



FIT5145: Foundations Of Data Science

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Assignment 1

Workplace Injury Claims Analysis for
Customisation of Insurance Plans

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1. Project Description

This project aims to analyse the workplace injury claims data to help insurance companies in customising more precise insurance plans for their customers. The core idea is to develop a data driven model that can predict the trend of injury rate in workplace based on the historical injury data from various factors such as industry type, bodily location of injury, agency of injury and others. The analysis result will provide insights to insurance companies on adjusting the premium rates and coverage limit to specific customers' conditions and also helping reduce the financial risks of the insurance companies (Ogunnaike & Si, 2017). For instance, insurance companies can increase coverage limit of certain high-risk bodily location for a specific customer. While customer from industries that have low injury rates, insurance companies can offer a low premium price to retain the customer.

The project will involve 3 key roles:

- **Data Scientist:**
The data scientist is responsible to conduct the analysis of the injury trends and also develop a driven model that can predict the injury trends in future across different industries, bodily locations and agency of injury.
- **Data Engineer:**
The data engineer focuses on the cleaning, preprocessing, and organising the injury claims data to ensure the data is usable for data analysis. This role will also handle the quality of the data, structure the data for easy access and make integration of different set of data if needed.
- **Business Analyst:**
The business analyst is responsible to interprets the result of data analysis and translating them into actionable insurance premium strategies. This role needs to align the insights gained from the data analysis with the goals of reducing claim costs, enhancing customer satisfaction without threatening the profitability of insurance companies.

2. Business Model

This project focuses on the insurance industry, particularly in the area of workplace injury insurance and claims management. The primary goal is to leverage data-driven insights from historical workplace injury claims to create a dynamic model for customising premium rate and coverage limits (Riikinen et al., 2018). By incorporating additional factors from workplace injury claims data, such as industry type, bodily location and more, insurance companies can shift from traditional static risk assessment to a more dynamic risk evaluation. This approach aligns with modern trends in insurance technology (InsurTech), where data science plays crucial role in risk assessment (Stoeckli, Dremel & Uebernickel, 2018).

Benefits/ Business Values:

1. Customized Premiums:

Through this project, insurance companies can customise the premiums based on the analysis of customer's industry type, work environment and injury trends. For example, customers from manufacturing industry with higher rate of injury can be offered higher premium rates, while industries with lower injury rates can receive a lower price. This dynamic adjustment ensures the competitiveness of the insurance plan.

2. Dynamic Coverage Limits:

Insurance companies can adjust the coverage limits for high-risk bodily locations, such as limb injuries while also providing more financial aid during the recovery period.

3. Improved Customer Retention:

The analysis results will help insurance companies to optimise their pricing model for workplace insurance products which make the pricing to be more competitive, thereby retaining more customers and increasing profit (Kumar, Srivastava & Bisht, 2019).

Stakeholders:

1. Insurance companies:

They are primary stakeholders which can benefit from improved risk assessment, optimised premium pricing and improved customer retention.

2. Policyholders (Businesses/Employers):

Employers that focus on workplace safety improvement and successfully reduced the injury rate can enjoy lower insurance premium, thereby reducing their expenses.

3. Employees:

The increase of coverage limits on high-risk role also ensure workers receive better protection.

Challenges of Project:

1. Data Quality and Availability:

The effectiveness of the model heavily depends on the quality and availability of historical workplace injury claims data (Cai & Zhu, 2015). However, since not all work injury claims data available in public so exploring additional data sources and ensuring the richness of data become a challenge to keep the analysis accurate.

2. Rapid Industries Evolution:

Many industries are evolving rapidly, especially with the integration of artificial intelligence, which may contribute to reducing injury risks (Khairuddin et al., 2022). Therefore, it is important for the model to update and adapt new risk factors from each industry to maintain the accuracy of analysis.

3. Ethical Concern:

As the workplace injury claims data may include privacy data such as worker's personal information so data privacy and security are one of the challenges. Throughout the project, data that contains personal information should be anonymized at early stage and the data should be stored in encrypted database that meet industry security standard.

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