. The web-application isn't helpful to use for clients as it's anything but a portable application.

3. The client needs to include all the fields and at exactly that point the expectation will be given to the client. In any case, contributing every one of these qualities is a tedious activity, and the client can't include these qualities through discourse.

8) APPLICATIONS:

The utilization of AI strategies for foreseeing post-usable future in the lung malignancy patients is a region with little exploration and not many solid proposals.

So as to utilize AI strategies viably, trait positioning and determination is an essential part to fruitful well being result expectation.

9) CONCLUSION:

Before the finish of the entirety of our emphases and upgrades, we had the option to accomplish genuinely great 4 outcomes with the Random forest .These outcomes have huge ramifications in the clinical field. An examination like our own could be performed before a patient goes in for medical procedure to perceive how high hazard they are, which could be significant data. Clients can communicate with the framework by means of a straightforward Graphical UI which is as a structure with input spaces which the client needs to fill the contributions to and afterward anticipate results.

10) FUTURE SCOPE:

1. We can make the model more accurate and do more relevant featureextraction.
2. We can make a mobile app as now-a-days, it is morepreferred.
3. We can connect the model to the database which can predict the life Expectancy of not for one medical research but for other research areas too This will help us analyze the trends in the lifespan

11) BIBILOGRAPHY:

1) Learn how to add, edit, delete text using Writer:

https://www.zoho.com/writer/help/working-with-text.html

2) GitHub account creation:

https://github.com/

3) Data visualization, preparation, and transformation using IBM Watson Studio:

https://developer.ibm.com/tutorials/watson-studio-data-visualization-preparation- transformation/

4) Automate model building in IBM Watson Studio:

https://developer.ibm.com/tutorials/watson-studio-auto-ai/

5) Create a Node-RED starter application:

https://developer.ibm.com/tutorials/how-to-create-a-node-red-starter-application/

https://www.youtube.com/watch?v=s7wmiS2mSXY&feature=youtu.be

6) Life Expectancy Post Thoracic Surgery:

http://cs229.stanford.edu/proj2014/Adam%20Abdulhamid,%20Ivaylo%20Bahtchevanov,%20Peng%20Jia,Life%20Expectancy%20Post%20Thoracic%20Surgery.pdf

https://archive.ics.uci.edu/ml/datasets/Thoracic+Surgery+Data

12) APPENDIX:

A. Source code

The source code for IBM Watson Project and Node-RED Flow can be found at:
https://github.com/SmartPracticeschool/llSPS-INT-3431-One-Year-Life-expec ancy-post-thoracic-surgery-Using-IBM-Watson

The web-app can be used at:
https://thoracic-surgery-prediction-with-node-red--web-app.mybluemix.net/ui/ #!/0?socketid=bl9LFwZlJou7-gJKAAAP