<p style="text-align:center">Predicting Term Insurance Subscription Using Machine Learning</p>

<p style="text-align:center">Elakkiya Nila R</p>

1. Abstract

This project focuses on the difficulty a modern insurance company has in maximizing its telemarketing campaigns to sell term insurance. The goal is to create a machine learning model that, using past marketing data, can forecast whether a customer will purchase insurance. The business can strategically use telephonic marketing to target potential customers who are most likely to convert, cutting costs and increasing campaign effectiveness. Using historical marketing data, the project entails developing and accessing a machine learning model, allowing the business to proactively identify and prioritize potential customers for tailored outreach. The findings will offer insightful information that can be used to optimize customer acquisition strategies and marketing strategies.

1.1) Buying insurance is important as it ensures that you are financially secure to face any type of problem in life.

2. Problem Statement

The modern insurance company faces the challenge of maximizing the effectiveness of its telemarketing campaigns to sell

term insurance. While telephonic marketing remains a powerful strategy, it incurs significant costs.

To optimize its outreach efforts and minimize expenses, it is crucial for the company to identify customers who are most likely to convert beforehand, allowing for targeted and personalized telemarketing campaigns. The company possesses historical marketing data, providing an opportunity to leverage machine learning techniques and develop a predictive model.

The objective of this project is to build a machine learning model that accurately predicts whether a client will subscribe to the insurance based on the available historical marketing data. By successfully identifying potential customers with higher conversion probabilities, the company can strategically allocate resources and focus its telemarketing efforts on individuals who are more likely to purchase term insurance.

Predicting Term Insurance Subscription

2.1) Predicting Term Insurance Subscription

3. Market/Customer/Business Need Assessment

The new-age insurance company recognizes the importance of effective outreach plans to sell term insurance to its customers. While various marketing strategies are employed, telephonic marketing campaigns remain one of the most effective ways to engage with

potential customers. However, these campaigns can be costly and time-consuming.

Therefore, it becomes crucial for the company to identify customers who are most likely to convert beforehand, enabling targeted telephonic marketing efforts. To meet this need, the company aims to develop a machine learning model that can accurately predict whether a client will subscribe to the insurance based on historical marketing data.

By leveraging the power of machine learning, the company seeks to optimize its telephonic marketing campaigns by targeting potential customers who are more likely to convert. This targeted approach will not only reduce costs but also improve the overall effectiveness of the campaigns.

The market for term insurance is highly competitive, with numerous insurance providers vying for customer attention. It is imperative for the company to stand out by offering personalized and tailored services to its potential customers. By using a machine learning model, the company can analyze vast amounts of historical marketing data, identify patterns, and extract valuable insights. These insights will allow the company to understand the characteristics and behaviors of customers who are more likely to subscribe to insurance.

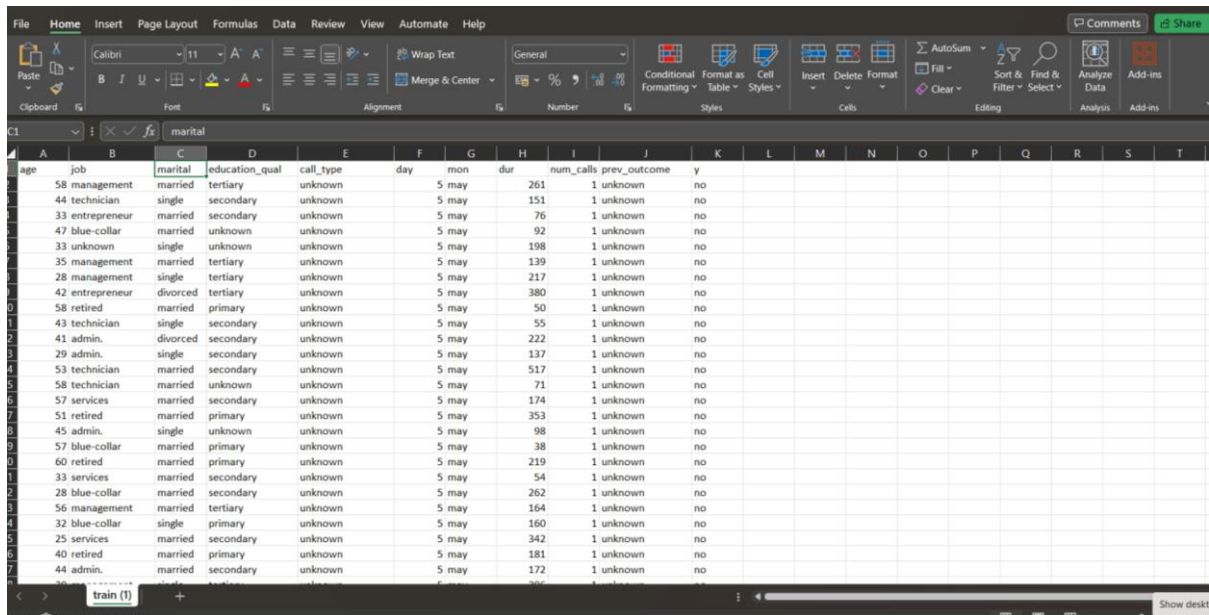## 4. Target Specifications and Characterization

The target customer for this machine learning model is an individual who is considering purchasing term insurance. The model will need to be able to predict whether or not this individual is likely to subscribe to term insurance based on a number of factors, including age, income, health status, and other demographic information.

5. Monetization Idea

1. Licensing the model: You can offer your trained machine learning model as a licensed product to insurance companies. They can integrate the model into their own systems or applications to make predictions about customer insurance purchasing behavior.

2. Subscription-based service: Offer your prediction model as a subscription-based service, where insurance companies pay a recurring fee to access and utilize the predictive capabilities of your model. This can be combined with additional features such as data analytics, visualization, or customer segmentation.

3. Customization and consulting: Provide customization services to insurance companies by tailoring the prediction model to their specific needs and datasets. This could involve adapting the model to their particular customer segments, incorporating additional variables, or fine-tuning the predictions. Offer consulting services to help companies leverage the insights from the model effectively.

4. Data analysis and insights: Beyond the prediction model itself, you can offer data analysis services to insurance companies. Analyze their customer data, identify patterns and trends, and provide actionable insights that can help them optimize their marketing and sales strategies.

5. Lead generation partnerships: Collaborate with insurance companies to generate leads for their sales teams. By leveraging your prediction model, you can identify potential customers who are more likely to buy insurance. You can provide these leads to insurance companies for a fee or a revenue-sharing arrangement.

6. White-label solution: Develop a white-label version of your prediction product, allowing insurance companies to brand and customize the solution as their own. This gives them the flexibility to offer prediction capabilities to their clients directly.

7. Ancillary services: Offer complementary services or products alongside your prediction model. For example, you could provide training workshops, educational materials, or data cleansing and preprocessing tools to help insurance companies optimize their data for accurate predictions.

CLIENTS DATASET COLLECTED FROM KAGGEL

First, import the basic libraries for data preprocessing:

DATA PREPARATION AND CLEANING

1. Handling Missing values
2. Fix any incorrect values
3. Look at some information about the data and the columns.

```
In [13]: df.isnull().sum()
```

```
Out[13]: age              0
         job              0
         marital          0
         education_qual   0
         call_type        0
         day              0
         mon              0
         dur              0
         num_calls        0
         prev_outcome     0
         y                0
         dtype: int64
```

```
In [14]: data = df.drop_duplicates(keep='first')
```

Here we don't need to change any Data type Of the Columns

```
In [15]: data.dtypes
```

```
Out[15]: age             int64
         job             object
         marital         object
         education_qual  object
         call_type       object
         day             int64
         mon             object
```

Checking unique values for each column

```
In [16]: print(data['job'].unique())
         print(data['marital'].unique())
         print(data['education_qual'].unique())
         print(data['call_type'].unique())
         print(data['mon'].unique())
         print(data['prev_outcome'].unique())
         print(data['y'].unique())
```

```
['management' 'technician' 'entrepreneur' 'blue-collar' 'unknown'
 'retired' 'admin.' 'services' 'self-employed' 'unemployed' 'housemaid'
 'student']
['married' 'single' 'divorced']
['tertiary' 'secondary' 'unknown' 'primary']
['unknown' 'cellular' 'telephone']
['may' 'jun' 'jul' 'aug' 'oct' 'nov' 'dec' 'jan' 'feb' 'mar' 'apr' 'sep']
['unknown' 'failure' 'other' 'success']
['no' 'yes']
```

```
In [17]: data.job.value_counts()
```

```
Out[17]: blue-collar     9730
         management      9457
         technician      7596
         admin.          5170
         services        4153
         retired         2264
         self-employed   1579
         entrepreneur    1487
         unemployed      1303
         housemaid       1240
         student          938
         unknown          288
         Name: job, dtype: int64
```

6.Business model

- Selling the model to other insurance companies. This would be the most straightforward way to monetize the model, as other insurance companies would be willing to pay for a model that can help them to improve their telemarketing campaigns.

- Using the model to generate leads for the company. The company could use the model to identify potential customers who are most likely to purchase insurance, and then use this information to generate leads for the sales team.

- Using the model to improve the company's customer service. The company could use the model to identify customers who are at risk of cancelling their insurance, and then use this information to provide them with personalized service in order to retain them as customers.

- Using the model to develop new insurance products. The company could use the model to identify trends in customer demand, and then use this information to develop new insurance products that meet the needs of their customers.

In addition to these direct monetization methods, the company could also use the model to improve its reputation and brand awareness. By demonstrating that they are using cutting-edge technology to improve the customer experience, the company could attract new customers and retain existing ones.

The specific monetization strategy that the company chooses will depend on a number of factors, including the size of the company, its target market, and its budget. However, the machine learning model that you are developing has the potential to generate significant revenue for the company, and it is worth exploring all of the possible monetization options.

7.Summary of the product

Product Name: Predicting Term Insurance Subscription

Description: Predicting Term Insurance Subscription is an advanced machine learning solution designed for insurance companies. It utilizes predictive modeling techniques to determine the likelihood of a customer purchasing insurance based on available data. By analyzing various customer variables such as demographics, past interactions, and insurance history, the product generates accurate predictions that assist insurance companies in optimizing their sales and marketing strategies.

Key Features:

1. Predictive Modeling: Utilize state-of-the-art machine learning algorithms to develop a robust prediction model for insurance purchase behavior.

2. Data Analysis: Analyze and preprocess customer data to extract meaningful insights and identify patterns and trends.

3. Customization: Tailor the prediction model to the specific needs of insurance companies, incorporating their unique datasets and customer segments.

4. Actionable Insights: Provide actionable insights and recommendations to insurance companies, enabling them to target potential customers more effectively.

5. Integration and Monitoring: Seamlessly integrate the prediction model into existing systems or applications and establish monitoring mechanisms to ensure ongoing accuracy and performance.

Benefits:

1. Improved Sales Efficiency: Enable insurance companies to focus their efforts on customers more likely to purchase insurance, improving conversion rates and sales productivity.

2. Enhanced Marketing Strategies: Empower insurance companies with data-driven insights to optimize their marketing campaigns, target specific customer segments, and allocate resources effectively.
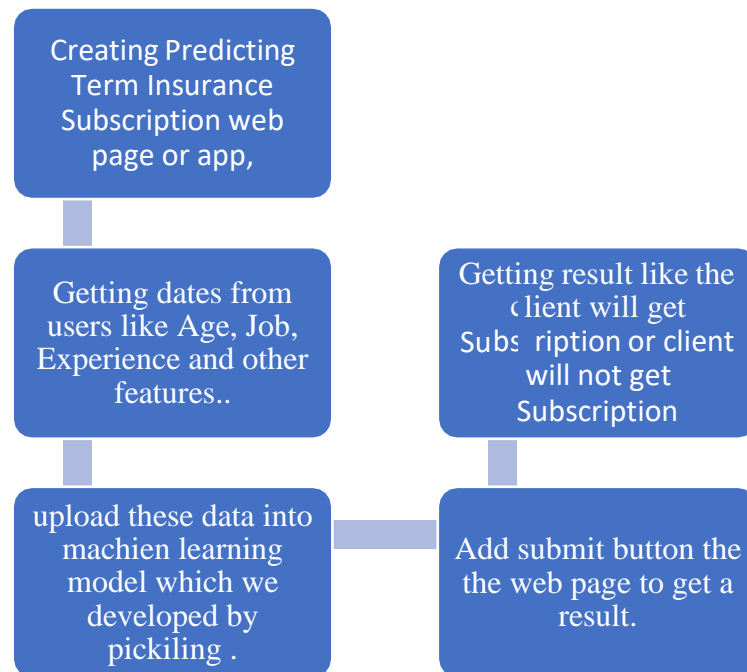
3. Cost Reduction: Minimize marketing costs by prioritizing leads and allocating resources based on predicted customer purchasing behavior.

4. Competitive Advantage: Stay ahead of competitors by leveraging advanced machine learning techniques to better understand customer preferences and behavior.

5. Scalable and Flexible: The product can accommodate the evolving needs of insurance companies, adapting to new data sources and business requirements.

8.Final product prototype

8.1 Abstract

This paper presents Predicting Term Insurance Subscription,an innovative machine learning solution designed for insurance companies to enhance their sales and marketing strategies. The product utilizes advanced predictive modeling techniques to analyze customer data and accurately predict the likelihood of a customer purchasing insurance. By leveraging demographic information, past interactions, and insurance history, Predicting Term Insurance Subscription provides valuable insights and actionable recommendations to insurance companies, enabling them to optimize their customer targeting, allocate resources efficiently, and improve conversion rates. The product offers customization options, allowing insurance companies to adapt the prediction model to their specific needs and datasets. With seamless integration into existing systems, Predicting Term Insurance Subscription provides a scalable and flexible solution that can keep pace with evolving market dynamics. Through its data-driven approach, Predicting Term Insurance Subscription empowers insurance companies to gain a competitive edge, increase sales efficiency, and drive revenue growth.

8.2 Schematic diagram

```
┌─────────────────────┐
│  Creating Predicting│
│   Term Insurance    │
│  Subscription web   │
│     page or app,    │
└─────────────────────┘
         │
┌─────────────────────┐     ┌─────────────────────┐
│  Getting dates from │     │ Getting result like │
│  users like Age, Job│     │   the client will   │
│ Experience and other│     │  get Subscription or│
│     features..      │     │ client will not get │
│                     │     │     Subscription    │
└─────────────────────┘     └─────────────────────┘
         │                           │
┌─────────────────────┐     ┌─────────────────────┐
│  upload these data  │     │ Add submit button   │
│ into machien learning│────│ the the web page to │
│  model which we     │     │   get a result.     │
│  developed by       │     │                     │
│    pickiling .      │     │                     │
└─────────────────────┘     └─────────────────────┘
```

9. Conclusion

Predicting Term Insurance Subscription offers a cutting-edge solution for insurance companies to leverage the power of machine learning and predictive modeling. By accurately predicting customer insurance purchasing behavior, the product equips insurance companies with valuable insights and actionable recommendations. This empowers them to optimize their sales and marketing strategies, allocate resources efficiently, and improve overall business performance. With its customizable nature, Predicting Term Insurance Subscription ensures that insurance companies can tailor the prediction model to their specific needs, incorporating their unique datasets and customer segments. The seamless integration and ongoing monitoring capabilities of the product guarantee its reliability and accuracy in real-world scenarios. By embracing Predicting Term Insurance Subscription, insurance companies can gain a competitive advantage, enhance their customer targeting, and drive revenue growth.