Project Report

Project Title :- Predicting Life Expectancy Using Machine Learning

(This project is made successfully under the guidance of **Smartinternz).**

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**Abstract**

The project tries to create a model based on data provided by the World Health Organization (WHO) to evaluate the life expectancy for different countries in years. The data offers a timeframe from 2000 to 2015. This project is based on the models and methodologies to predict life expectancy. In this project we have to use IBM service cloud and WHO dataset. Machine learning algorithms are valuable tools for the generation of predictive models and identification of complex patterns between variables.This problem statement is aimed at predicting Life Expectancy rate of a country given various features.Life expectancy is a statistical measure of the average time a human being is expected to live, Life expectancy depends on various factors: Regional variations, Economic Circumstances, Sex Differences, Mental Illnesses, Physical Illnesses, Education, Year of their birth and other demographic factors. Now, overall in this project we have to find how humans will live more .We have to use life predicting using machine learning.

**INTRODUCTION**

Overview:- A typical Regression Machine Learning project leverages historical data to predict insights into the future. This problem statement is aimed at predicting Life Expectancy rate of a country given various features.This problem statement provides 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 are given.

Purpose:- There are two complementary areas of research from which progress in life-span prediction can be anticipated. The first of these involves generation of data sets including a range of predictor variables as well as outcomes of interest, such as life span, disease risk, and indices of age-dependent functional decline against which candidate predictors can be evaluated. The second element focuses on determining which statistical methods are best able to integrate results from a panel of predictors into a single model

**Literature Survey**

Existing problem:- The problem statement to predict the life expectancy historical data insight into the future reference for calculating mathematical values , how humans will live more ?

Proposed solution :- In this project , we aimed to predict the life expectancy as a supervised machine learning task with the help of IBM service cloud, watson studio , Node Red . Through the use of this tool or Random Forest Regression we can eaily calculate and predict the life expectancy and values.

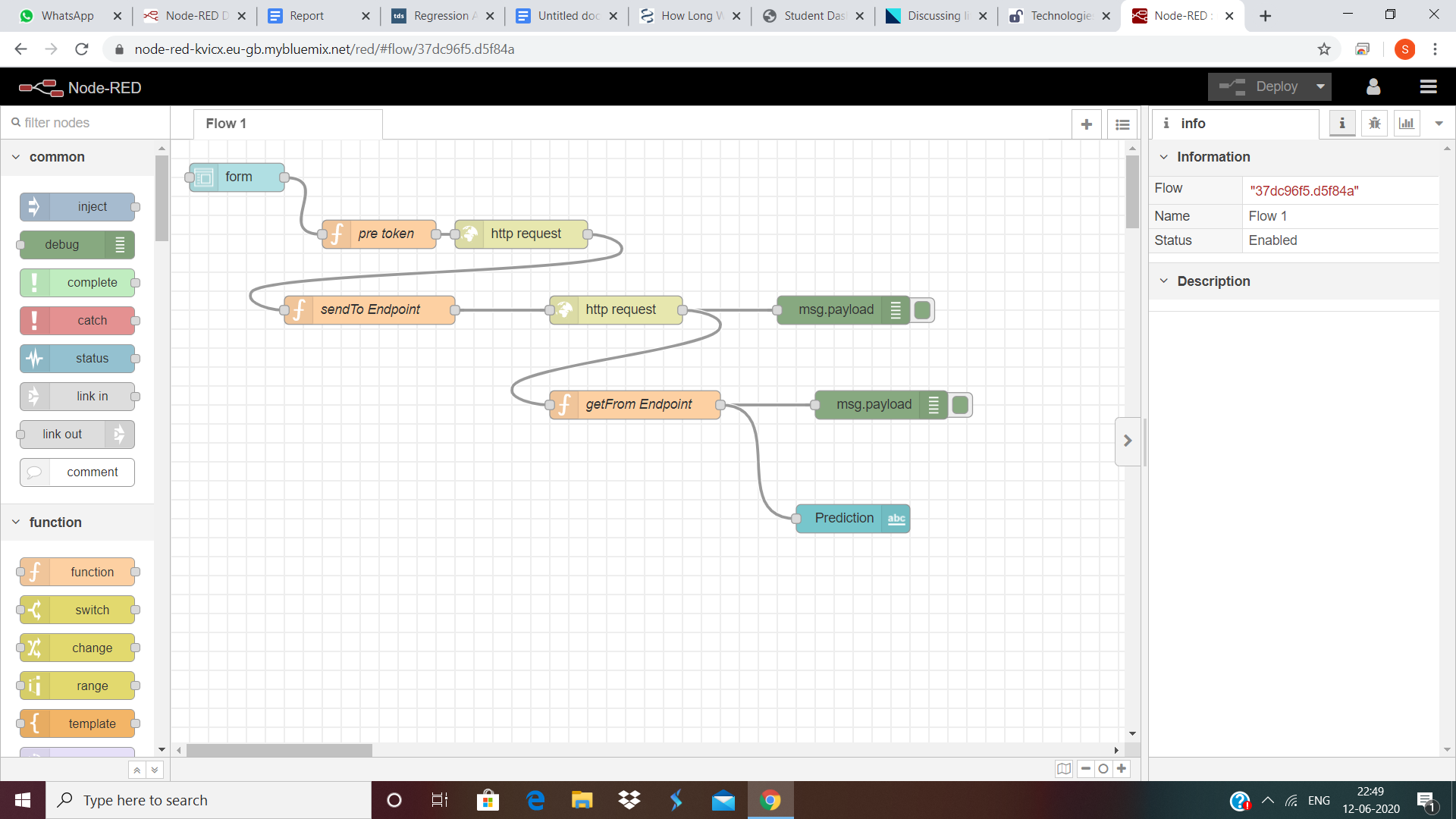
**Theoretical Analysis**

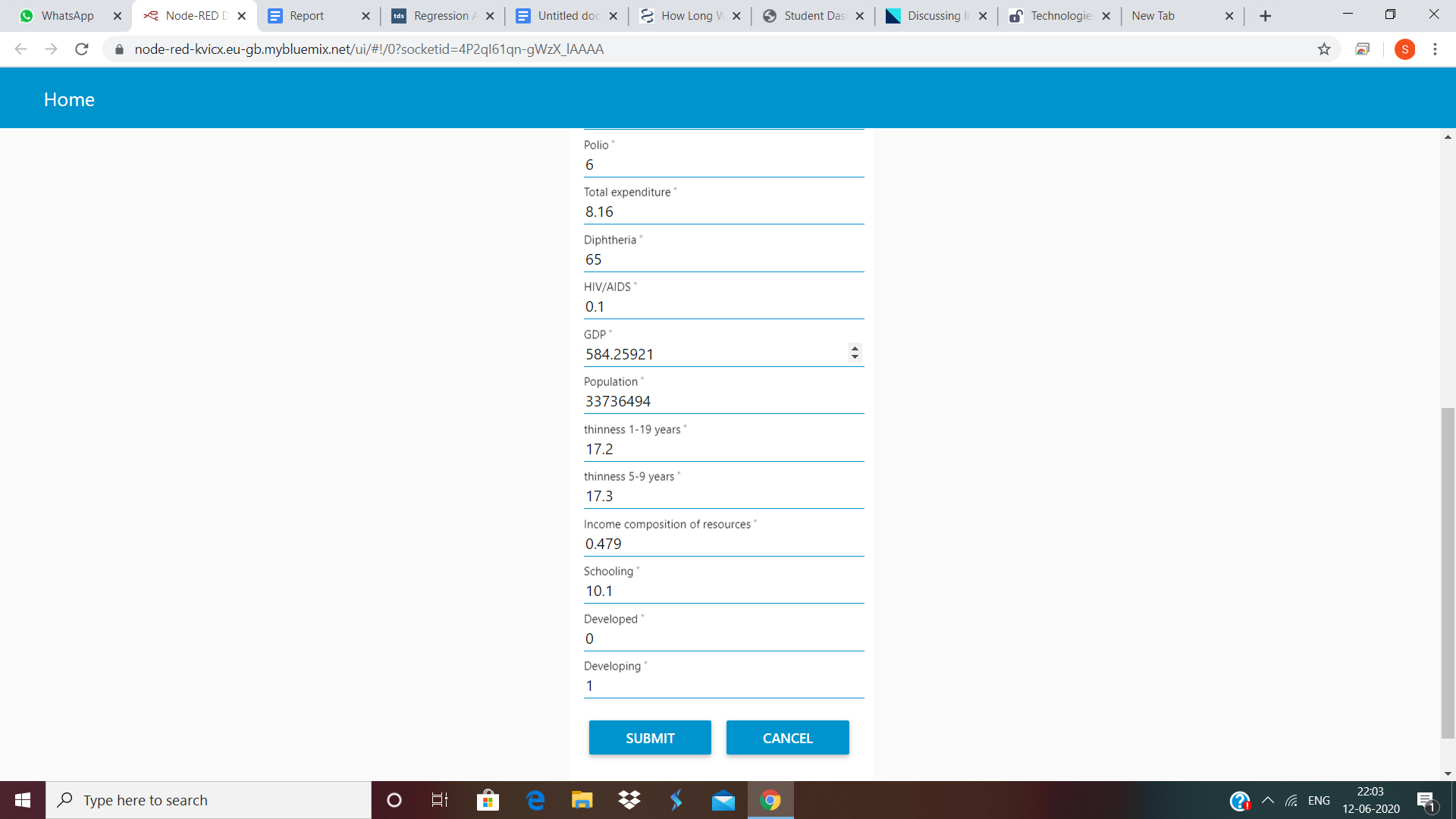
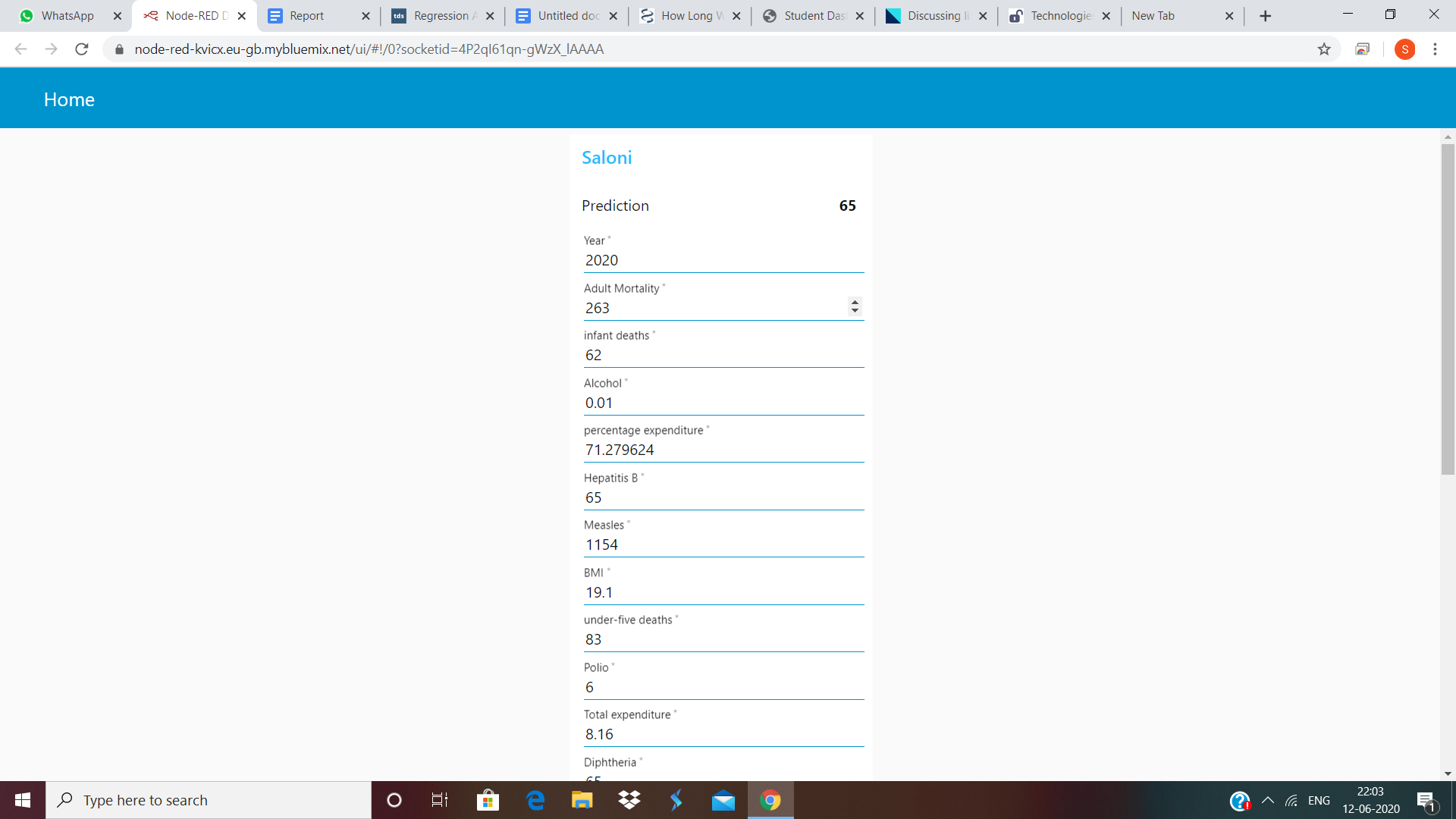
Block Diagram:-



Hardware / Software designing

First we have to collect the data from the dataset then import the libraries using pandas then applying data cleaning techniques ( refine the data). This model is divided into two part train and test . Then train the data using Random forest regression and build a model for testing . After making the model, this model is deploy using Watson studio . Then after , this model connecting to NodeRed and then I make a frontend page of life expectancy for easy to implement and understandable .

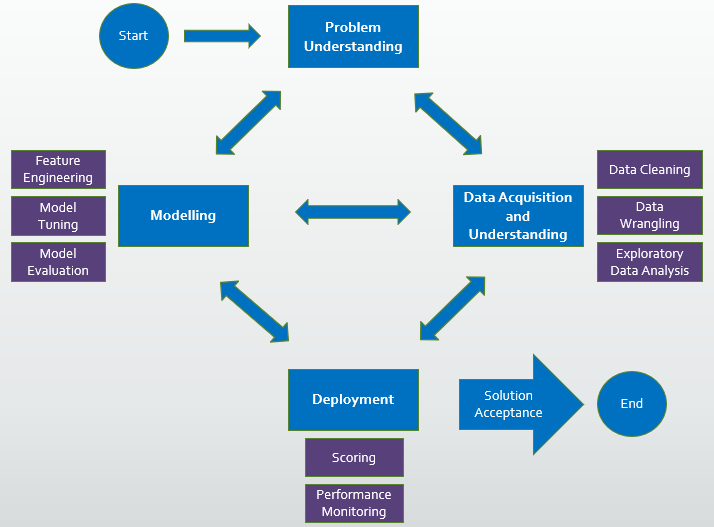




**Experimental Investigation**

# In this part we are going to investigate our model and look at our model performance. For any country having values as following ‘Year’: 2015, ‘Status’: 1, ‘Adult\_Mortality’: 263, ‘infant\_deaths’: 62, ‘Alcohol’: 0.01, ‘percentage\_expenditure’: 71.27963362, ‘Hepatitis\_B’: 65, ‘Measles’: 1154, ‘BMI’: 19.1, ‘under\_five\_deaths’: 83, ‘Polio’: 6, ‘Total\_Expenditure’: 8.16, ‘Diphtheria’: 65, ‘HIV/AIDS’: 0.1, ‘GDP’: 584.25921, ‘Population’: 33736494, ‘thinness\_1\_19\_years’: 17.2, ‘thinness\_5\_9\_years’: 17.3, Income\_composition\_of\_resources’: 0.479, ‘Schooling’: 10.1’ gives us the result of Life Expectancy exact value is 65.

**Flowchart**



**Result**

Finally result of this project , we can predict value:-

Model Score= 0.8921022092508543

Accuracy=89.21

MAE(Mean\_Absoulte\_Error): 2.099418886198547

MSE(Mean\_Square\_Error): 8.061608716707024

RMSE (Root\_Mean\_Square\_Error): 2.8392972223258037

**Advantages & Disadvantages**

Advantages

1. Countries could economically benefit from people living longer and should invest more in health to raise life expectancy, a think-tank has urged.
2. The International Longevity Centre said that as people live longer productivity also increases, in terms of ‘output’ per hour worked, per worker, boosting the economy.
3. Raising life expectancy results in improved productivity, countries will also be able to collect more taxes from the people in work.

Disadvantages

1. The most obvious disadvantage of longevity people are facing now is the aging problem.
2. Another problem ,In a world with low fertility, low mortality, and restricted immigration, countries must deal with the reality of having 20 percent or 30 percent of their populations older than age 65 .
3. The aging population causes a series of problems to the society.

**Application**

1. Along with existing heath applications such as fitness tracking, chronic disease monitoring and real-time patient monitoring,

### Analytical customer relationship management (CRM)

### Direct marketing

### Predicting outcomes of legal decisions

### Project risk management

**Conclusion**

. We have reviewed existing works and techniques in the prediction of human LE, and reached a conclusion that it is feasible to predict a PLE for individuals using evolving technologies and devices such as big data, AI, machine learning techniques, and PHDs, wearables and mobile health monitoring devices.

It is proposed that this can be extended to a lifetime prediction by using big data to generate a generic data, which can be used to create a PLE based on training data as a future solution

**Future scope**

This will help in suggesting a country which area should be given importance in order to efficiently improve the life expectancy of its population.

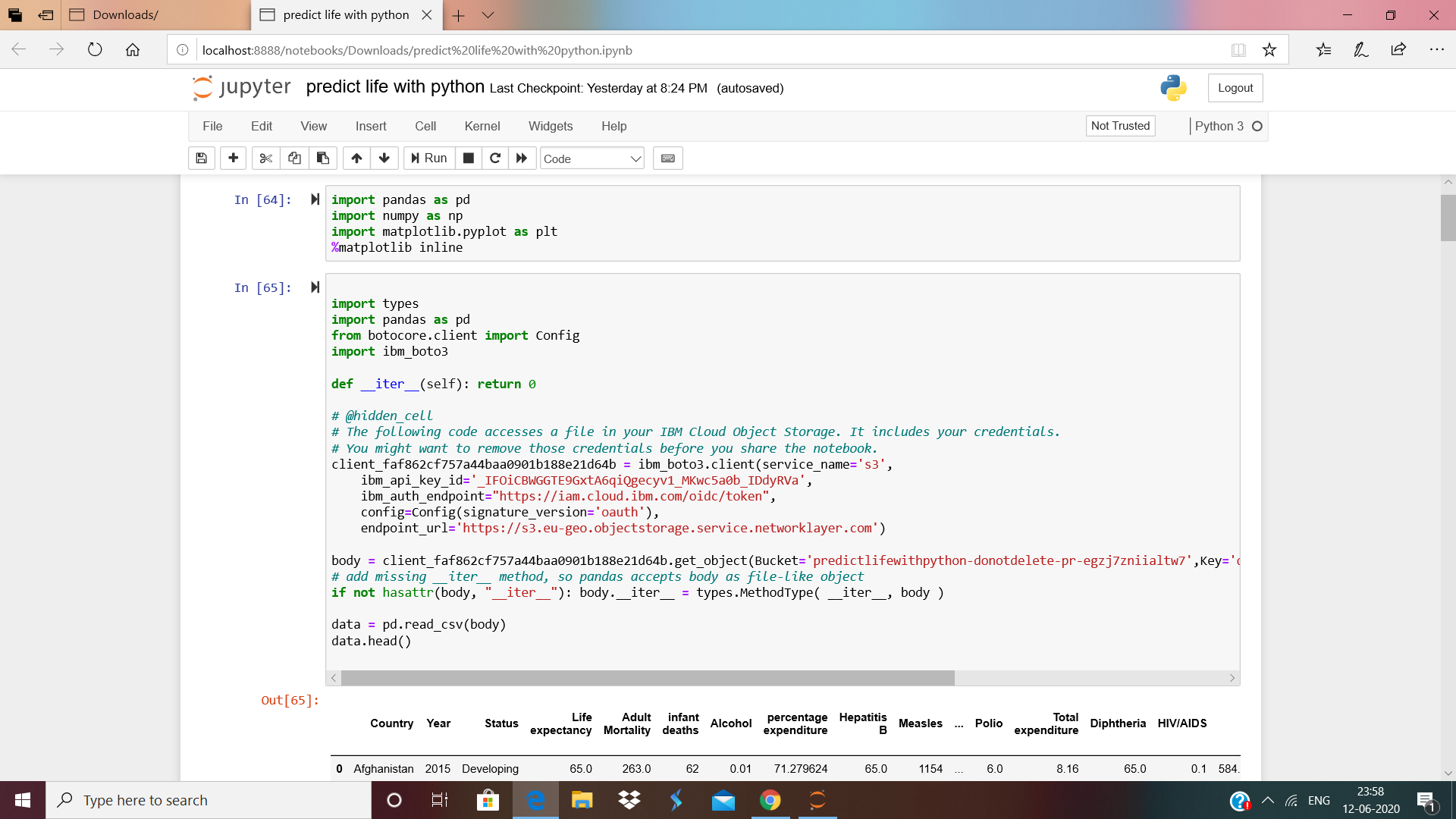
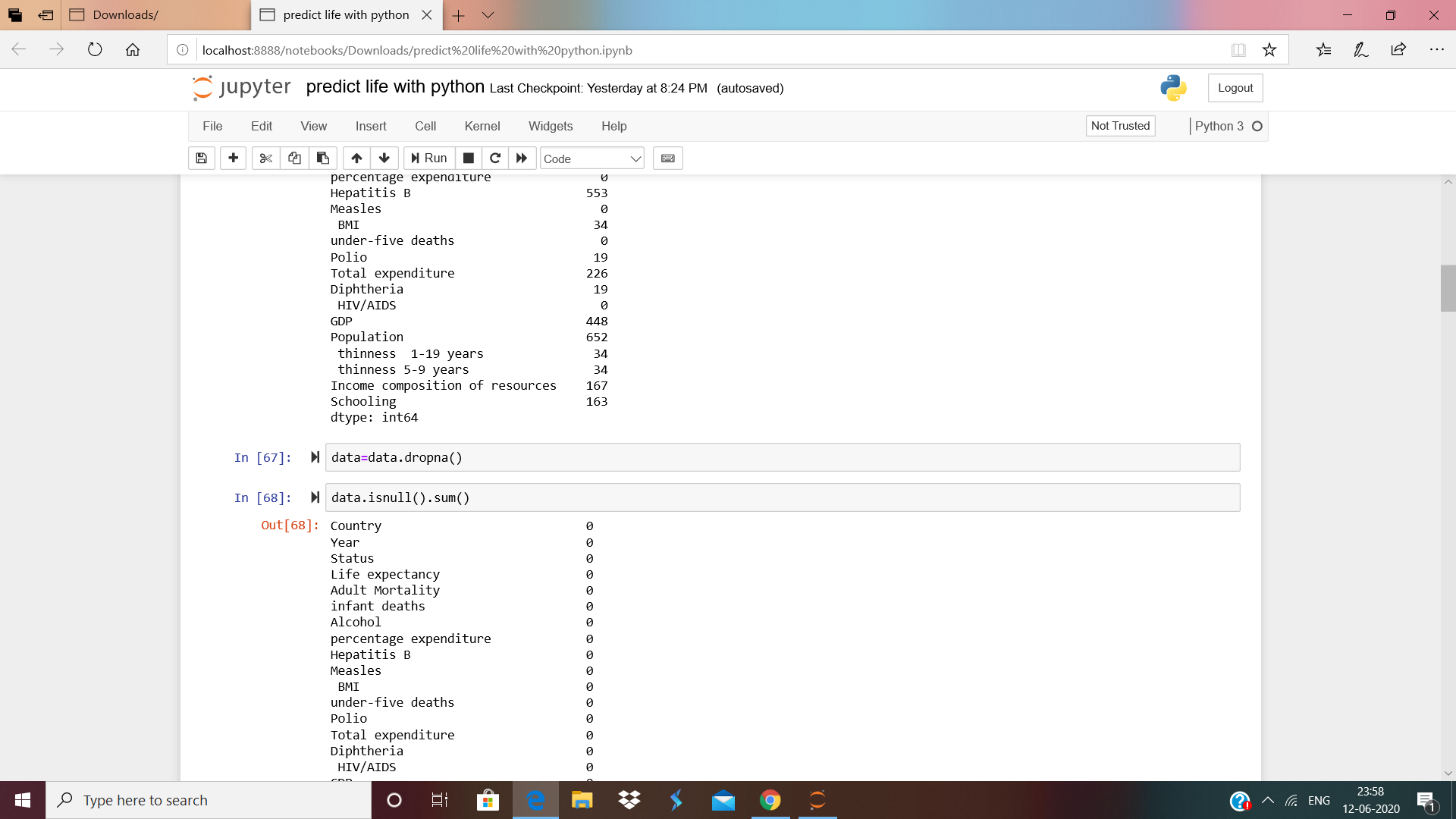
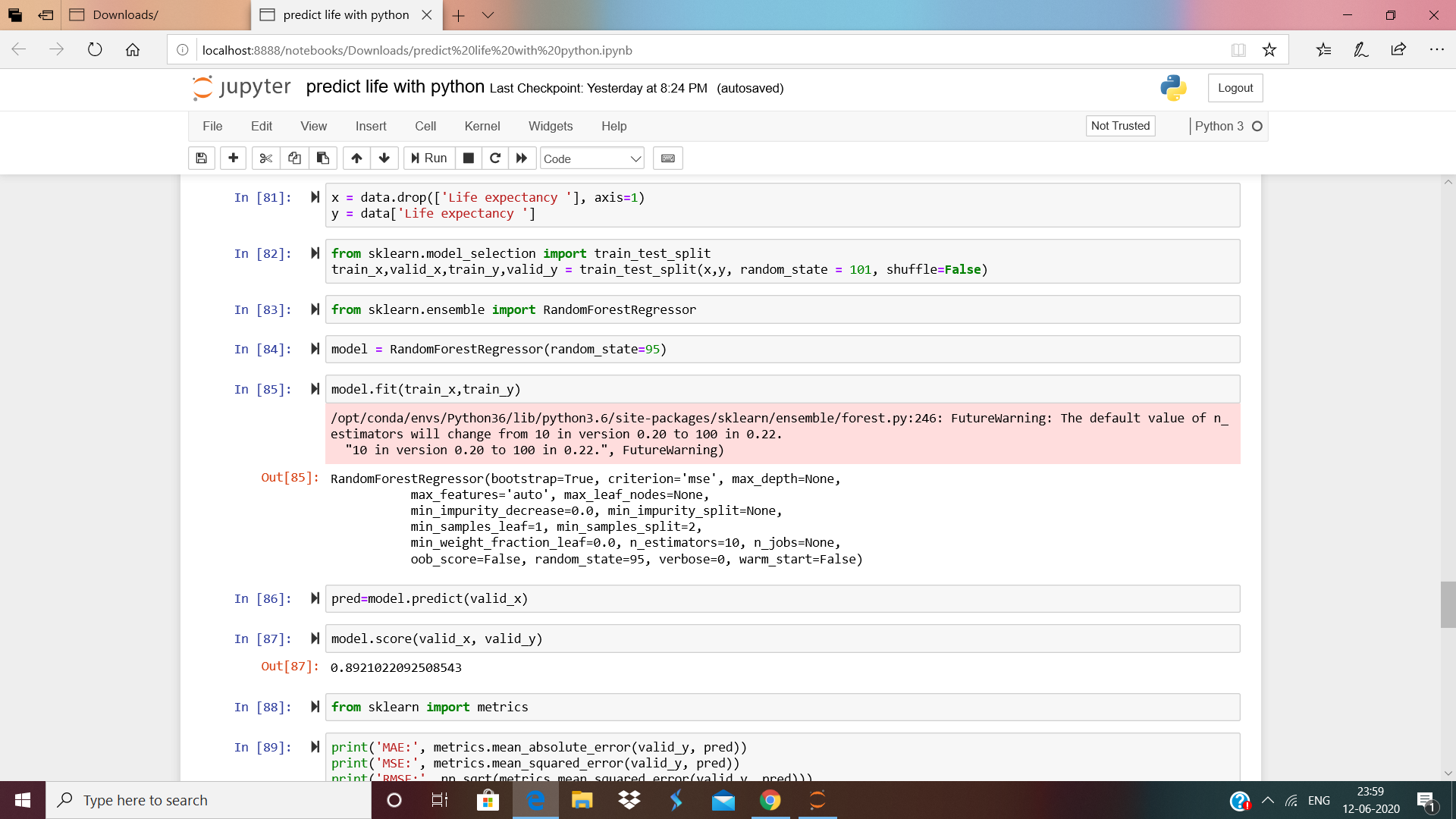
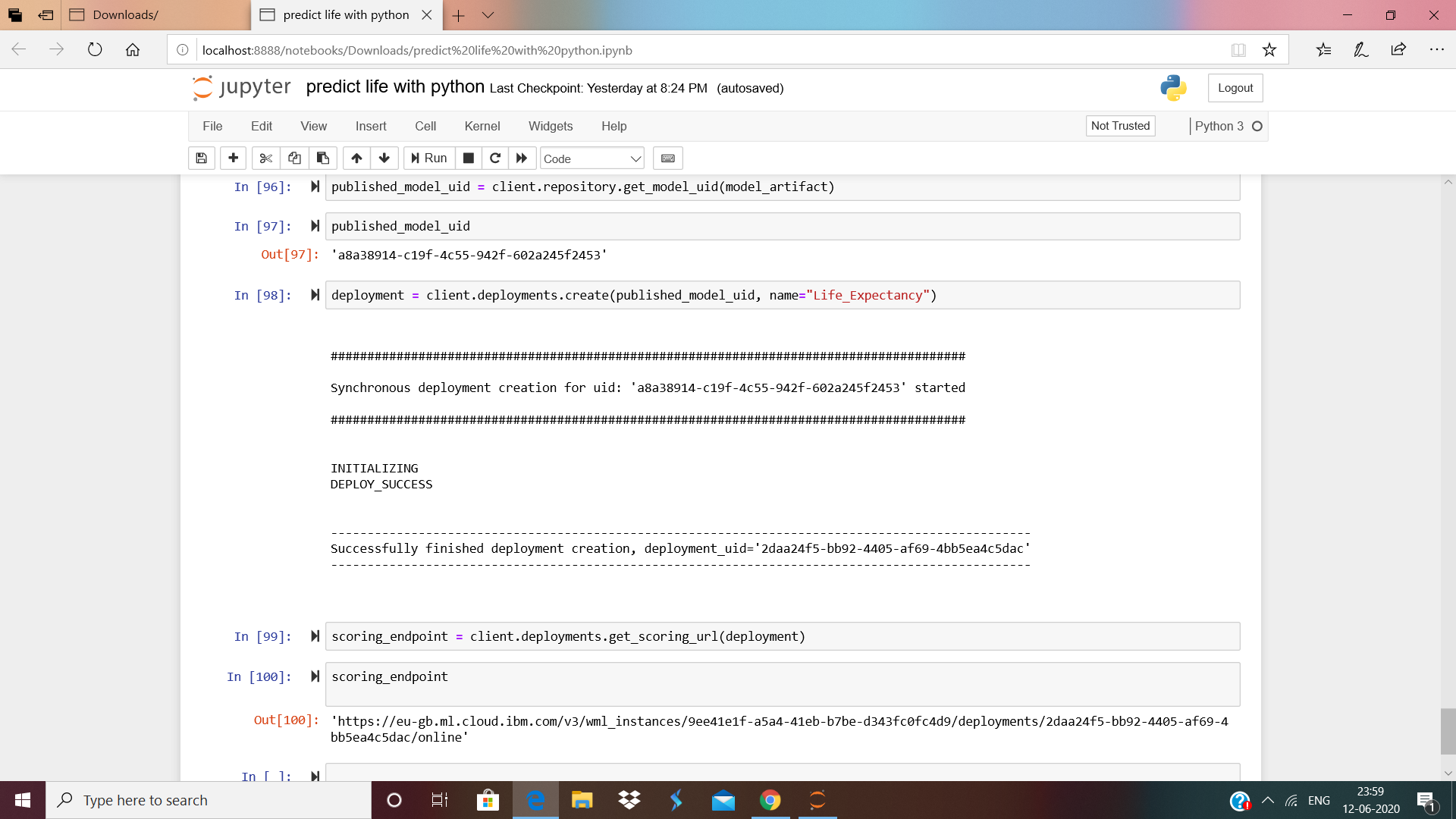
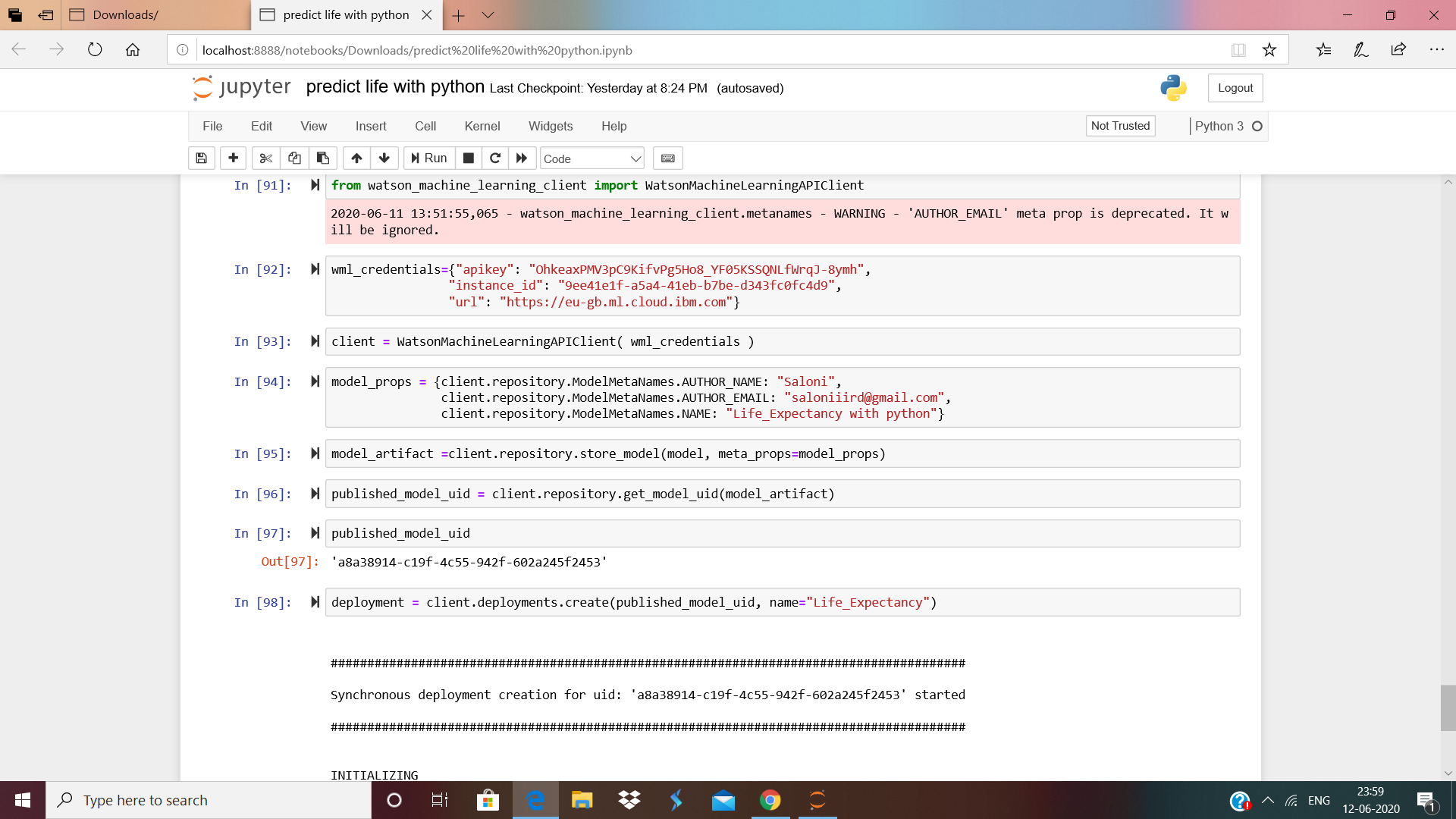
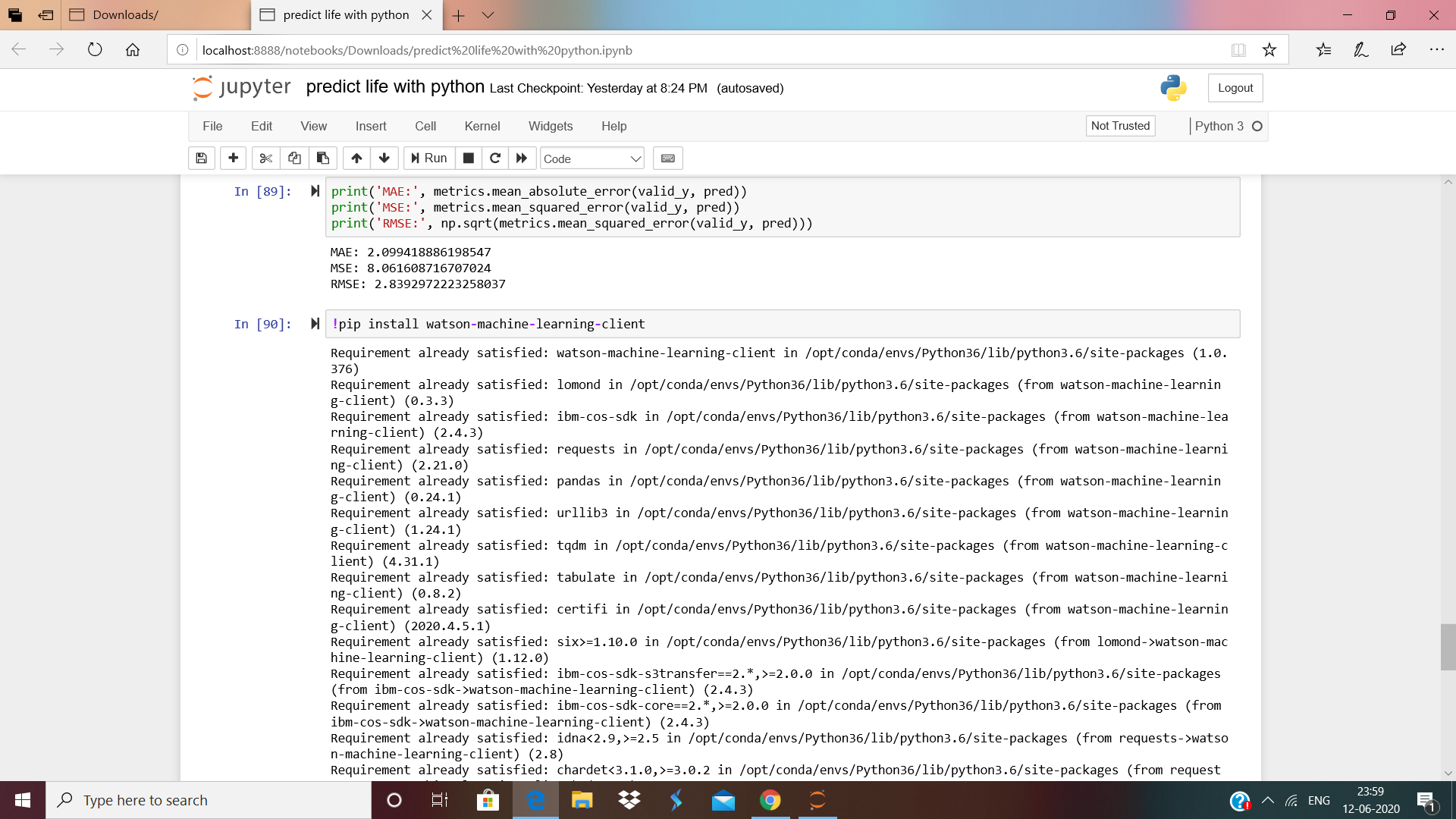
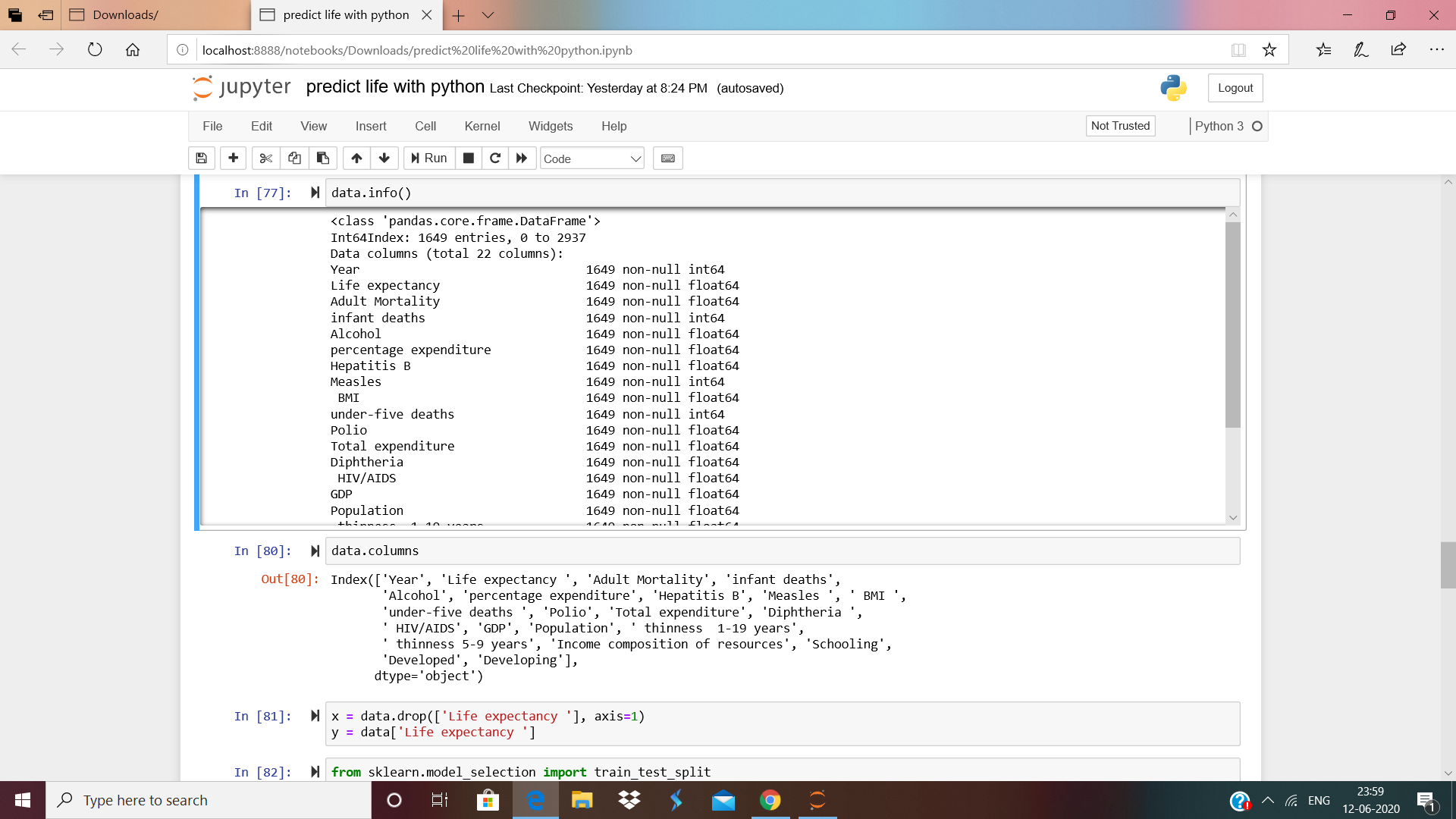
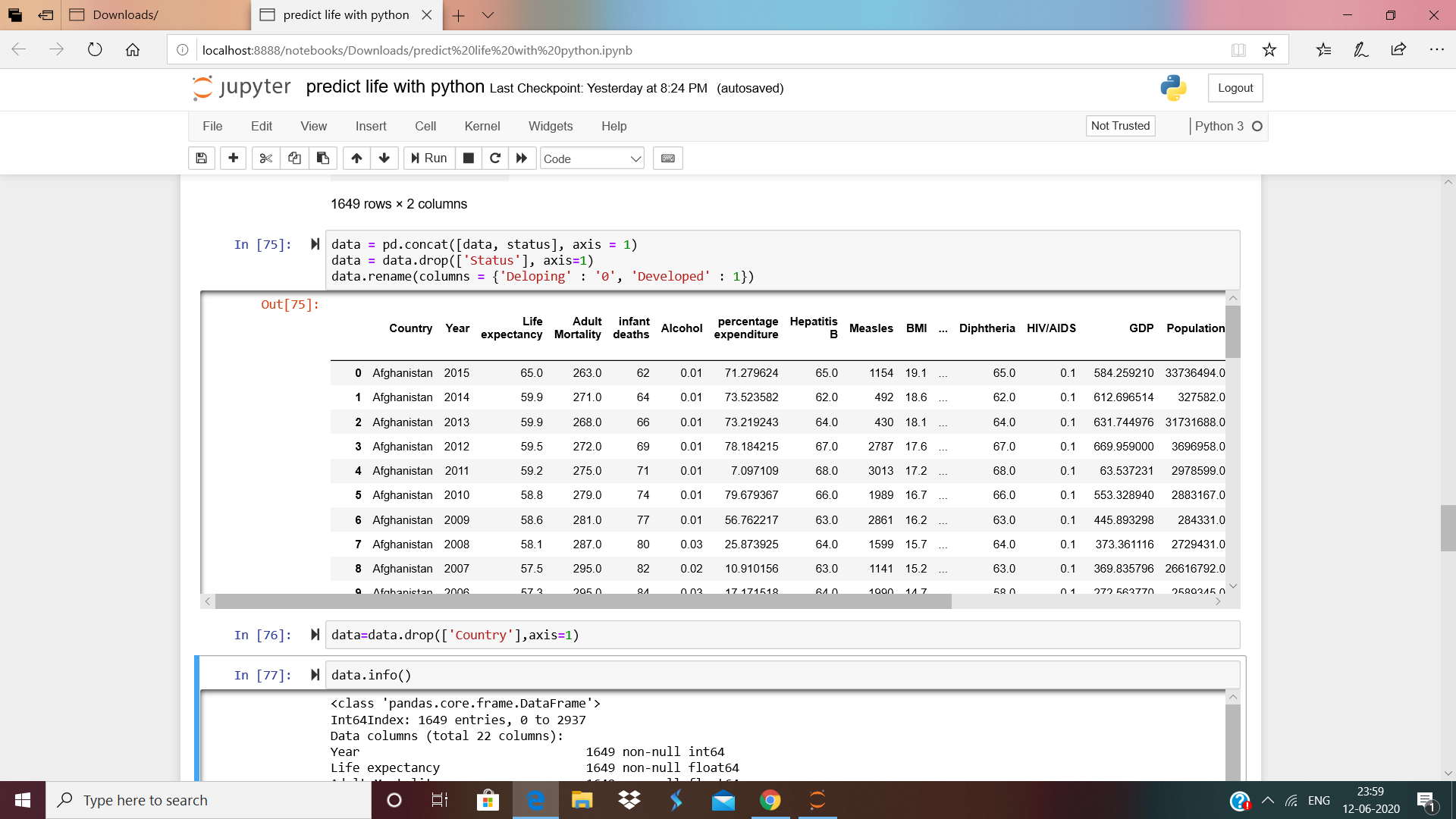
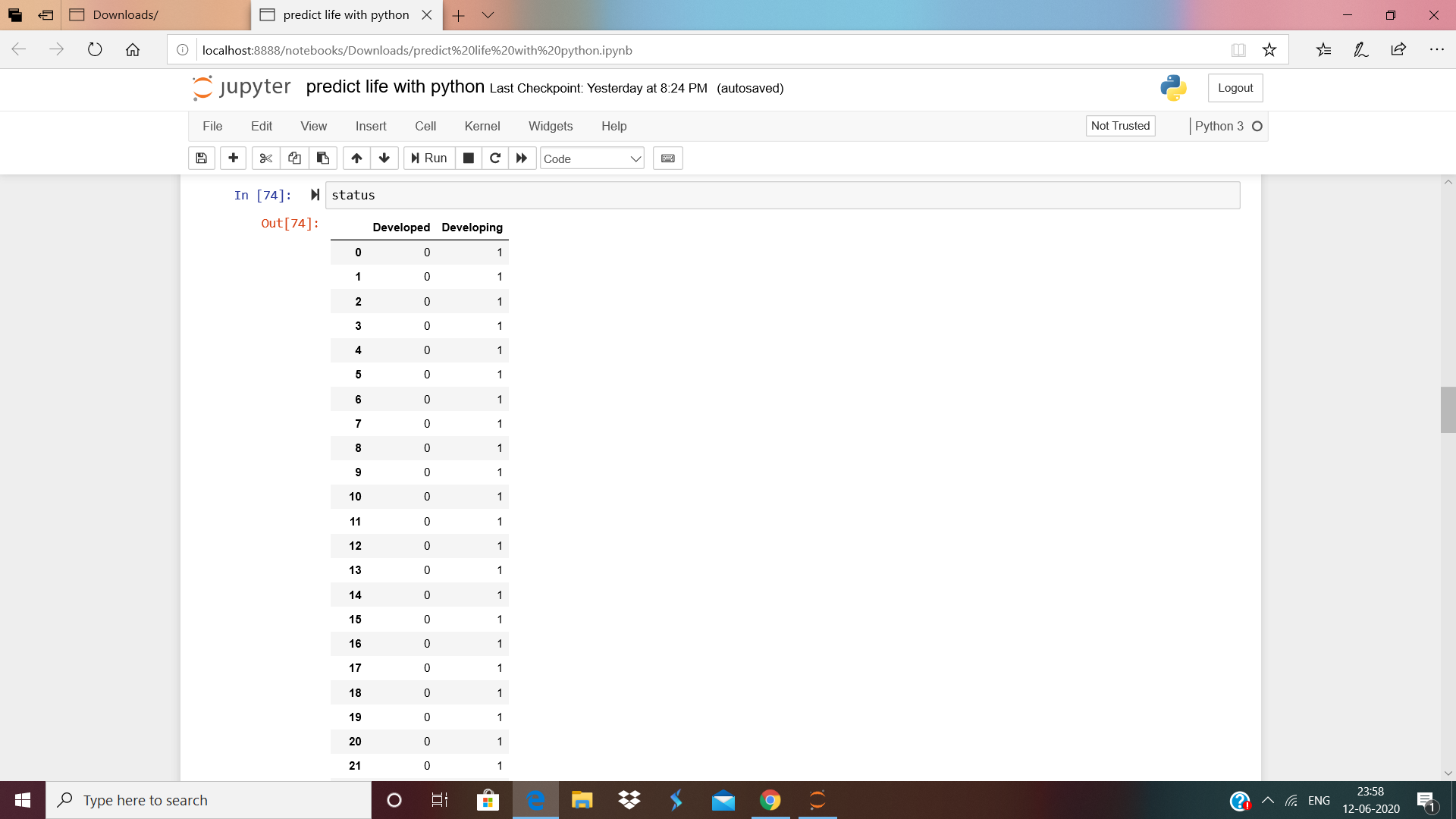
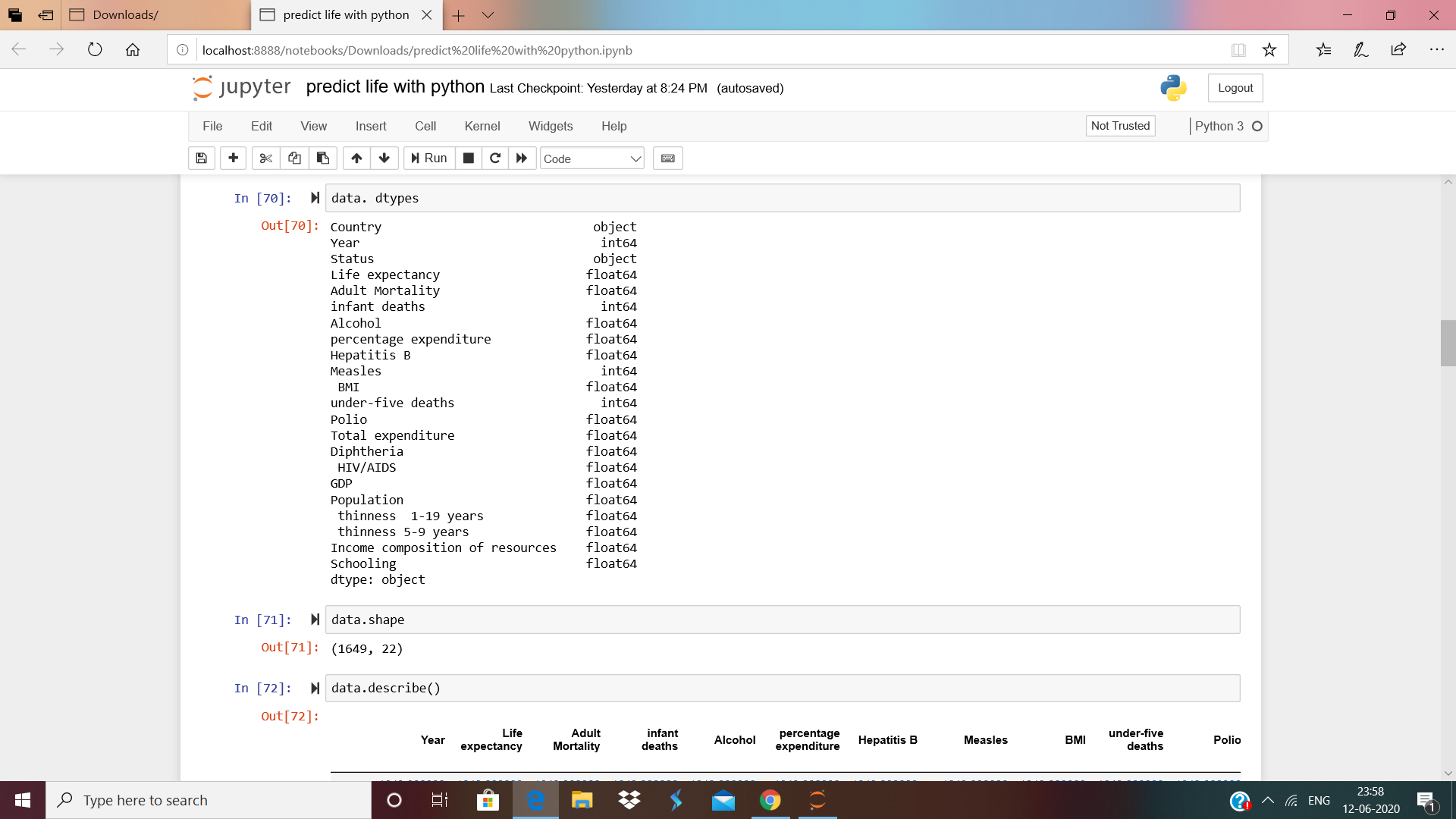
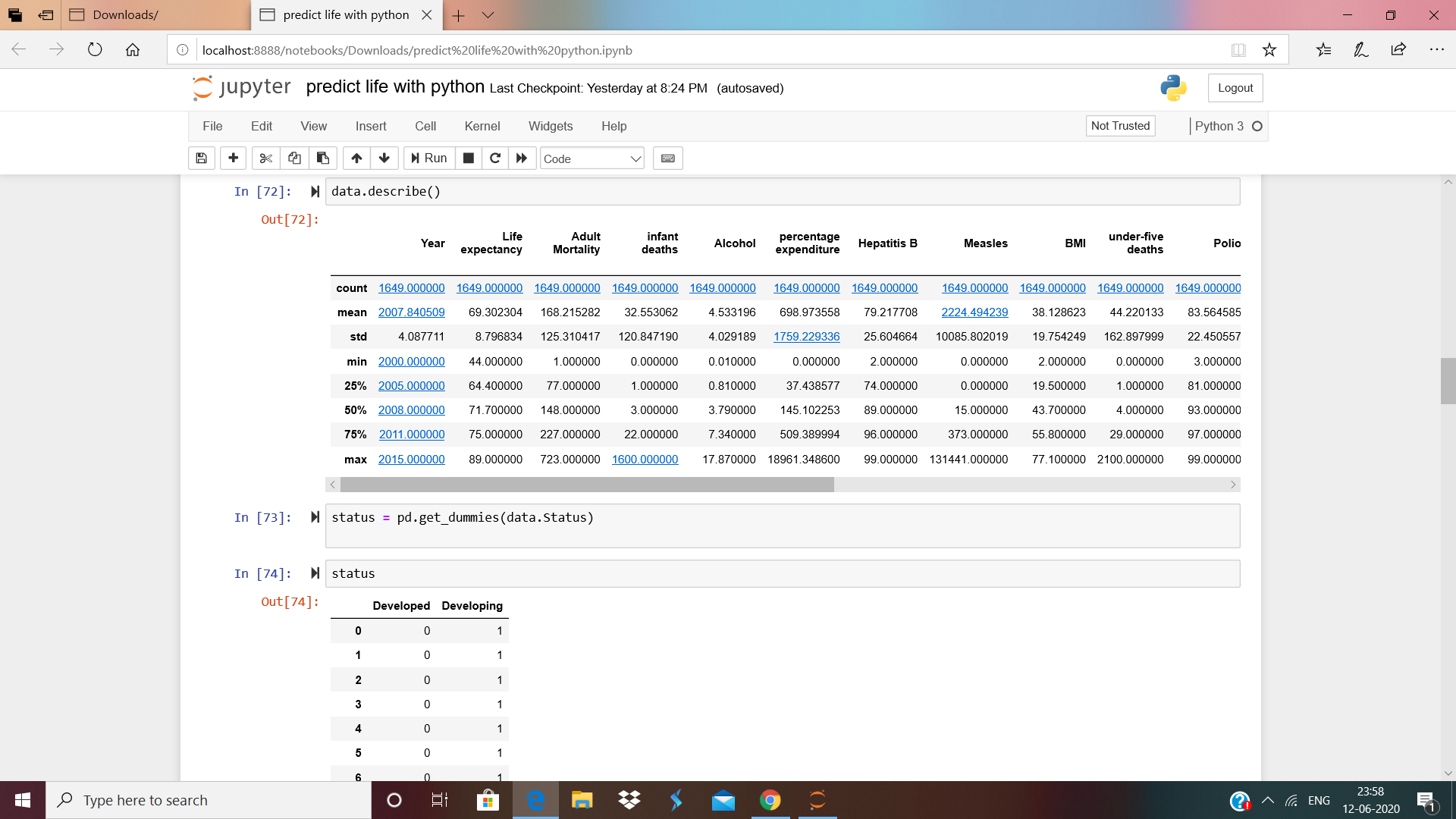
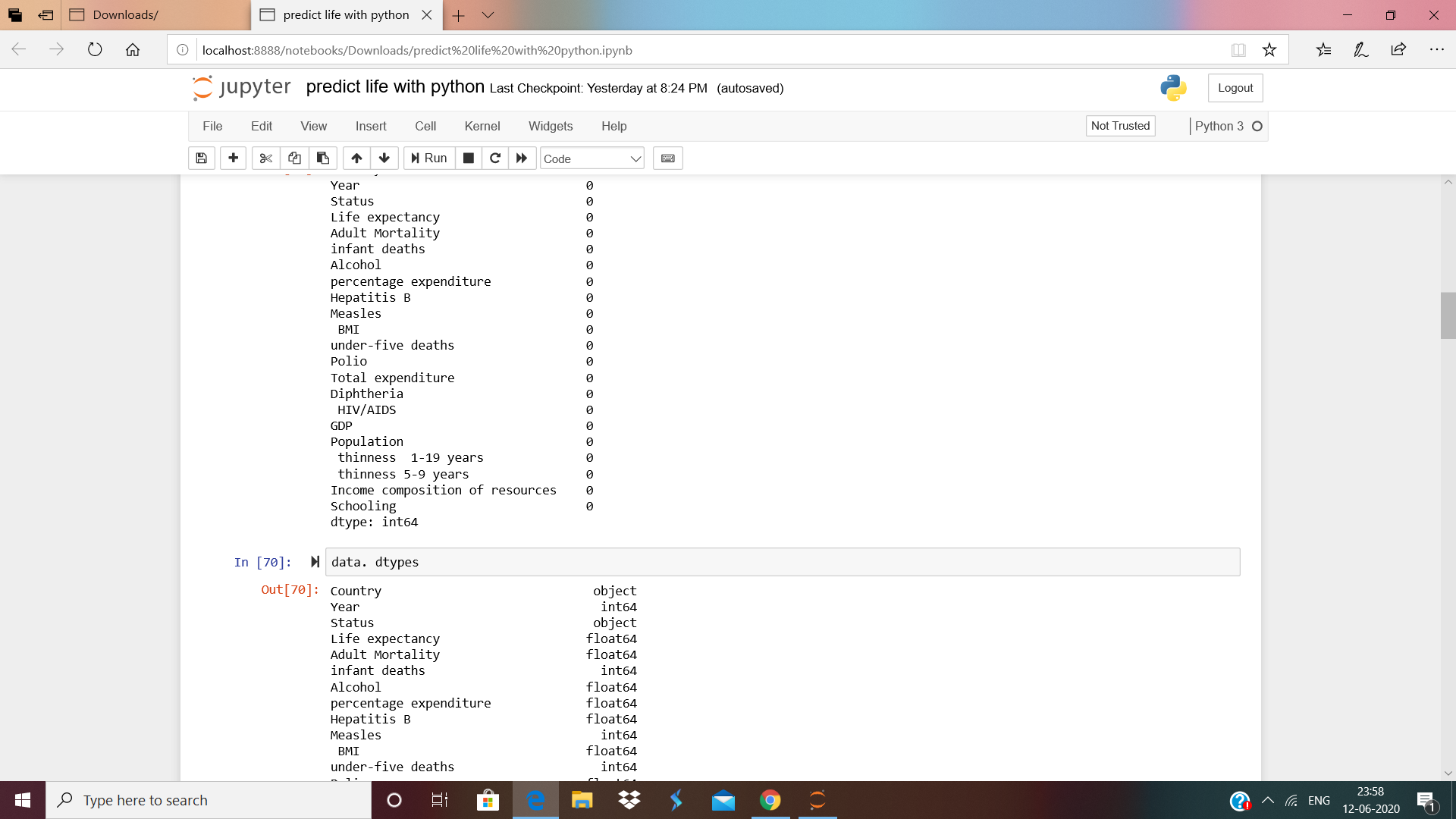
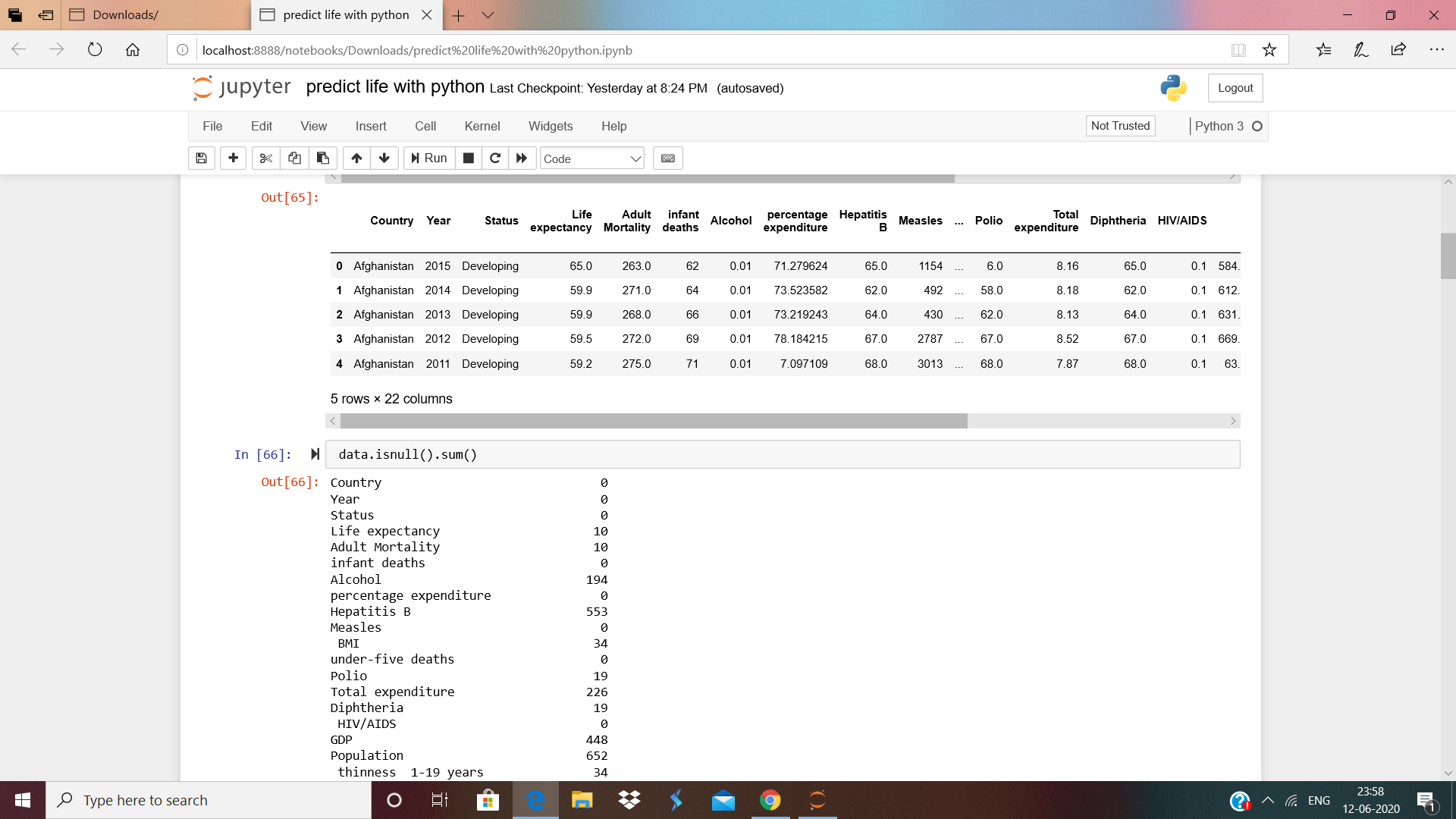
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2. Resources =<https://cloud.ibm.com/resources>
3. Watonstudio =<https://eu-gb.dataplatform.cloud.ibm.com/home?context=wdp&apps=data_science_experience&nocache=true>
4. Node Red =<https://node-red-kvicx.eu-gb.mybluemix.net/red/#flow/37dc96f5.d5f84a>
5. NodeRedDashboard=<https://node-red-kvicx.eu-gb.mybluemix.net/ui/#!/0?socketid=4P2qI61qn-gWzX_lAAAA>
6. WatonMachinelearning =<https://cloud.ibm.com/services/pm-20/crn%3Av1%3Abluemix%3Apublic%3Apm-20%3Aeu-gb%3Aa%2Ff3ec6e67edf04e5ba9f89ff6696f5ada%3A9ee41e1f-a5a4-41eb-b7be-d343fc0fc4d9%3A%3A?paneId=manage>
7. Notebook =https://eu-gb.dataplatform.cloud.ibm.com/analytics/notebooks/v2/682f5f96-14f0-413d-a01e-f7cd29840710/view?access\_token=b9b936d831a5213cf4ed7b576f56cdfcec3d4b87d1e51ac4fb85a8e3d46188da
8. Data set =https://www.kaggle.com/kumarajarshi/life-expectancy-who

**Appendix**

Source code



**Node Red Flow**

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