Prediction Of Health Insurance Preminum Costs With IBM Auto AI Service

1 INTRODUCTION

1.1 Overview

This project aims at building a web App that automatically estimates premium cost by taking the input values.

Using IBM AutoAI, we automate all of the tasks involved in building predictive models for different requirements. I will create a model from a data set that includes the age, gender, BMI, number of children, smoking preferences, region, and charges to predict the health insurance premium cost that an individual pays.

We will create an IBM Watson Studio Service, IBM Cloud Object Storage Service on IBM Cloud.

Then uploads the insurance premium data file into Watson Studio.

Then creates an AutoAI Experiment to predict an insurance premium on Watson Studio.

AutoAI uses Machine Learning Service to create several models, and then we will deploy the best performing model.

We use the Node-RED web application to connect to the deployed model and predict an insurance

1.2 Purpose

The main aim of this project is to create a model based on statistically significant factors (independent variable) which will affect premium charges (dependent variable) by an insurance company. In this

project we are using Snap boosting machine regression algorithm for the accurate prediction. An application is also built which can be interlinked with the model so as to view the result on UI based on the input parameters.

By using this application, customers see the radical difference their lifestyle choices make on their insurance charges. By leveraging artificial intelligence (AI) and machine learning, this help customers understand just how much smoking increases their premium by predicting how much they will have to pay within seconds.

2 LITERATURE SURVEY

2.1 Existing problem

Health insurance companies have a tough task at determining Premium for their customers. While the health care law in any country does have some rules for companies to follow to determine premiums. It's really up to the companies on what factors they want to hold more weightage. Companies should know the most important factors and how much statistical importance they hold.

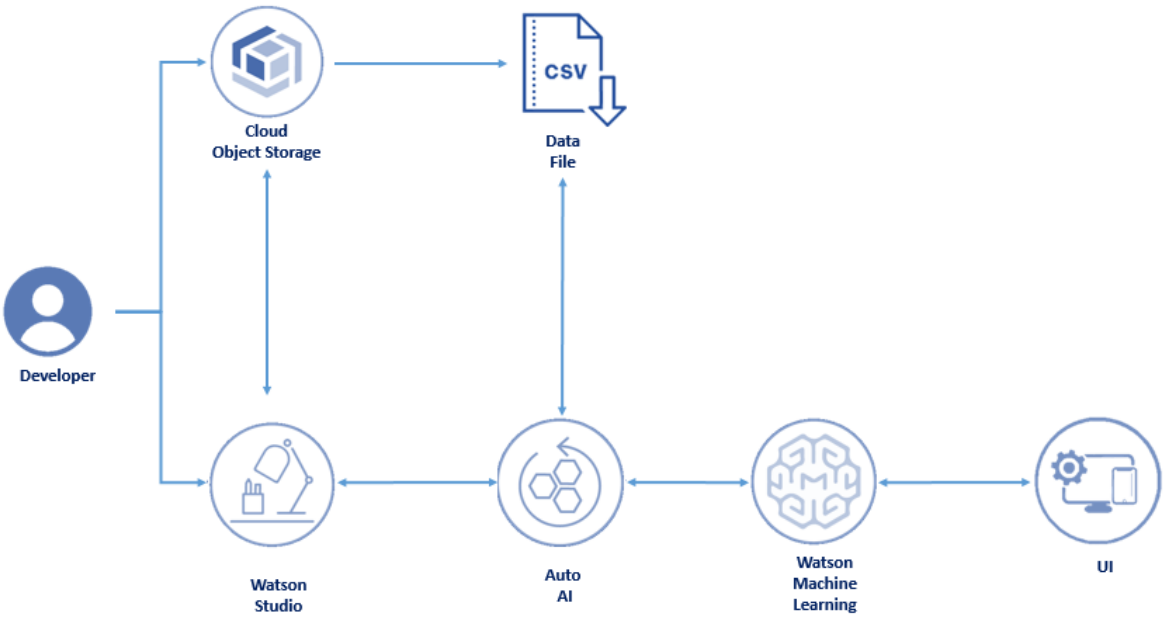
2.2 Proposed solution

Applying Snap boosting machine regression model to insurance dataset to predict future insurance cost for the individuals. Machine learning is a method of data analysis which sends instructions to computers so that they can learn from data. Then, based on the learned data ,they provide us with the predicted results/ patterns.

AI will provide accurate, instant, and efficient health insurance cost.

3 THEORITICAL ANALYSIS

3.1 Block diagram



3.2 Hardware / Software designing

IBM Watson Studio - IBM Watson Studio helps data scientists and analysts prepare data and build models at scale across any cloud.

IBM Watson Machine Learning - IBM Watson Machine Learning helps data scientists and developers accelerate AI and machine-learning deployment.

IBM Cloud Object Storage - IBM Cloud Object Storage makes it possible to store practically limitless amounts of data, simply and cost effectively.

Node-RED - a flow-based development tool for visual programming developed originally by IBM for wiring together hardware devices, APIs and online services as part of the Internet of Things. Node-RED provides a web browser-based flow editor, which can be used to create JavaScript functions.

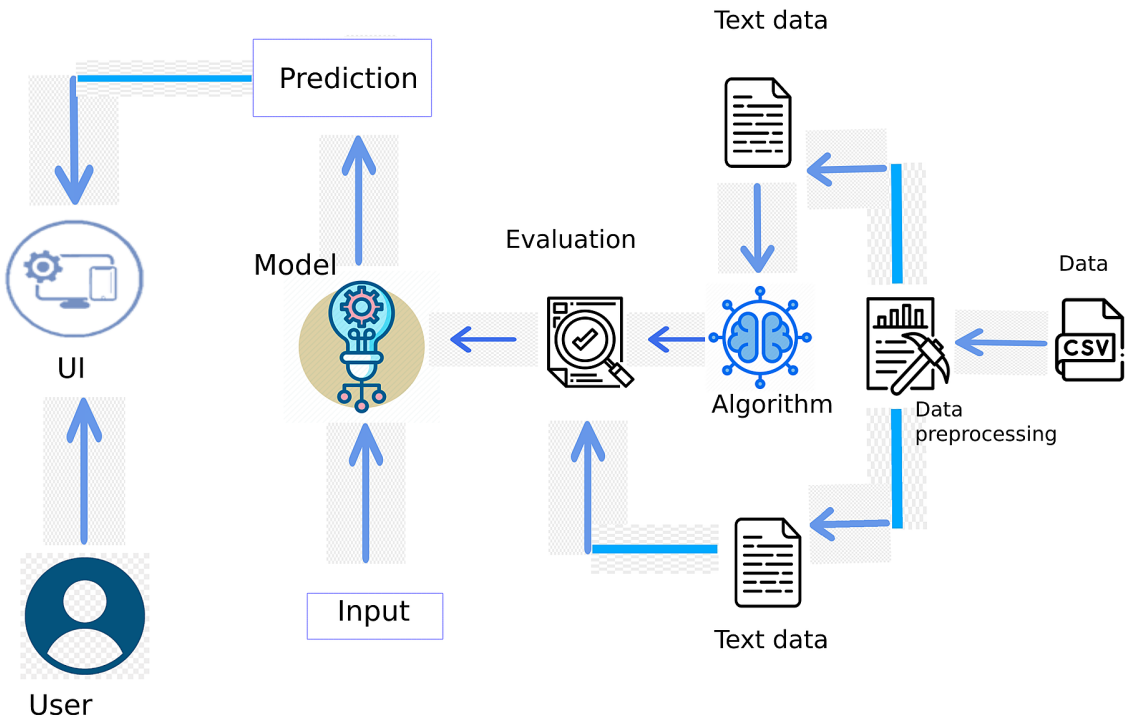
4 EXPERIMENTAL INVESTIGATIONS

Here we are going to build a machine learning model that predicts insurance-premium-prediction based on the following parameters

- Age
- BMI
- Children and expenses
- Sex
- Smoker and
- Region

Here there are 6 parameters which affect the premium cost of Health Insurance. They are age, BMI, children , sex, smoker or not , region. All these values are the factors which predict the expense of the customer.

5 FLOWCHART



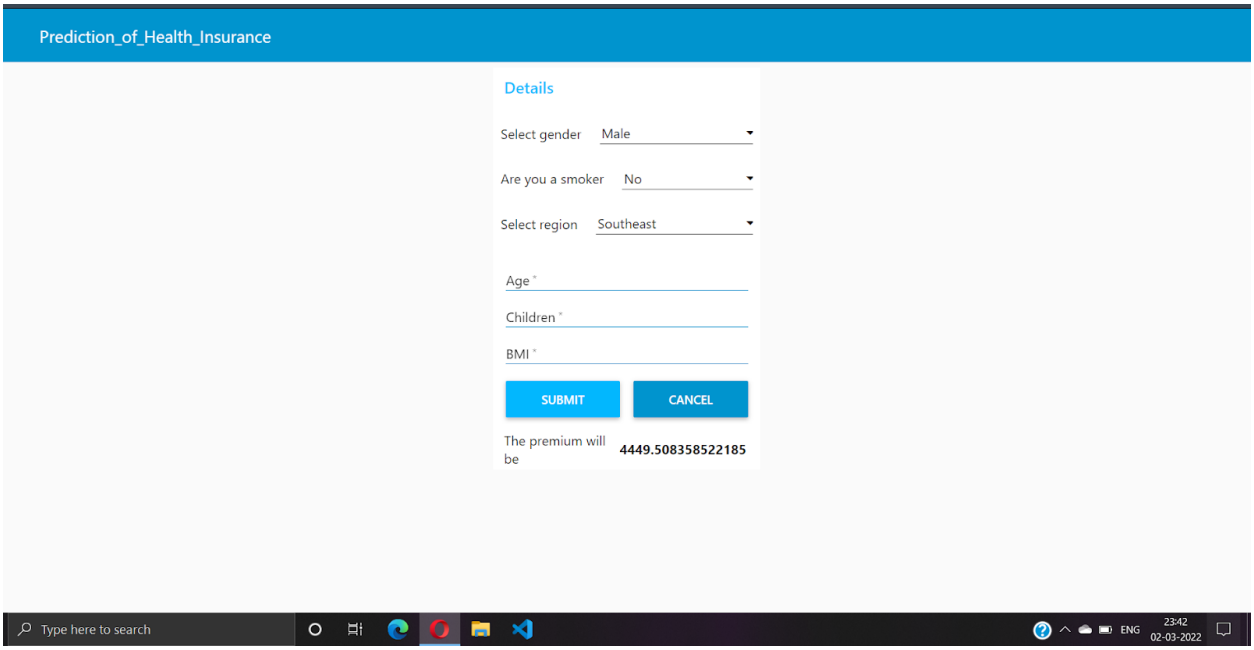
1. The user creates an IBM Watson Studio Service on IBM cloud.
2. The user creates an IBM Cloud Object Storage Service and adds that to Watson Studio.
3. The user uploads the insurance premium data file into Watson studio.
4. The user Create an Auto AI Experiment to predict an insurance premium on Watson studio.
5. Auto AI uses Watson Machine Learning to create several models, and the user deploys the best performing model.
6. The user uses the NODE-RED application to connect to the deployed model and predict an insurance charge.

6 RESULT

When we input the values in each input fields as our wish

For an instance,

Select gender : Male, Are you a smoker : No , region : southeast, age : 27 , children : 1, BMI :27.



Here we got the prediction of premium cost of Health Insurance as 4449.5.

7 ADVANTAGES & DISADVANTAGES

7.1 Advantages

- Keeps you financially Protected

  The biggest benefit of purchasing health insurance is that it prevents erosion of your long-term savings. You might be saving and investing for goals such as buying a property or child'sleducation, but you or someone in your family suffering from a medical emergency can require you to liquidate your assets. If you are still unable to manage the expenses, you might also go ahead and borrow money from family, friends, or take a loan. All of these things can put a huge dent on your current financial health as well as long-term objectives. Having health insurance can help you avoid such outcomes due to the rising cost of quality healthcare.

- Availability of Options

  Gone are the days when insurers only used to offer basic health insurance plans. Modern insurance providers now offer a wide range of health insurance policies. For instance, most insurers now offer individual policy and family floater plans. You get to protect yourself with an individual plan, but with a family floater plan, you can insure

the health of your entire family. Apart from these two popular options, you can also find other types of health plans like ULHP (Unit Linked Health Insurance), critical illness plan, group health insurance, personal accident plan, and hospital cash benefit plan. The availability of so many options ensures that you can select a policy that best meets your requirements.

- Cashless Hospitalization

  One of the biggest benefits of health insurance is cashless claims. Most top insurers nowadays have an extensive list of network hospitals all over the country. In case if you are suffering from a health problem and get admitted to one of the network hospitals, you'll mostly be able to take advantage of cashless hospitalisation. This facility eliminates the traditional claim reimbursement process where you were first required to clear the hospital dues and then get it reimbursed from the insurer. With cashless treatment, the insurer will directly pay your medical bills to the hospital. Thus, you will not be required to bear the high treatment costs from your pockets. In case if you are admitted to a non-network hospital, you will be able to use the reimbursement claim faculty here.

- No Claim Bonus

  Health insurance plans also come with a bonus element known as

NCB. Health plans are generally renewed every year by paying the insurance premium. But if you do not file any claim for the entire year, you will be entitled to receive NCB. This NCB benefit is also available with vehicle insurance plans. However, there is a major difference between NCB of vehicle insurance and health insurance. With motor insurance, the NCB reduces the annual premium. But with health insurance, the NCB provides you with a higher sum assured at the same premium amount. So, if the coverage of your health insurance plan is Rs. 5 lakhs and you do not file any claim in a year, the coverage will be increased to Rs. 5.5 lakhs (10% of coverage) in the next year without any increment in the premium amount.

7.2 Disadvantages

- Healthy people pay for the sickest

  US studies found that chronic diseases make up 90% of healthcare costs. According to these studies, the sickest 5% of the population create 50% of total healthcare costs, while the healthiest 50% only create 3%.

- Less financial incentive to stay healthy.

  Without co-payments, the general concern is that people might overuse emergency rooms and doctors.

- Decreased quality of care.

If they aren't financed well-enough by cost-cutting governments, doctors may cut back on care to lower costs.

8 APPLICATIONS

The companies like Certifi and Prognos Health use a similar kind of AI to streamline processes, track data and improve the system.

The health insurance providing company can make use of this model to make their task easy from the traditional mechanism. This fast communication with policyholders, builds a huge revenue for insurance companies.To provide policyholders with accurate, instant, and efficient health insurance plans, AI is utilized by insurance companies to provide the best and tailor-made health insurance plan for customers.

9 CONCLUSION

In this project, IBM AutoAI suggested two models and evaluated individual health insurance data. The health insurance data was used to develop the regression models, and the predicted premiums from these models were compared with actual premiums to compare the accuracies of these models. It has been found that Snap Boosting Machine Regressor is the best performing model.

Various factors were used and their effect on the predicted amount was examined. It was observed that a person's age and smoking status affects the prediction most in every algorithm applied. Attributes which had no effect on the prediction were removed from

the features.

Premium amount prediction focuses on a person's own health rather than other companies' insurance terms and conditions. The models can be applied to the data collected in coming years to predict the premium. This can help not only people but also insurance companies to work in tandem for better and more health centric insurance amount.

10 FUTURE SCOPE

While machine learning artificial intelligence may be seen as a data-hungry machine, the crucial aspect of a successful AI system that manages a client's healthcare is its ability to develop efficient reasoning and intuitively read and understand trends.
So in the future we can add more parameters to predict and analyze the premium cost of health insurance.

11 BIBILOGRAPHY

- https://www.acko.com/health-insurance/ai-artificial-intelligence-in-health-insurance/
- https://www.forbes.com/sites/forbesbusinesscouncil/2022/01/10/using-ai-and-machine-learning-to-improve-the-health-insurance-process/?sh=873347042b14
- https://theconversation.com/very-risky-business-the-pros-and-cons-

of-insurance-companies-embracing-artificial-intelligence-106536

- https://developer.ibm.com/patterns/create-an-application-to-predict-your-insurance-premium-cost-with-autoai/
- https://www.kaggle.com/mirichoi0218/insurance
- https://economictimes.indiatimes.com/wealth/insure/what-you-need-to-know-beforebuying-healthinsurance/articleshow/47983447.cms?from=mdr