**Project Report**

**1. Introduction**

1.1 Overview

1.2 Purpose

**2. LITERATURE SURVEY**

2.1 Existing Problem

2.2 Proposed Solution

**3. THEORITICAL ANALYSIS**

3.1 Block diagram

3.2 Hardware/ Software designing

**4. EXPERIMENTAL INVESTIGASTIONS**

**5. FLOWCHART**

**6. RESULT**

**7. ADVANTAGES AND DISADVANTAGES**

**8. APPLICATIONS**

**9. CONCLUSION**

**10. FUTURE SCOPE**

**11. BIBILOGRAPHY**

**12. APPENDIX**

12.1 Source code

**INTRODUCTION**

**Overview**

Life expectancy is calculated by constructing a life table. A life table incorporates data on age-specific death rates for the population in question, which requires enumeration data for the number of people, and the number of deaths at each age for that population. Life expectancy is a measure that is often used to gauge the overall health of a community. Hence, we are making this project in which we use machine learning to predict the expectancy of life in a certain region by the help of a dataset. In the dataset there are several columns such as adult mortality rate, infant death, alcohol consumption, status of the country (developed or developing), population and several diseases present in that country. A machine learning regression model would be helpful to make predictions about the life expectancy and for the user interface part, node red would be used. User will enter the details of a country and will get an output of prediction of life expectancy.

**Purpose**

Predicting Life Expectancy is a crucial thing as it is one of the most important factors in end-of-life decision making and is based on an estimate of the average age that members of a particular population group will be when they die. It will help people to know the expectancy of life on their region and if life expectancy of any region is low then their government can take some contagious steps for increasing the expectancy. We can understand the purpose of it by an example that is, if a person is living in a country or in a region then they can use this software to decide in which they want to live. It is certainly a project which will help people to make their decision better and live a great life.

**LITERATURE SURVEY**

**Existing Problem**

Life expectancy is the measure of how long an organism is expected to live and is often used to gauge the overall health of a community at birth measures health status across all age groups. Shifts in life expectancy are often used to describe trends in mortality. Hence, it is important to make a software which will help people to know their life expectancy prediction.

**Proposed Solution**

We would make a machine learning model to predict the life expectancy with at least 75% accuracy and for the user interface part node- red will be used. In the machine learning model, we will use the regression algorithm and sklearn library with several other libraries. IBM cloud services will be used for the deployment part and for the integration as well. In the UI part user needs to fill the details and a prediction would be given to him. As Life Expectancy depend upon various features like Regional variations, Economic Circumstances, Sex Differences, Mental Illnesses, Physical Illnesses, Education, Year of their birth and other demographic factors. So, in this model we will use a way to predict average life expectancy of people living in a country when various factors such as year, GDP, education, alcohol intake of people in the country, expenditure on healthcare system and some specific disease related deaths that happened in the country will be given to model. Hence, in the solution we provide an interface with which user can see the prediction by filling all the details.

**THEORITICAL ANALYSIS**

**Block Diagram**

**Software Designing**

✔ Watson Studio

✔ Node-red

✔ Machine Learning service

✔ Jupyter Notebook

✔ Git

**Hardware Designing**

✔ Python 3.7.4

✔ Windows or Linux Operating Sytem

✔ Processor - i3 or higher version

✔ Dataset

✔ IBM cloud account

**EXPERIMENTAL INVESTIGATIONS**

Experimental investigation of predicting life expectancy includes how it retaliate on the changes we made to the model. It will surely depend upon how we made our model and how it reacts. So, I have used a simple and basic machine learning algorithm that is linear regression for this model and the accuracy it shows about eighty two percent which is quite for a novice model. Some other regression algorithm could also be used for this part and the second part is node red part which is helpful for making the UI part in which the predictions be shown, if the things are messed up in the node-red part then the prediction could be affected as well.Now the experimental investigation begins when, we roughly fill all the details and the predictions is as follows and now we will try to change some values and see how our model respond to them.

A screenshot of a cell phone

Description automatically generatedA screenshot of a video game

Description automatically generated

So now, we have made some changes by changing the HIV/AIDS rate from 0.1 to 10. If the rate is higher than prediction should be lower as it decreases the chances of the life expectancy.

A screenshot of a video game

Description automatically generated

We can see that the prediction goes down from 62.246 to 58.0422. So, our prediction model works good with it.

One more test for the investigation is that if we change the status from 0 to 1 that is formerly country is in the developing phase and for latter one it is developed. If a country is developed than surely it will have more resources and life expectancy would be higher too.

A screenshot of a cell phone

Description automatically generatedA screenshot of a cell phone

Description automatically generated

Hence surely prediction goes higher from 58.04 to 59.61. So, now we can conclude that our model is working fine on the basis of these investigations.

**FLOWCHART**

**RESULT**

The Result of the whole process came out as a successful project has been made out with more than 80% accuracy. User can interact with the user interface part of the project and can get the prediction easily but for this they should have proper information about region of which they want to find the prediction about.

**ADVANTAGES**

The Advantage is that user can easily get the prediction by filling all necessary information and will get the result in seconds. It will become a contagious thing as people will know the life expectancy and then even can decide their end-to-life decisions.

**DISADVANTAGES**

The Disadvantage of this project is that if the users do not have the correct details of what is needed then the predictions could be wrong in a certain way and would not be to the point. So, the project is not flexible to handle these kinds of situations.

**APPLICATIONS**

The Application of the project would be –

* It will be helpful to have prediction about a certain region.
* User can easily make end-to-life decision with the help of this.
* People can take certain measures if their country’s life expectancy is low.
* Government can also take steps for increasing the expectancy on that region.

**CONCLUSION**

The conclusion drawn is that the project will certainly help people to make strong decision about their life. We have used the Machine Learning regression model for making this project and also for the user interface part we use node-red from IBM cloud services. This also helps for the integration of node-red and ML model. Hence the project is a platform for user to get their region’s life expectancy.

**FUTURE SCOPE**

The future scope of the project is that now people can easily locate their life expectancy and they certainly want to see changes of any of the resources improve. We can expand our machine learning model by using more complex algorithms that will be used to enhance predictions and increase the accuracy as well. We can provide the suggestion how one can live on the particular region with this amount of expectancy. We can even provide them the courtesy to use different language and with more and less details, whatever they have for filling, So the project will be more flexible. As we have only created it for the webpage, we can even make an android or ios app. Hence a lot can be made out of this and have a huge scope in future.

**BIBILOGRAPHY**

* Predicting Life expectancy with regression

Author – Terence S

Website – Medium.com

Link - <https://medium.com/swlh/predicting-life-expectancy-w-regression-b794ca457cd4>

* Linear regression

Author – Wikipedia

Website – Wikipedia, the free encyclopedia

Link - <https://en.wikipedia.org/wiki/Linear_regression>

* Life expectancy – what does it really mean?

Author – Esteban Ortiz – Ospina

Website – Our world in data

Link - <https://ourworldindata.org/life-expectancy-how-is-it-calculated-and-how-should-it-be-interpreted>

* Browser used – Firefox

**APPENDIX**

**SOURCE CODE**

In the source code I am showing how the columns are co- related using heatmap of seaborn library. Seaborn is a data visualizing library which is made up on matplotlib.

A screenshot of a social media post

Description automatically generated

Now, in the below code it is showing the graph of prediction.

A screenshot of a social media post

Description automatically generated