**AI Powered Intelligent Insurance Risk Assessment and Customer Insights (AI Powered IIRA and CI)**

**Current Challenges:**

1. assessing risk
2. predicting claim amounts
3. detecting fraudulent claims
4. understanding customer sentiments

Objective:

1. Risk classification

Supervised learning – Classification

Predict whether an insurance claim is high-risk or low-risk based on customer profiles, medical history, claim history, and policy details

Claim Prediction

Supervised learning – Regression

Predict the expected claim amount using regression models based on historical data

Dataset:

Created with 100000 rows

Columns: Policy\_ID, Customer\_Age, Gender, Policy\_Type, Annual\_Income, Claim\_History, Premium\_Amount, Claim\_Amount, Fraudlent\_Claim, Risk\_Score, Vehicle\_or\_Property\_Age

Data cleaning:

1. Column names mase lower case
2. No missing value
3. No duplicates found

Target: risk\_score

Low 50114

Medium 29830

High 20056

Splitted the columns into numeric and categoric

EDA:

Univariate numeric:

Univariate categoric:

1. Female/Male has more or less equal claims. Other has low
2. Policy\_type: Auto>health>life>property
3. Risk\_score: low>modium>high

Dropped Policy\_ID column

Checked box plot for outliers:

Annual\_income/claim\_history/premium\_amount/claim\_amount has outliers

Bivariate : cat vs cat:

Genger and property vs risk\_score

1. Customer segmentation

Unsupervised learning – Clustering

Segment policyholders into different categories using clustering techniques to tailor personalized insurance plans

high-risk

low-risk

young professionals

elderly customers

1. Fraud Detection

Associative learning/Anomaly detection

Identify fraudulent claims by detecting unusual patterns using association rule mining and anomaly detection techniques

1. Feature Engineering and Dimension Reduction

PCA, t-SNE, Autoencoders

Reduce the dimensionality of high-dimensional customer data for better model performance and explainability

1. Automated multilingual insurance document translation

Hugging Face Transformers

Build a translator to convert insurance policies, terms & conditions, and claim documents into multiple languages using transformers

1. Sentiment Analysis of Customer Reviews & Complaints

Analyze customer sentiments from feedback, emails, and chat support to detect dissatisfaction trends and areas of service improvement.

1. Text Summarization for Insurance Policies

Abstractive & Extractive Summarization

Summarize lengthy insurance policy documents into concise and understandable formats using NLP techniques

1. Text Generation for Automated Insurance Responses

Develop a chatbot or AI assistant using Hugging Face Transformers to generate automated yet personalized responses for customer queries