

High Level Design (HLD)

Insurance Premium Prediction

Revision Number: 1.0

Last date of revision: 08/03/2022

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Abstract

Penetration of Insurance facility is very less till date in the world. People are unaware of the fact that they can insure their earning member's life and health by buying life and health insurance. For more awareness of insurance facility, many companies hired agents to go and make people aware in various corners of the world. In this system, the agents sometimes try to sell the most highly premium insurance products to the customers. It becomes very difficult for the people to buy such highly priced life and health insurances. The insurances are based on certain factors like age, sex, medical situation of the customer. Depending on various such factors, the premium of the insurance policy is fixed. Our prediction model will predict the exact premium amount one needs to pay to buy a life and health insurance.

1 Introduction

1.1 Why this High-Level Design Document?

The purpose of this High-Level Design (HLD) Document is to add the necessary detail to the current project description to represent a suitable model for coding. This document is also intended to help detect contradictions prior to coding, and can be used as a reference manual for how the modules interact at a high level.

The HLD will:

- Present all of the design aspects and define them in detail
- Describe the user interface being implemented
- Describe the hardware and software interfaces
- Describe the performance requirements
- Include design features and the architecture of the project
- List and describe the non-functional attributes like:
 - Security
 - Reliability
 - Maintainability
 - Portability
 - Reusability
 - Application compatibility
 - Resource utilization
 - Serviceability

1.2 Scope

The HLD documentation presents the structure of the system, such as the database architecture, application architecture (layers), application flow (Navigation), and technology architecture. The HLD uses non-technical to mildly-technical terms which should be understandable to the administrators of the system.

2 General Description

2.1 Product Perspective

The premium prediction model is a machine learning model which predicts the exact premium amount depending on various factors.

2.2 Problem statement

To create an AI solution for predicting insurance premium and to implement the following use cases.

- To predict premium based on age, sex and bmi
- To predict premium based on whether the customer is a smoker or not
- To predict premium based on number of children and region of the customer.

2.3 PROPOSED SOLUTION

The solution proposed here is based on customer's age, sex, bmi, children, smoker and region. If the person is young then his premium will be lesser compared to a person who is old. Smoking also increases the premium rate. More a person is healthy, less will be the insurance premium.

2.4 FURTHER IMPROVEMENTS

By predicting the insurance premium per year, a person can budget his/her life. He can be less worried if any high level health checkup is required since health insurance covers such medical emergencies. Moreover, his dependents need not worry about money as they will get the entire sum assured if the person dies.

2.5 Data Requirements

Data requirement completely depend on our problem statement.

The insurance.csv dataset contains 1338 observations (rows) and 7 features (columns). The dataset contains 4 numerical features (age, bmi, children and expenses) and 3 nominal features (sex, smoker and region) that were converted into factors with numerical value designated for each level.

2.6 Tools used

Python programming language and frameworks such as NumPy, Pandas, Scikit-learn, TensorFlow, Keras and Roboflow are used to build the whole model.

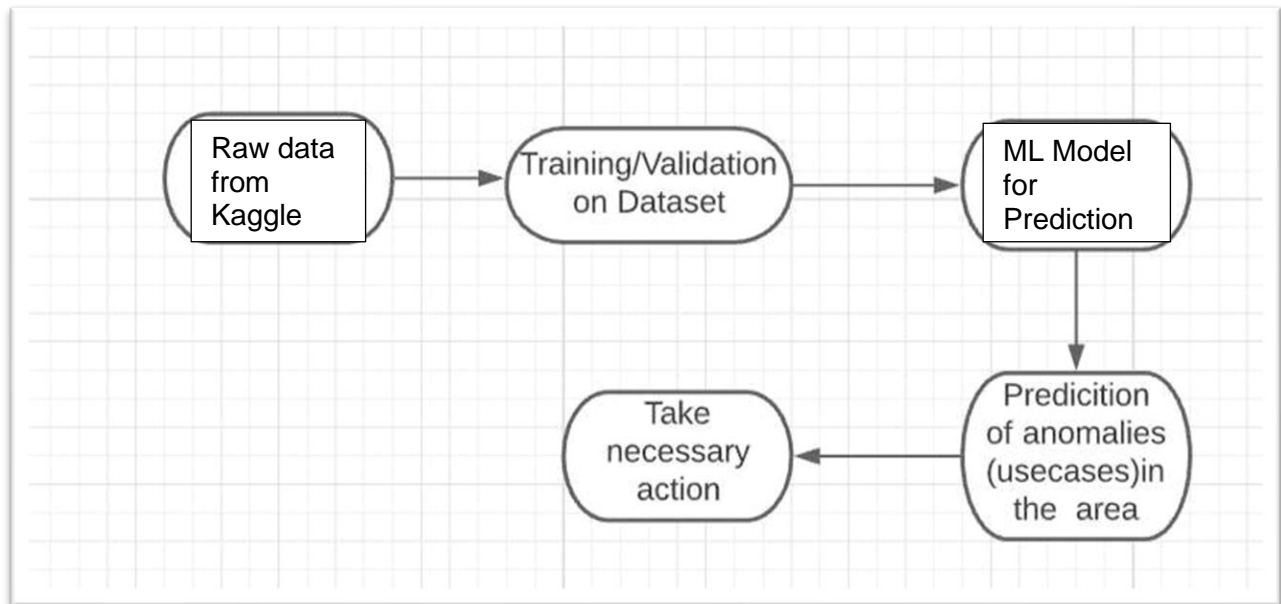


3 Design Details

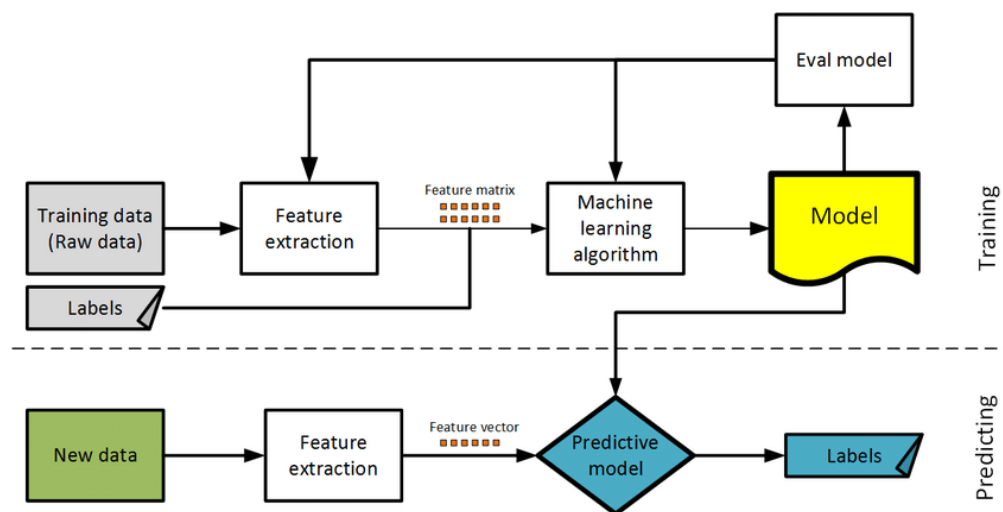
3.1 Process Flow

For identifying the different types of anomalies, we will use a machine learning base model. Below is the process flow diagram as shown below.

Proposed methodology



3.1.1 Model Training and Evaluation



3.2 Event log

The system should log every event so that the user will know what process is running internally.

Initial Step-By-Step Description:

1. The System identifies at what step logging required
2. The System should be able to log each and every system flow.
3. Developer can choose logging method. You can choose database logging/ File logging as well.
4. System should not hang even after using so many loggings. Logging just because we can easily debug issues so logging is mandatory to do.

3.3 Error Handling

Should errors be encountered, an explanation will be displayed as to what went wrong? An error will be defined as anything that falls outside the normal and intended usage.

4 Performance

The insurance premium prediction model is working fine. Also, model retraining is very important to improve the performance.

4.1 Reusability

The code written and the components used should have the ability to be reused with no problems.

4.2 Application Compatibility

The different components for this project will be using Python as an interface between them. Each component will have its own task to perform, and it is the job of the Python to ensure proper transfer of information.

4.3 Resource Utilization

When any task is performed, it will likely use all the processing power available until that function is finished.

4.4 Deployment



5 Conclusion

The insurance premium will be predicted from this model and people can use it to budget their life. It is advised to take both life and health insurance as early as possible in your life as this will reduce the premium rate.

6 References

1. <https://www.kaggle.com/noordeen/insurance-premium-prediction>