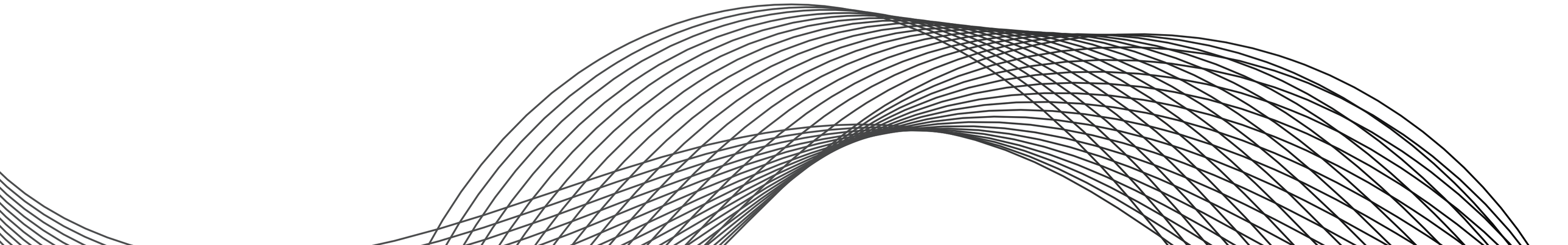
Cerebral Cortex

presents

BadDebtGuard_AI

AI-Driven Risk Intelligence System for Malaysian Lending Ecosystem



THE PROBLEM

Hidden Behavioral Signals

Loan Assessment Depends Only on Structured Data

Missed Human Factors

Borrowers Hide Financial Stress in Text Fields

Numbers-Only Judgement

Manual Review Is Slow, Costly & Subjective

Slow Subjective Review

Incomplete Risk Identification

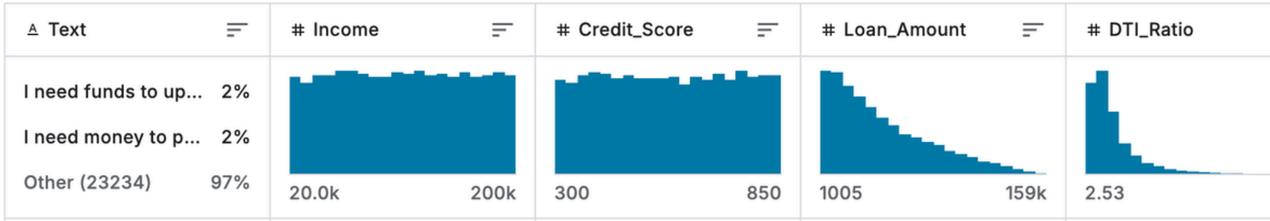
DATA RESEARCH

KEBANKRAPAN

Jumlah kes kebankrapan yang ditadbir hingga September 2025	110,767
Jumlah kes kebankrapan yang ditadbir bagi tempoh 2021 hingga September 2025	27,911

Malaysia Bankruptcy Dataset(Malaysia Department of Insolvency)

📊 110k cases (real local data)
🧠 Behaviour signals: job loss / debt stress
🏷️ Risk labels: High / Medium / Low



Loan Approval Dataset (Kaggle)

📌Structured data: Income, Credit Score, DTI, Loan Amount
🖇️Unstructured text: borrower financial narratives
🎯Supports ML + NLP fusion for approval prediction

OUR SOLUTION

Web-based underwriting assistant

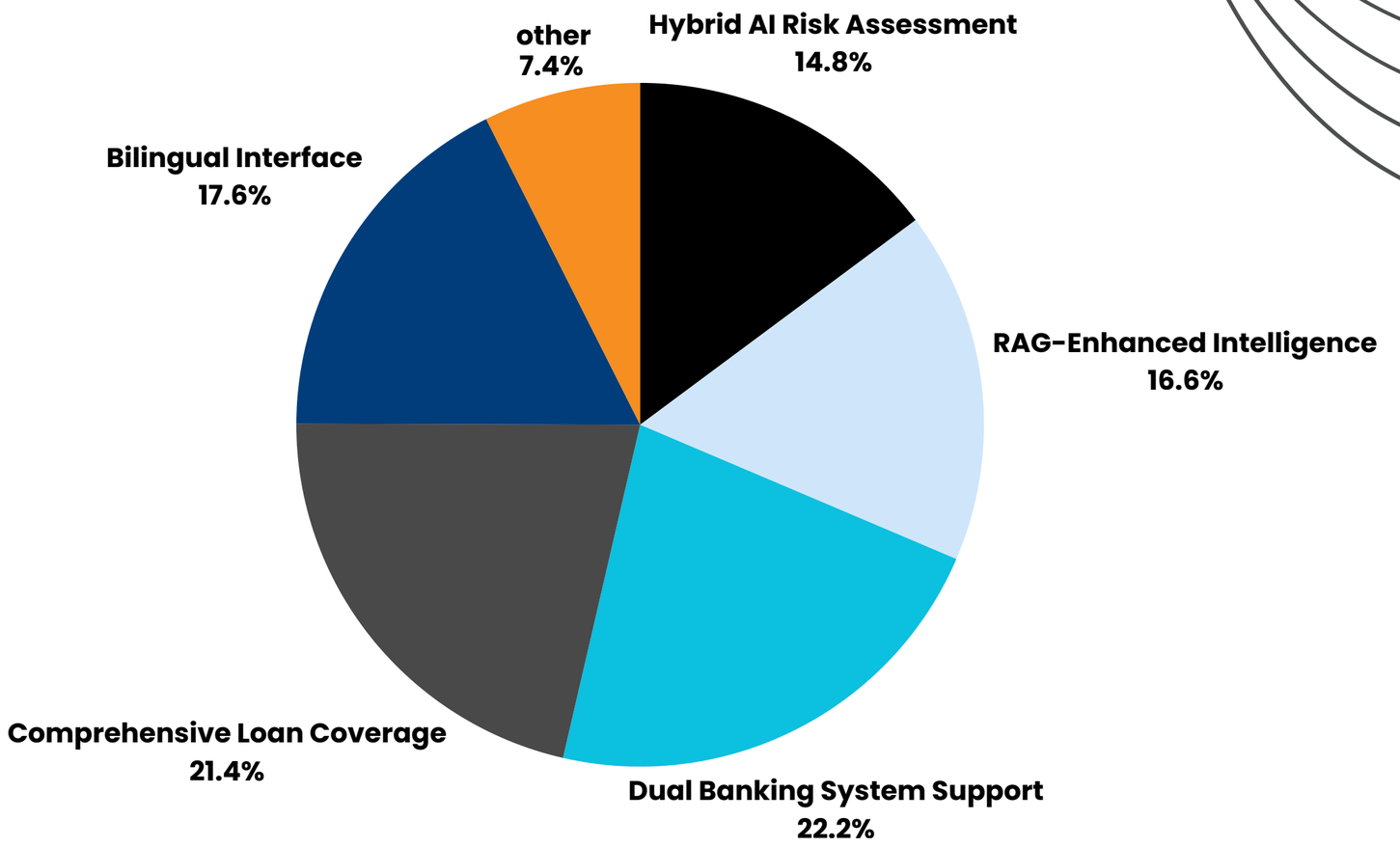
- Upload Files (Bank Statements, CCRIS, Essays)
- OCR + Data Extraction
- LLM interprets narrative tone & intent
- ML model analyzes numeric patterns
- Combined risk score + explanations

Hybrid (Multi-Modal) model

- XGBoost → Best for structured (Numerical) features (income, CCRIS, DSR)
- LLM (RAG) → Best for language, intent, tone
- Hybrid model = higher accuracy + interpretability
- Post Fusion Model for Final Metrics
- Industry research supports combining both for risky level

KEY FEATURES

- Dual Banking System Support
- Comprehensive Loan Coverage
- Customer Segmentation
- Hybrid AI Risk Assessment
- RAG-Enhanced Intelligence
- Bilingual Interface



TECHNOLOGY

🧠 LLM Behaviour Analysis

Extracts risk signals from borrower text (OpenAI 4o)

📊 Financial Feature Processing

Income, DTI, Credit Score, Employment

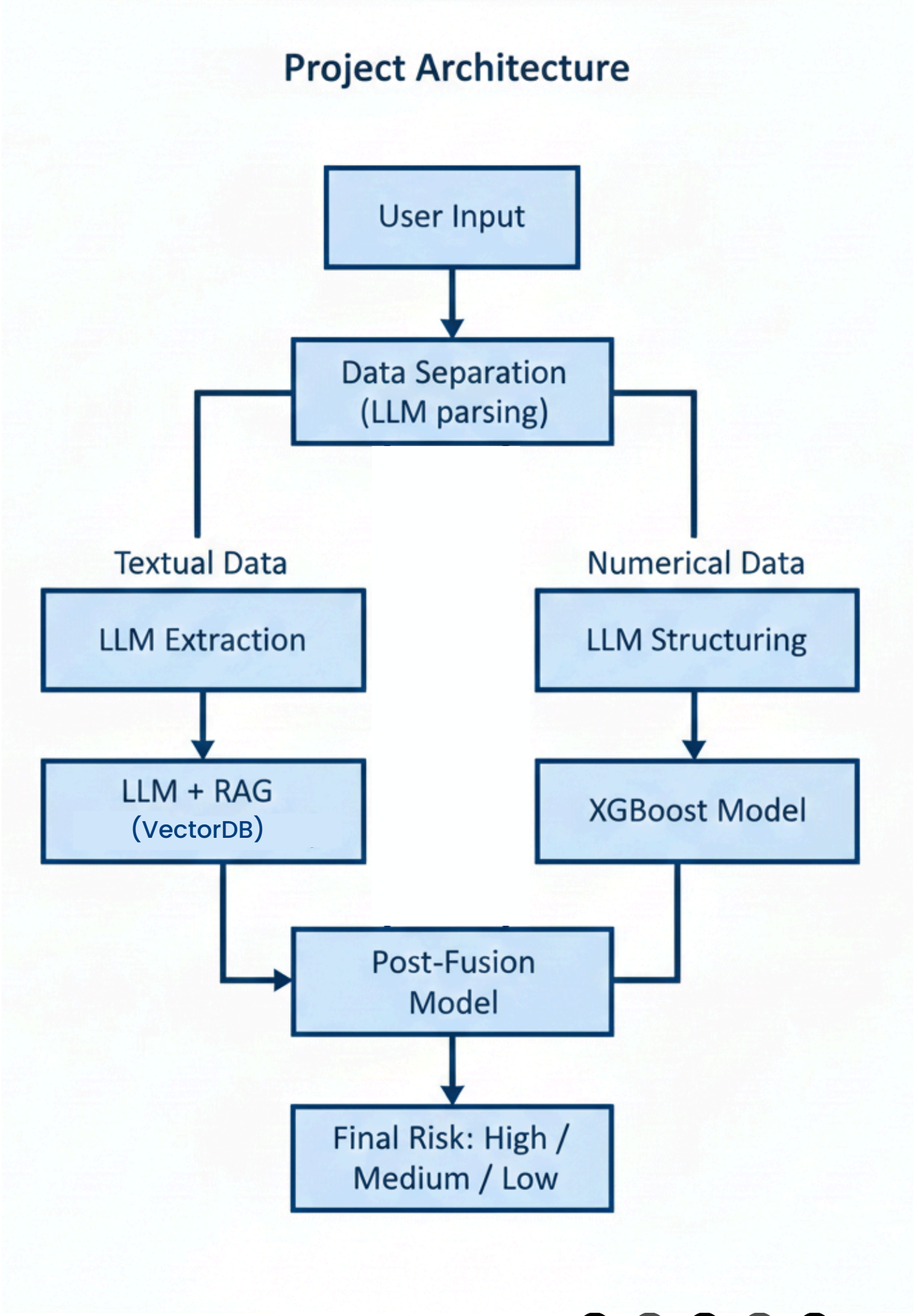
🔗 Multimodal Fusion Engine

Combines text + numeric data for precise/robust scoring

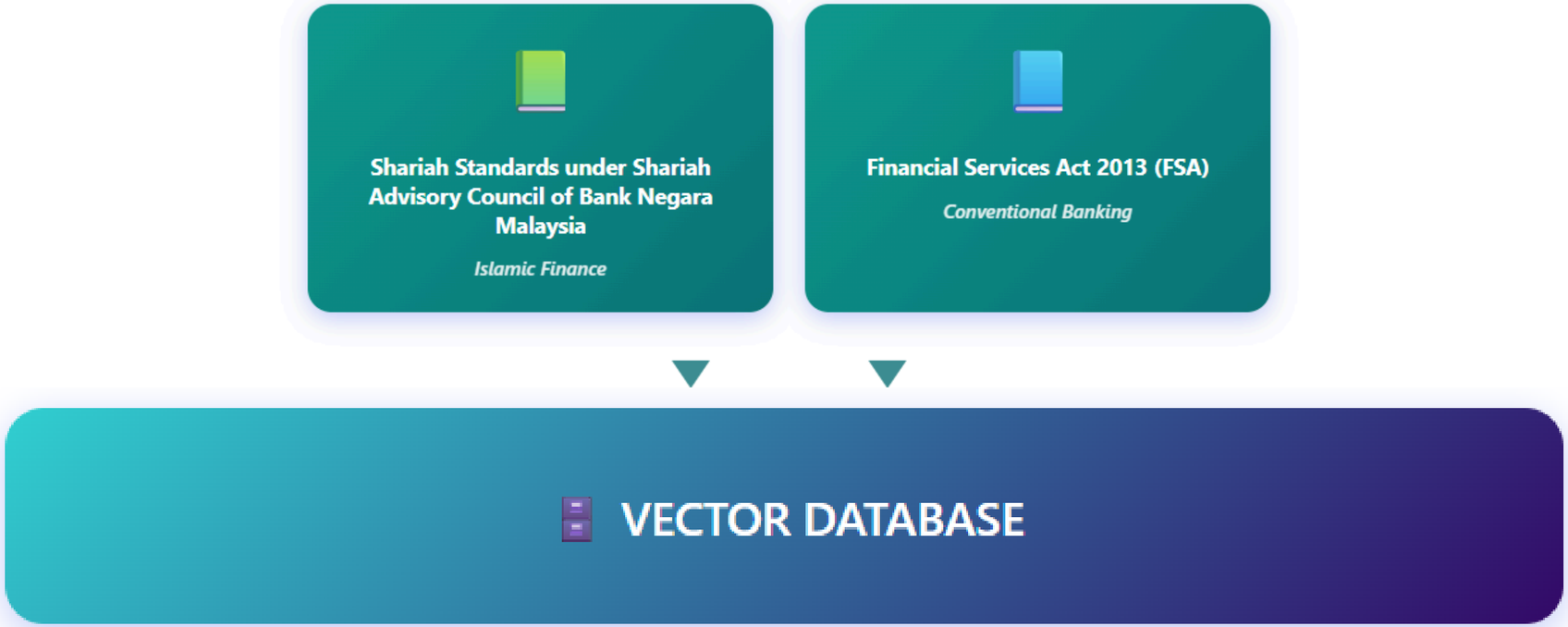
⚡ Real-time Risk Inference Outputs

High/Medium/Low with Reasoning

ARCHITECTURE



RAG (VECTOR DB)



LLM Optimized for Malaysian Context

STACK AT A GLANCE

🧠 **LLM + Vector DB**

OpenAI 4o + Chroma

📊 **FrontEnd**

React + Tailwind CSS

🔗 **Multimodal Fusion Engine**

Post-Fusion Model

⚡**BackEnd**

FastAPI

VALUE + BUSINESS MODEL

BUSINESS IMPACT

HIGH RISK

Reject Application

✓ Reduce Risky Loan Approvals

✓ Reduce Bad Debt & Uncollectible Amounts

✓ Reduce Accounts Receivable Asset

↑ Strong Upward Trend - Assets Growing Consistently ↑

BUSINESS IMPACT

CONCLUSION

We developed an AI-enabled risk assessment system capable of identifying behavioural risk indicators that conventional, numerically driven models fail to capture.

By integrating unstructured textual disclosures with structured financial metrics, the system enhances the speed, fairness, and accuracy of loan evaluation processes.

The solution is designed to integrate seamlessly into Malaysia’s existing lending workflows, providing institutions with an improved capacity to reduce default rates and strengthen overall portfolio quality.

THANK YOU

TEAM
Cerebral Cortex