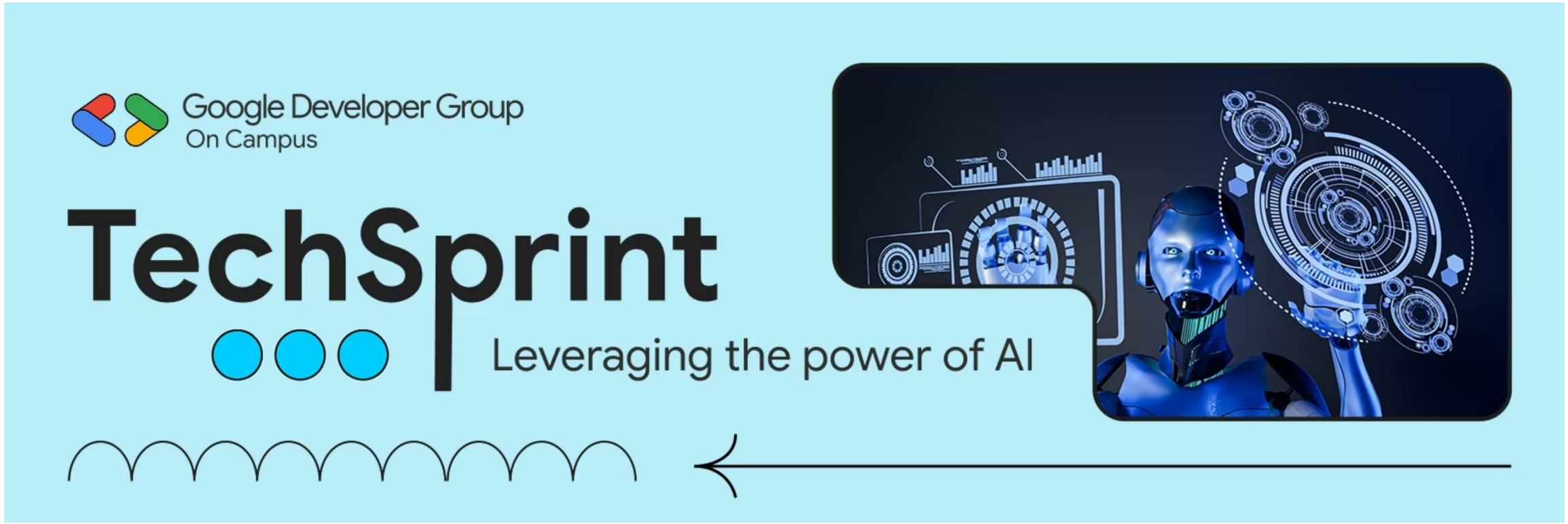

Team Details

1. Team name: Legrand
2. Team leader name: Sam Roger X
3. Problem Statement: Financial Distress Prediction in FinTech

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Solution Overview

FinGuard AI is a hybrid Adaptive Whale Optimization Algorithm–Deep Learning (AWOA-DL) framework that predicts financial distress with 95-98% accuracy. It integrates Deep Neural Networks with global optimization to capture complex non-linear relationships in financial data, addressing the limitations of traditional statistical models. The system outputs risk probabilities mapped into Green, Yellow, and Red categories for improved interpretability and actionable insights for banks and FinTech platforms.

Opportunities

1. Unlike traditional Altman Z-Score and logistic regression models that rely on linear assumptions, our AWOA-DL hybrid approach combines deep learning with adaptive optimization to capture non-linear financial patterns and automatically tune hyperparameters without manual intervention.
2. By integrating Whale Optimization with DNNs, we eliminate local minima issues, improve model convergence, handle high-dimensional features (96 financial ratios), address class imbalance using SMOTE, and deliver 95-98% prediction accuracy for early financial distress detection.

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List of features offered by the solution

- Automated financial distress prediction with 95-98% accuracy
- Adaptive hyperparameter optimization using Whale Optimization Algorithm
- Risk categorization system (Green/Yellow/Red badges)
- Real-time API-based inference for scalability
- Handles high-dimensional data (96 financial indicators)
- Robust preprocessing with SMOTE for class imbalance
- End-to-end FinTech decision support solution
- Cloud-based deployment with enterprise integration

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Google Technologies Used

- Google Cloud Platform (GCP) for cloud deployment and scalability
- TensorFlow/Keras for deep neural network implementation
- Google BigQuery for financial data processing and analytics
- Cloud Run for serverless API deployment
- Cloud Storage for model versioning and data management

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Process flow diagram

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System Architecture

Our AWOA-DL framework delivers robust performance by leveraging a carefully constructed architecture and advanced optimisation techniques.

Comprehensive Data Input

Utilises a large Taiwanese dataset of **6,819 companies** and **96 financial ratios** for comprehensive pattern learning.

Advanced Preprocessing

Leakage removal and feature selection result in **94 robust features**, complemented by **SMOTE** for enhanced data quality and balance.

Optimised DNN Architecture

A Deep Neural Network with **94 input neurons** and **2 hidden layers (64, 32 neurons)**, using **ReLU/Sigmoid** activations for deep feature extraction.

Adaptive AWOA Optimiser

The **Adaptive Whale Optimisation Algorithm** (AWOA) intelligently tunes weights and hyperparameters, effectively avoiding local minima and enhancing overall model accuracy.

Clear Risk Interpretation

Provides intuitive risk output with a **three-tiered badge system**: 🟢 Green (low), 🟡 Yellow (moderate), and 🔴 Red (high) for actionable insights.

Model Performance & Validation

Dataset: Taiwanese Bankruptcy Prediction Dataset (6,819 companies, 96 financial ratios)

Performance Metrics:

- Accuracy: 95-98%
- Improved Recall and F1-Score for minority distressed class
- Better convergence compared to standard deep learning models
- Strong generalization across multiple benchmark datasets

Key Advantages:

- Handles class imbalance effectively
- Captures non-linear financial relationships
- Automated hyperparameter tuning eliminates manual configuration
- Outperforms traditional statistical and ML approaches

Feasibility & Scalability

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Technical Feasibility:

- Uses open-source frameworks (TensorFlow, scikit-learn, Python)
- Publicly available Taiwanese Bankruptcy Dataset
- Modular architecture enables easy integration with financial systems
- Prototype MVP already developed and tested

Scalability:

- Cloud-based deployment on Google Cloud Platform
- Serverless API using Cloud Run for auto-scaling
- Handles real-time predictions for multiple companies
- Suitable for banks, NBFCs, FinTech startups, and investment firms

Business Viability:

- SaaS subscription model for financial institutions
- API-based pricing for integration partners
- Reduces credit losses through early risk detection
- Regulatory compliance support for financial monitoring

Unique Selling Points (USP)

1. Hybrid AI Innovation: First-of-its-kind integration of Adaptive Whale Optimization with Deep Learning for financial prediction
2. High Accuracy: 95-98% prediction accuracy, outperforming traditional models
3. Automated Optimization: Eliminates manual hyperparameter tuning
4. Interpretability: Risk badging system (Green/Yellow/Red) for non-technical stakeholders
5. Scalability: Cloud-native architecture for enterprise deployment
6. End-to-End Solution: Complete FinTech decision support from data input to risk assessment
7. Robustness: Handles high-dimensional data and severe class imbalance
8. Real-Time Capability: API-based inference for instant risk assessment

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Provide links to your:

1. GitHub Public Repository: https://github.com/lolboi06/Financial-Distress-Prediction-Google-Hackathon-Techspirit-
2. Technical Documentation:

https://github.com/lolboi06/Financial-Distress-Prediction-Google-Hackathon-Techspirit-/blob/main/TECHNICAL_DOCUMENTATION.md

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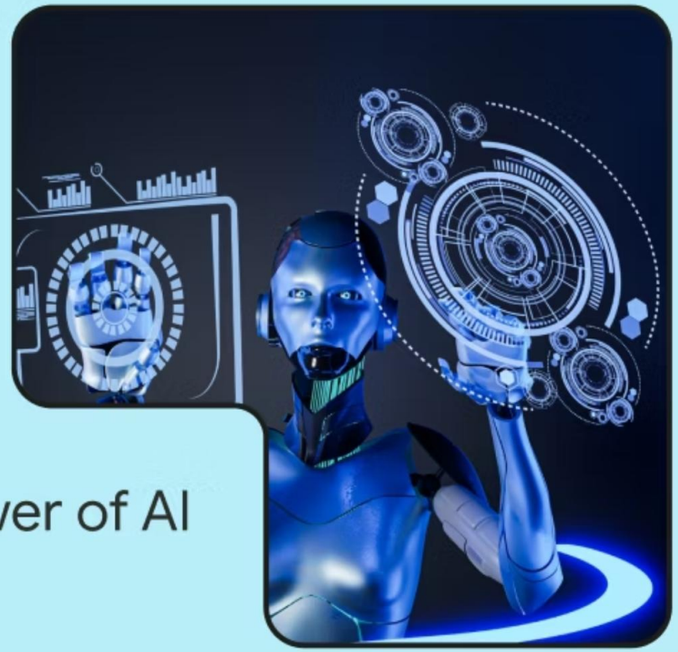
TechSprint

Leveraging the power of AI



Thank you!