



CODECELL-CMPN, VESIT

SIRIUS HACKATHON 2025

Category Code: C4

Problem Statement Title: AI Powered Dynamic Insurance Pricing System

Team Name:CtrlCV

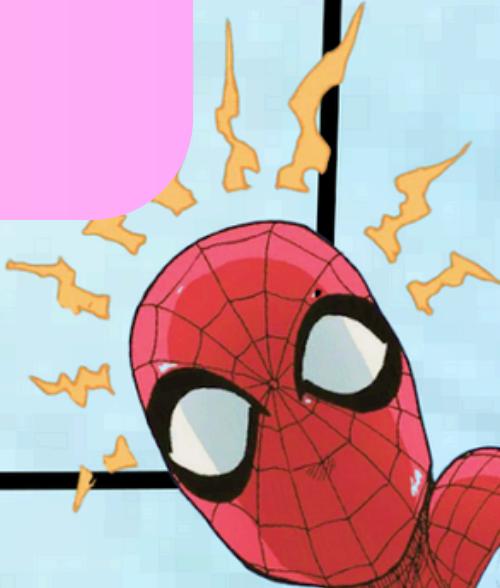
Institute Name: Vivekanand Education Society's Institute of Technology



Problem Statement

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- Traditional insurance pricing models rely on historical data and generalized risk factors, leading to inaccurate premium calculations and potential financial inefficiencies for both insurers and policyholders.
- There is a lack of dynamic and real-time risk assessment, resulting in overpricing for low-risk customers and underpricing for high-risk individuals.
- This results in imbalanced risk distribution, inefficient claim management, and poor customer satisfaction.



Approach details



Dynamic Insurance Pricing – Reward-Based System

- ◆ Fitbit integration (steps, calories, BMR, distance)

Monthly marathons & half-yearly health checkups

Incentives for a healthy lifestyle:

AI-Based premium adjustments based on health & risk score

Risk Score
Factors: Age, lifestyle, income
source, residence, family size, disease history

Premium changes within a range based on health checkups & risk score



Risk Score



What is risk Score?

A risk score is a numeric value assigned to an individual considering their health status, lifestyle and habits which affect their health.

Risk Score Calculation is as follows:

Each factor contributes to the overall **Health Risk Score (0-100)**. The score is determined by assigning weights to different risk components, ensuring that **higher scores indicate greater health risks and higher insurance premiums**.

Why risk score?

A Risk Score helps in determining premiums dynamically. It also can help in tracking progress towards being more healthy for an individual.



Factors affecting the risk Score

1.Age Factor:

Age Range	Risk Score Contribution
18 - 30	5 (Low Risk)
31 - 45	10 (Moderate Risk)



Factors affecting the risk Score

2. Body Mass Index(BMI):

BMI Category	BMI Range	Risk Score Contribution
Underweight	$\text{BMI} < 18.5$	10 (Nutritional Deficiency Risks)
Normal	$18.5 \leq \text{BMI} < 24.9$	5 (Healthy)
Overweight	$25 \leq \text{BMI} < 29.9$	15 (Increased Risk)
Obese	$\text{BMI} \geq 30$	25 (High Risk)



Factors affecting the risk Score

3. Body Mass Index(BMI):

Lifestyle Habit	Risk Score Contribution
Smoking (Regular)	+15
Alcohol (Excessive, >3 times/week)	+10
Sedentary Lifestyle (No Exercise, Low Steps)	+10
Active Lifestyle (Frequent Exercise, High Steps)	-10 (Risk Reduction)



Factors affecting the risk Score

4. Medical History Factor:

Medical Condition	Risk Score Contribution
No Chronic Illness	0 (Healthy)
Mild Conditions (e.g., Hypertension, Pre-Diabetes)	+10
Moderate Conditions (e.g., Type 2 Diabetes, Asthma)	+20
Severe Conditions (e.g., Cancer, Heart Disease, Kidney Failure)	+30



Factors affecting the risk Score

5. Family History:

Family History of Major Illnesses	Risk Score Contribution
No Family History	0 (Low Risk)
Family History of Minor Conditions (e.g., High BP, Diabetes)	+10
Family History of Major Conditions (e.g., Cancer, Heart Disease, Stroke)	+20



Factors affecting the risk Score

6. Occupation Risks:

Occupation Type	Risk Score Contribution
Office/Remote Work	0 (Low Risk)
Moderate Risk Jobs (e.g., Drivers, Factory Workers)	+10
High-Risk Jobs (e.g., Construction, Mining, Firefighters)	+20



Factors affecting the risk Score

7. Fitness Factor:

Fitness Activity Level	Risk Score Contribution
Very Active (10K+ steps/day, Regular Exercise)	-10 (Lower Risk)
Moderately Active (5K-10K steps/day)	0 (Neutral)
Sedentary (<5K steps/day, No Exercise)	+10 (Increased Risk)



Generation of Risk Report



Highlights the strong points and weak points of the policy holder.

Gives a detailed analysis about the policyholders activities.

Cross-Validation: Compare user inputs with wearable and medical records.

Insurer Dashboard: Provides real-time analytics on population health risks.



Fraud Detection



Real-Time Claim Analysis : AI agents instantly analyze claims, flagging inconsistencies.

pattern Recognition : Detects unusual claim patterns that differ from normal user behavior

Document Verification : NLP-based AI verifies medical documents for forgery or tampering.



RAG Ideation



Why Use RAG for Fraud Detection?

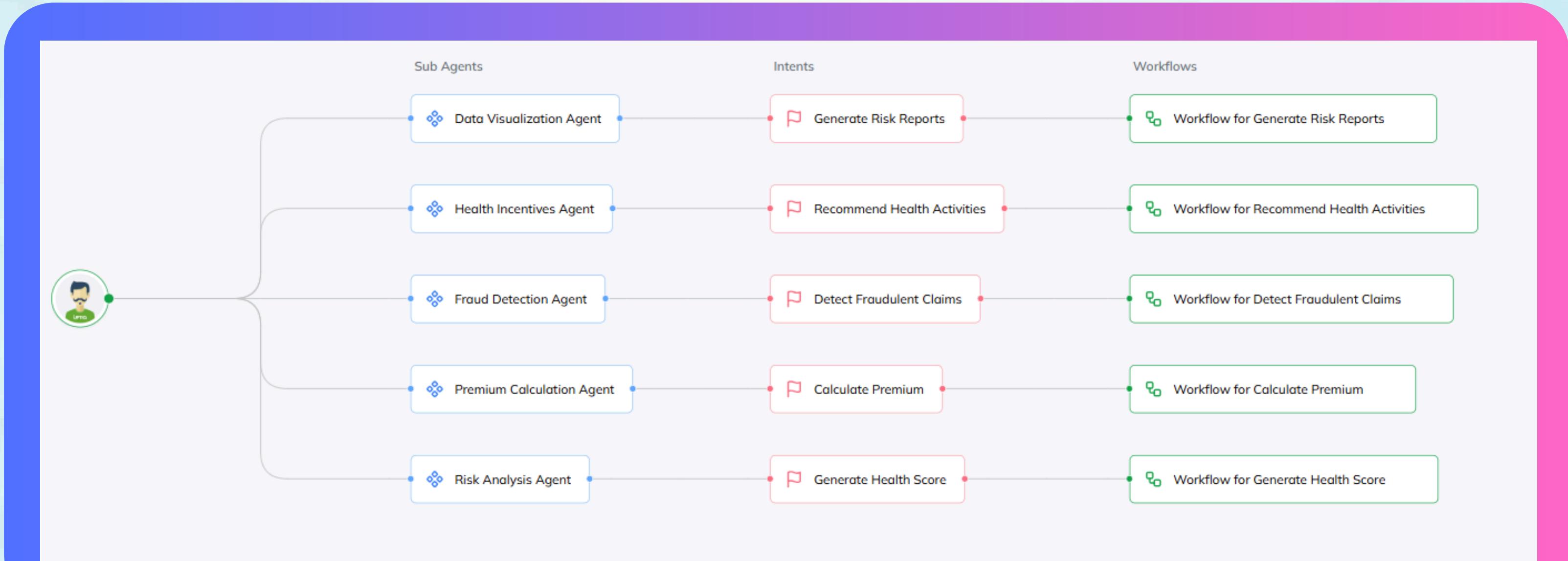
RAG enhances fraud detection by retrieving past fraud cases, policies, and patterns to provide real-time, context-aware, and explainable AI-driven decisions.

How RAG Works in Fraud Detection?

- 1) User submits an insurance claim
- 2) AI searches its fraud database and medical guidelines.
- 3) AI generates an explanation about why can this be suspicious
- 4) Fraud investigators receive the AI-generated report with supporting documents.



Implementaion



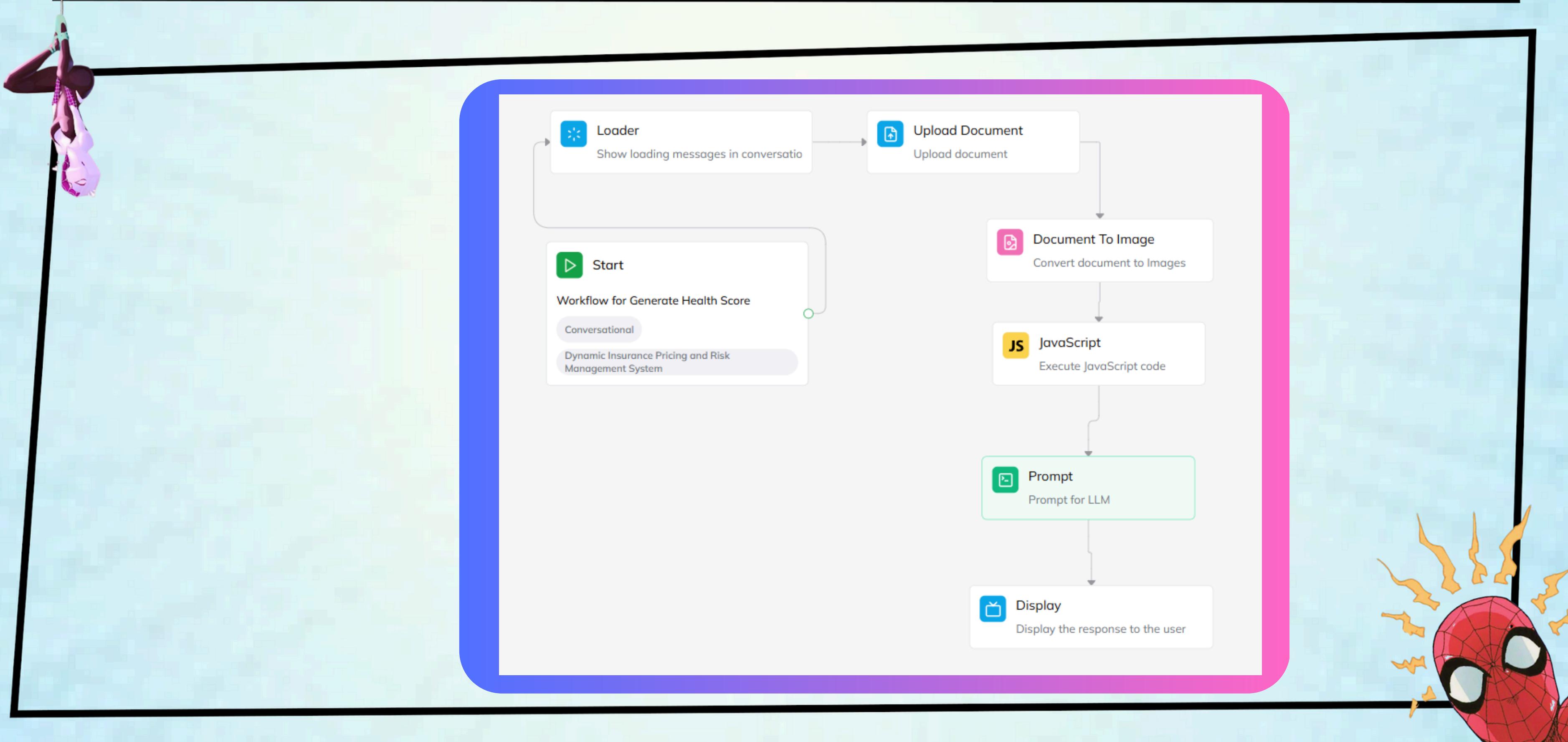
Implementaion

The screenshot displays a user interface for managing AI agents. It features four distinct sections, each representing a different agent:

- Data Visualization Agent** (`data-visualization-agent-3301`):
 - Scope:** Generates detailed risk assessment reports and predictive analytics dashboards for insurers, providing...
 - IC Model:** GPT 4o mini (Azure)
 - Intents:** Generate Risk... (+ Add New Intent)
- Health Incentives Agent** (`health-incentives-agent-0781`):
 - Scope:** Provides personalized health recommendations to policyholders aimed at reducing health risks and lowering...
 - IC Model:** GPT 4o mini (Azure)
 - Intents:** Recommend... (+ Add New Intent)
- Fraud Detection Agent** (`fraud-detection-agent-8496`):
 - Scope:** Utilizes anomaly detection techniques on financial reports, medical records, and claim history to identify and flag...
 - IC Model:** GPT 4o mini (Azure)
 - Intents:** Detect... (+ Add New Intent)
- Premium Calculation Agent** (`premium-calculation-agent-6205`):
 - Scope:** Implements a point-based system where various risk factors contribute to a customer's score, leading to dynamic...
 - IC Model:** GPT 4o mini (Azure)
 - Intents:** Calculate... (+ Add New Intent)

A large blue curved highlight surrounds the first two agents, and a large pink curved highlight surrounds the last two. A cartoon character is visible on the right side.

Implementaion of Risk Score Generator



Implementaion

The screenshot shows a dashboard titled "RAG" with a purple header bar. Below the header, there are three navigation tabs: "RAG Containers" (highlighted in green), "Vector Stores", and "Data Stores". A message box displays the text: "Not sure what is a RAG container? [Learn more](#)". To the right of the message box are a refresh icon and a search bar with the placeholder "Search by Name". A large green button labeled "+ Create RAG Container" is positioned below the message box. The main content area is a table with the following columns: Name, Vector Store, No. of Candidates, Generation LLM, State, Created At, and Actions. There is one entry in the table:

Name	Vector Store	No. of Candidates	Generation LLM	State	Created At	Actions
RagpersonInfo	vectorpersonInfo	5	GPT 4o	Available	Mar 28, 2025, 9:55 PM	



Output of Risk Score and Risk Report



Final Risk Score

Total Health Risk Score: 25

Categorization:

- Risk Score Category: Low Risk (0 - 30)
- Interpretation: Minimal health concerns, ideal for insurance.

Based on the information you've provided, here's your risk assessment report:

Strong Points:

1. Daily Exercise and Diet:

- Engaging in daily exercise is a significant contributor to maintaining a healthy weight, boosting mental health, and reducing the risk of chronic diseases.
- A balanced diet supports overall well-being, enhances energy levels, and improves cognitive function.

2. Occupation and Income:

- As an IT engineer with an annual income of 1,200,000, you likely have a stable financial base. This level of income affords you the ability to budget for essentials, savings, and discretionary spending.

Weak Points:

1. Smoking Habits:

- Smoking is a known risk factor for numerous health conditions, including respiratory illnesses, heart disease, and cancer, which can adversely affect overall health.

2. Alcohol Consumption:

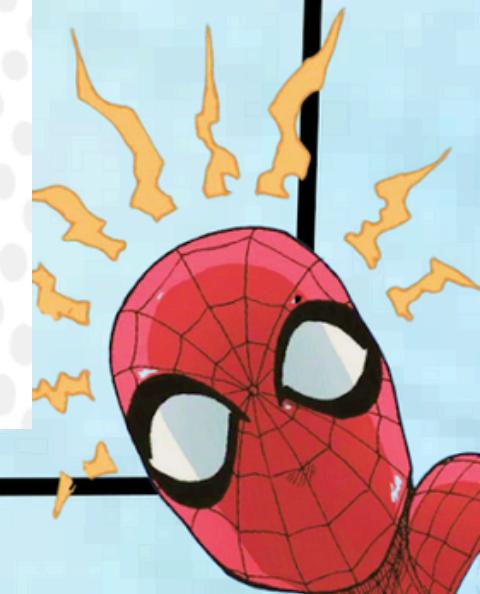
- Regular alcohol consumption can lead to health issues such as liver disease, addiction, and other chronic conditions over time.

3. Lack of Fitness Tracker Usage:

- Without a fitness tracker, it may be harder to monitor and maintain your fitness goals, missing out on valuable insights into your activity patterns and health metrics.

Improvement Plan:

1. Address Smoking Habits:



Suggestions



**Defining Parameters for Risk Score Calculation: Implemented
Integrating RAG for extraction from medical reports: Ideated**

**Formula to add risk score: this can be used because llms are not that good
with numbers and can make mistakes**

