

# Predicting Life Expectancy using Machine Learning

## Introduction

Life expectancy is a statistical measure of the average time an organism is expected to live, based on the year of its birth, its current age, and other demographic factors including gender. Life expectancy is commonly confused with the average age an adult could expect to live. This confusion may create the expectation that an adult would be unlikely to exceed an average life expectancy, even though, with all statistical probability, an adult, who has already avoided many statistical causes of adolescent mortality, should be expected to outlive the average life expectancy calculated from birth. Life expectancy is an average for all people in the population including those who die shortly after birth, those who die in early adulthood (e.g. childbirth, war), and those who live unimpeded until old age whereas maximum lifespan is an individual-specific concept, it is an upper bound rather than an average.

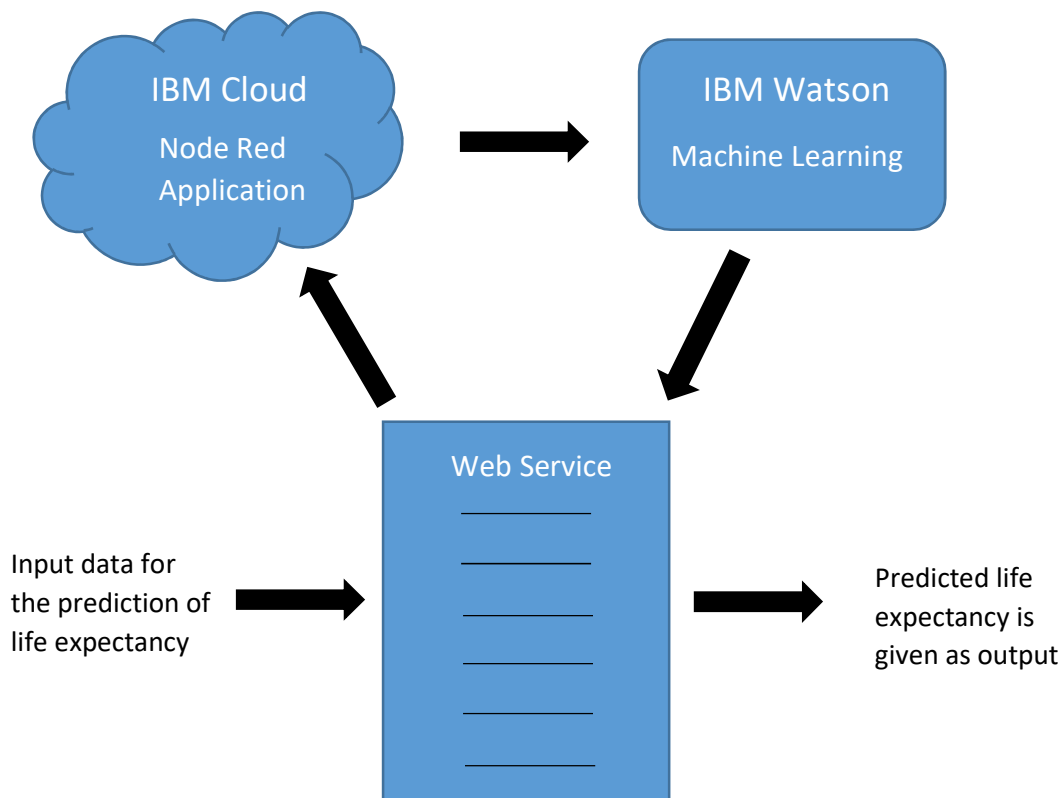
## Literature Survey

Many models out in the world which are used to estimate the life expectancy were characterized by the use of life years rather than a risk of death, questionable approaches to comorbidities, implausible estimates, questionable recommendations and poor clinical feasibility. Due to this there are appreciable errors in the results derived from these models.

In my project I overcame these errors by considering many issues like Regional variations, Economic Circumstances, Sex Differences, Mental Illnesses, Physical Illnesses, Education, Year of their birth 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 and other demographic factors.

I developed three models using supervised learning and the model which gives the best accuracy is taken to predict the life expectancy given all the required data to the system.

## Block Diagram



## Experimental Investigations

The data is downloaded from the online source. The data consists the life expectancy of different countries including different factors which is used to train the model for the prediction process.

The data consists out few outliers which are adjusted accordingly in the model creation so that those won't affect the accuracy of the predictions made for the given inputs.

The node red web service should be properly interfaced with the Watson machine learning jupyter notebook for proper results.

## Result

The trained machine learning model which is linked to the node red web service where the client can give in inputs for the model to evaluate will then predict the life expectancy based on the entries.

## **Advantages and disadvantages**

Life expectancy predictions would make people more aware of their general health, and its improvement or deterioration over time. This may motivate them to make healthier lifestyle choices.

They could also be used by insurance companies to provide individualised services, such as how some car insurance companies use black-box technology to reduce premiums for more cautious drivers.

Governments may be able to use predictions to more efficiently allocate limited resources, such as social welfare assistance and health care funding, to individuals and areas of greater need.

That said, there's a likely downside.

People may become distressed if their life expectancy is unexpectedly low, or at the thought of having one at all. This raises concerns about how such predictions could impact those who experience or are at risk of mental health problems.

Having people's detailed health data could also let insurance companies more accurately profile applicants, leading to discrimination against groups or individuals.

Also, pharmaceutical companies could coordinate targeted medical campaigns based on people's life expectancy. And governments could choose to tax individuals differently, or restrict services for certain people.

## **Conclusion**

Life expectancy predictions have the potential to be beneficial to individuals, health service providers and governments. If we can make a model which can make predictions with high accuracy it would be beneficial for many.