Health Insurance Cost Prediction Using IBM Watson

category:Machine Learning

1.Introduction

Overview:

In this Project,we will predict health insurance cost using IBM watson.We will make our predictions using Linear Regression, for which we will model the relationship between the three variables and insurance costs by fitting a linear equation to observed data.And also we will deploy our model locally and on IBM Watson in the end.

Purpose:

The main aim of this project is to create a model based on statistically significant factors (independent variable) which will affect premiums charges (dependent variable) by an insurance company. In this project we are using Linear regression for the accurate prediction. An application is also build which can be interlinked with the model so as to view the result on UI based on the input parameters.

2.Literature Survey

Existing Problem:

Health Insurance companies have a tough task at determining premiums 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 factor/s they want to hold more weightage. Companies should know the most important factors and how much statistical importance do they hold.

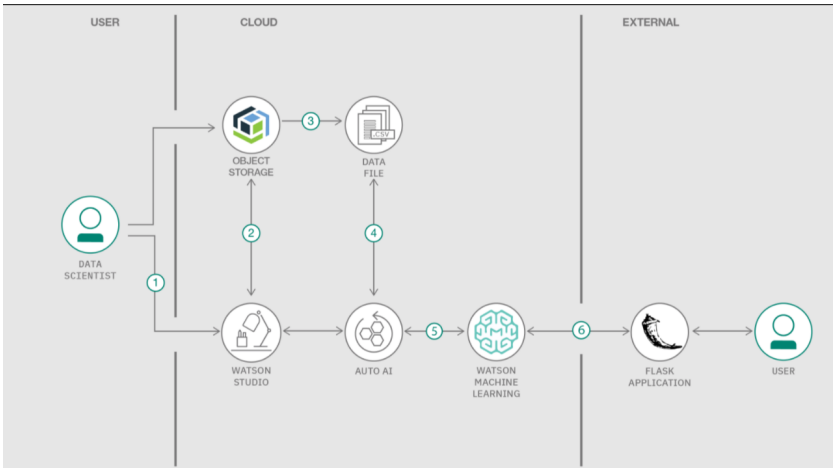
Proposed Solution:

Applying Linear regression model to Medical Insurance dataset to predict future Insurance costs for the individuals. Machine learning is a method of data analysis which sends instructions (programmable code) to computers so that they can learn from data. Then, based

on the learned data, they provide us the predicted results/patterns.

3.Therotical Analysis

Block Diagram:



Hardware/Software Designing:

we need basic software skills like python,python web frame works,python for data analysis,python for data visualisation,machine learning for developing this project and to predict the health insurance cost using IBM watson.

4.Experimental Investigations

a) Document Type
Article

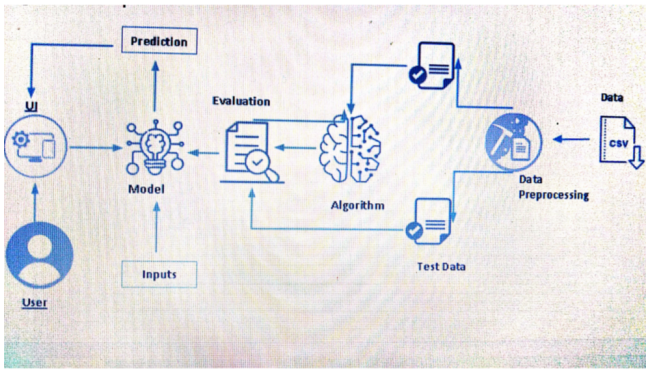
b) Publication Date
9-26-2020

c) Abstract
We introduce a new experimental approach to measuring the effects of health insurance policy

alternatives on behavior and health outcomes over the life course. Cash-motivated subjects are placed in a virtual environment where they earn income and allocate it across multi-period lives. We compare behavior across age, income and insurance plans—one priced according to an individual's expected cost and the other uniformly priced through employer-implemented cost sharing. We find that 1) subjects in the employer-implemented plan purchased insurance at higher rates; 2) the employer-based plan reduced differences due to income and age; 3) subjects in the actuarial plan engaged in more health-promoting behaviors, but still below optimal levels, and did save at the level required, so did realize the full benefits of the plan. Subjects had more difficulty optimizing choices in the Actuarial treatment, because it required more long term planning and evaluating benefits that compounded over time. Contrary, to model predictions, the actuarial priced insurance plan did not increase utility relative to the employer-based plan.

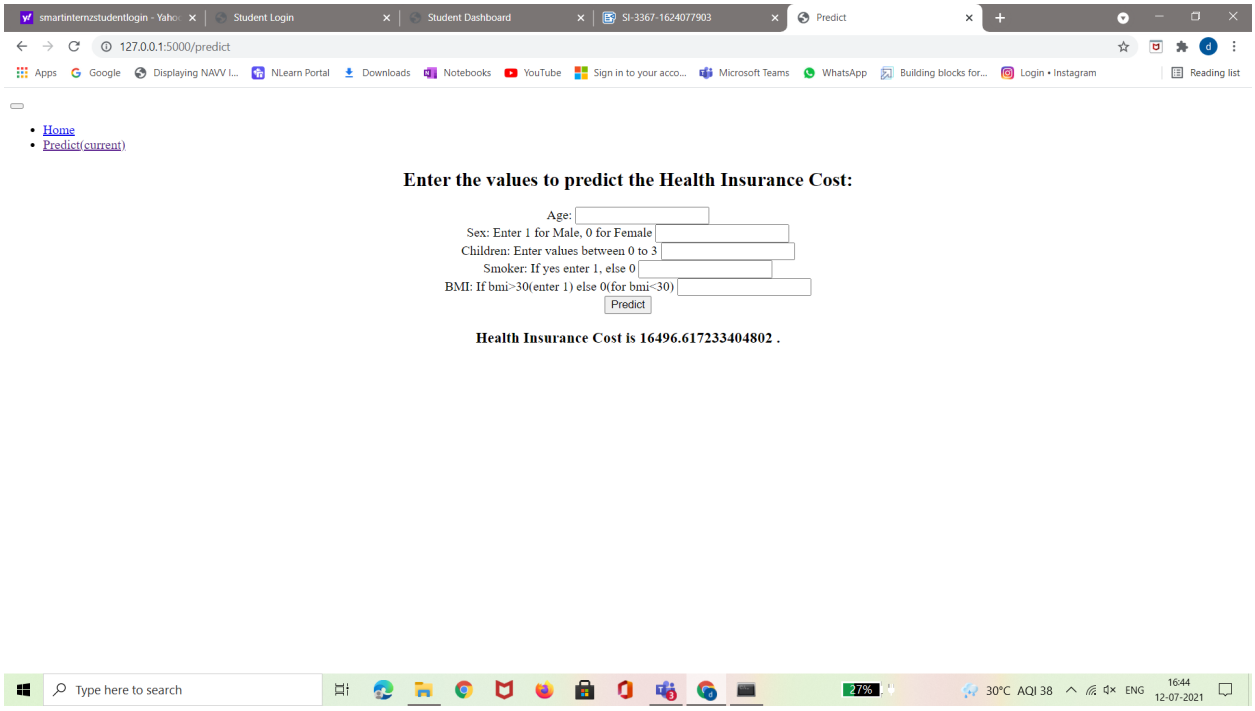
d) Comments
Working Paper 19-16
Previously titled: "An Experimental Investigation of Income, Insurance, and Investments in Health over the Life Course"

5.Flowchart



6.Result

Finally,as a result for this project we will predict the cost of health insurance for each person using linear regression model.And the result of the random inputs is displayed below with a screenshot



7.Advantages and Disadvantages

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's education, 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.

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.

- **Long wait times.** Patients may face long wait periods for elective procedures as government funds would be focused on providing basic and emergency healthcare.

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

- **Potential for corruption.** Public confidence in the state's capacity to run large institutions is at a record low. Growing evidence of public sector corruption does nothing to breed such confidence.

8.Conclusion & FutureScope

Background In this project, linear regression model is evaluated for individual health insurance data. The health insurance data was used to develop the linear regression model, and the predicted premiums from this model was compared with actual premium to compare the accuracies of this model. It has been found that Linear Regression model which is built upon decision tree is the best performing model.

Various factors were used and their effect on predicted amount was examined. It was observed that a persons 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.

The effect of various independent variables on the premium amount was also checked. The attributes also in combination were checked for better accuracy results.

Premium amount prediction focuses on persons own health rather than other companys 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.

9.Bibilography

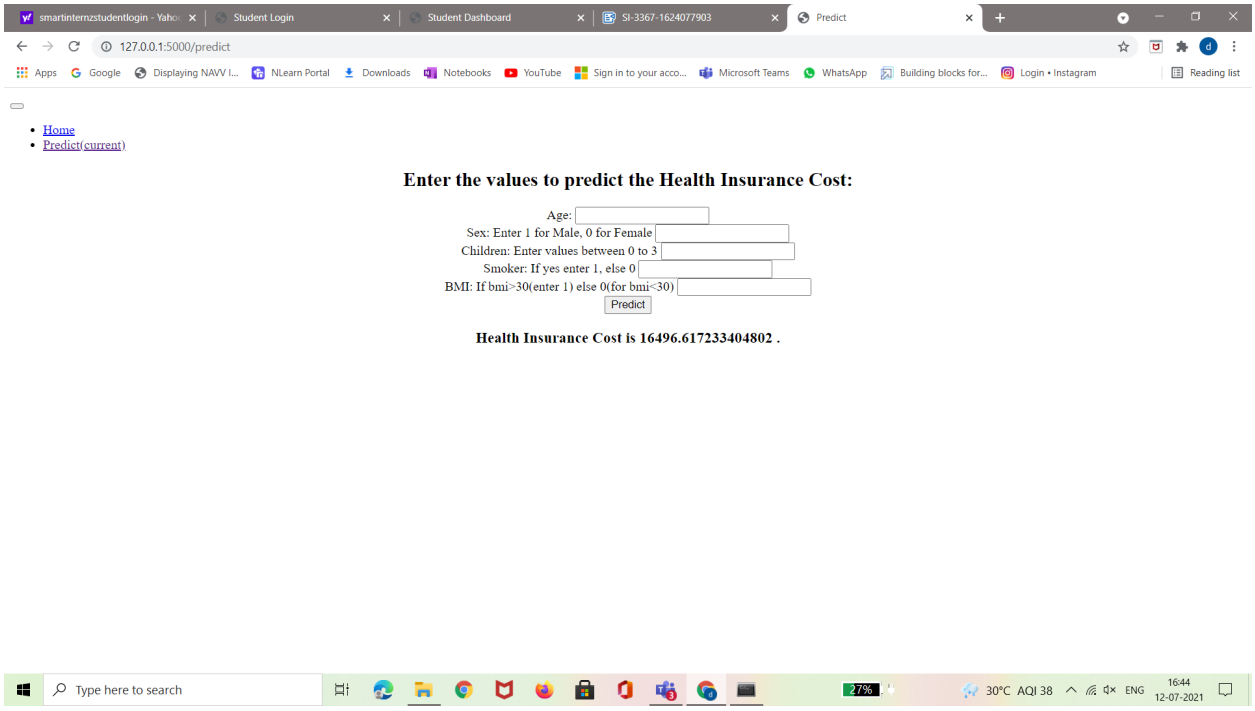
1. https://www.moneycrashers.com/factors-health-insurance-premium- costs/
2. https://en.wikipedia.org/wiki/Healthcare_in_India
3. https://www.kaggle.com/mirichoi0218/insurance
4. https://economictimes.indiatimes.com/wealth/insure/what-you-need-to-know-before-buying-health- insurance/articleshow/47983447.cms?from=mdr
5. https://statistics.laerd.com/spss-tutorials/multiple-regression-using- spss-statistics.php
6. https://www.zdnet.com/article/the-true-costs-and-roi-of-implementing-ai-in-the-enterprise/ .
7. https://www.saedsayad.com/decision_tree_reg.htm
8. http://www.statsoft.com/Textbook/Boosting-Trees-Regression- Classification

10.Appendix

Sourcecode:

https://drive.google.com/file/d/1tS5lYhKJLCf_Mdz8PeNfMETYFwT426tI/view?usp=sharing (please do copy & paste the link in new tab to view the source code).

Result:


smartinternzstudentlogin - Yaho
Student Login
Student Dashboard
SI-3367-1624077903
Predict
127.0.0.1:5000/predict
Apps
Google
Displaying NAVV I...
NLearn Portal
Downloads
Notebooks
YouTube
Sign in to your acco...
Microsoft Teams
WhatsApp
Building blocks for...
Login • Instagram
Reading list
Home
Predict(current)
Enter the values to predict the Health Insurance Cost:
Age:
Sex: Enter 1 for Male, 0 for Female
Children: Enter values between 0 to 3
Smoker: If yes enter 1, else 0
BMI: If bmi>30(enter 1) else 0(for bmi<30)
Predict
Health Insurance Cost is 16496.617233404802 .
Type here to search
27%
30°C AQI 38
ENG
16:44
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