

AI Bankruptcy Prediction & Analysis

PP-Y10-04



Team Members

1 Abdullah Imran
F2021105135

2 Shanzy Abid
F2021408030

3 Eman Ali
F2022105118

4 Muhammad
Affan
F2023105251

5 Ahmer Nazeer
F2021408020

Agenda

01 INTRODUCTION

02 IDEA IMPLEMENTATION

03 IDEA PITCHING

04 PROFESSIONAL PRACTICES

05 PROJECT SHOWCASE

06 CONCLUSION + EVIDENCES



Introduction





Current Challenges in Bankruptcy Prediction

Rising credit defaults pose a significant risk to overall financial stability.

Current risk models often rely on static metrics and subjective judgment, leading to limitations.

If a bank or the company itself is slow to identify that a borrower is in financial trouble and might default on their loan, that delay directly causes more loans to turn into "bad loans".

It's tough for regular people to understand how the current, complex tools get their answers.

Our Solution: TriCast AI



The product

An AI interface that takes company's financial data, processes it, and predict the bankruptcy using three state of the art AI models – 2 XGBoost, and 1 LSTM

Solves Manual Processing

Solves hours worth of manual work and does auto-calculation and future prediction

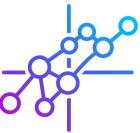
SDG 9

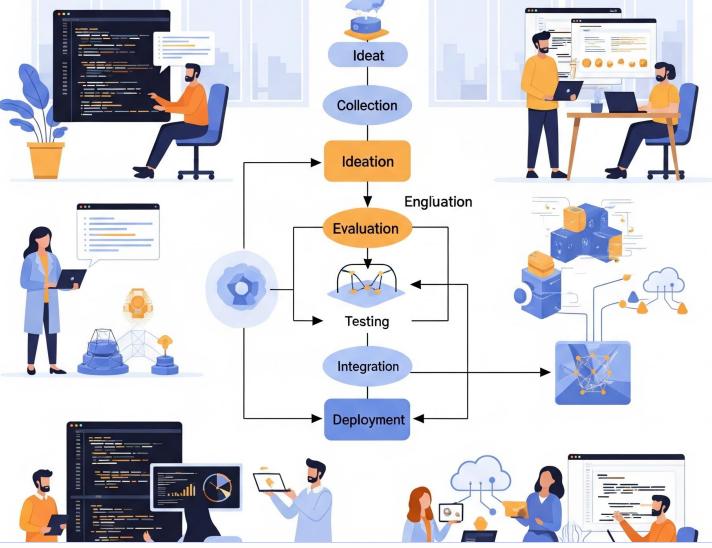
Tries to innovate the existing solutions, hence targets SDG clause 9 – Industry, Innovation, and Infrastructure

Graphical Representation

Gives AI prediction in graphical format so that it is easier for users to interpret

Steps of prediction

Data Input 	01 Takes in the company's data Quarterly revenue, risk metrics, financial ratios, shares, debt, etc.		
	 02 Perform predictions Uses state of the art Artificial Intelligence models and predict the results		
 AI Graph Results	03 Outputs the results <ol style="list-style-type: none">1. Risk / Not Risk prediction2. Anomaly detection3. Next Quarter's revenue forecasting		7



Project Implementation



Idea Implementation Details

Dataset Overview	Company Specific Metrics: industry, employees, risk scores, stock valuation ratios, share related information	Quarterly financial statements: assets, liabilities, revenue, equity from Q0 to Q10	Structured Dataset: static company attributes, historical performance, and market metrics
Exploratory Data Analysis (EDA)	<ul style="list-style-type: none">■ Dropped attributes > 25% missing values■ Imputed categorical features by mode	<ul style="list-style-type: none">■ Numerical features filled by global median■ Time Series features imputed by forward and backward fill	<ul style="list-style-type: none">■ Quarter & risk features imputed by their sector's median■ Revenue Growth imputed by rolling mean
Model Training	<ul style="list-style-type: none">■ IsolationForest creates class labels■ XGBoost predicts class labels: at risk/ not at risk	XGBoost Regressor predicts anomaly score: how abnormal a company is at a particular quarter.	Long Short Term Memory (LSTM) is Time Series, takes historical quarterly data to predict next quarter (Q11)

Accuracy of the Project

1

XGBoost Classifier

- 99% Model accuracy on unseen data
- 94% F1-Score: accuracy on positive and negative data

2

XGBoost Regressor

- Root Mean Squared Error (RMSE) of 0.195 means that the model's predictions are off by just 19.5% on average.

3

Long Short Term Memory (LSTM)

- Mean Squared Error (MSE) of 0.222 means that model's predictions are off by just 2.22% on average.





Project Pitching



Company Overview

- Pak Laser Engrave is a leader in the rotogravure printing industry, providing custom cylinder engraving solutions to packaging and printing clients.
- The company's focus on high precision, quality, and production efficiency makes it an ideal candidate for financial health innovation tools.
- Company's Location: 114 Shan Rd, Quaid-e-Azam Industrial Estate, Lahore
- Visited Date: June 2nd, 2025

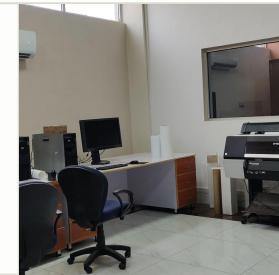


People whom the project was pitched to

1

Mr. Muhammad Asif – Head Manager

Oversees plant operations, financial decisions, and long-term strategic planning.



2

Mr. Shahwaiz Ahmad – HR Manager

Responsible for workforce planning, organizational development, and sustainability initiatives.



3

Accounts & Production Team

Represented technical and financial departments. Role: Interacted with the tool's financial data perspective and asked implementation-related questions.



Steps of Idea Pitching

Idea Presentation

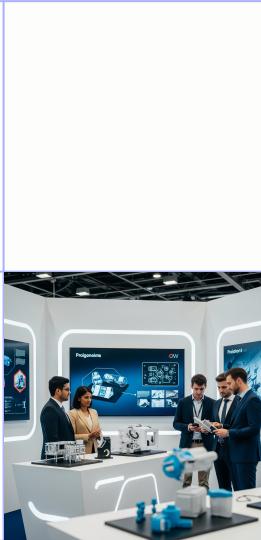
- Described all steps involved in the project
- Explained all technical aspects associated with the project

Project Showcase

- Showcased the project by running it
- Explained what each side of the project meant

Q&A, Feedback

- Cleared more technical aspects of the project
- Gathered the feedback on the project



Q & A, Feedback



Q & A

- Can it be linked to external economic events like currency drops? Yes, with additional features (inflation, GDP indicators), we can scale the model.
- What's the risk of false alarms? We've optimized precision-recall balance to minimize both false positives and negatives.
- Is the system secure for sensitive financial data? Yes. It uses secure upload protocols and performs all processing in memory.

FEEDBACK

Mr. Asif (Head Manager): He found the tool “practically useful and timely.” He related it to internal struggles they face due to sudden supplier payment issues and project delays. He expressed interest in piloting the tool using their last 3 years of financial statements.

Mr. Shahwaiz (HR Manager): He appreciated the innovation and inquired about employee impact forecasting, proposing that financial risk scores be tied to workforce planning to avoid unnecessary layoffs in bad quarters.



Professional Practices



Other Ideas Explored

1. Marketing Campaign Performance Analysis : very complicated , requires experienced individuals (*By Malik Affan*)
2. CO2 Emission Forecasting: dataset of many countries not fully available (*By Abdullah Imran*)
3. Smart Energy Saver System: difficult to wrap up within our 6 week timeline (*By Shanzy Abid*)
4. Automated Home Automation Platform: difficult to wrap up within our 6 week timeline (*By Ahmer Nazeer*)
5. HiredUp – Job & Internship Platform: Not feasible to implement on such small scale (*By Eman Ali*)

TriCast was chosen as it approved by everyone, was innovative, and could be finished within 6 weeks timeline.



Followed Professional Practices (1/2)

	01	Ethical & Explainable AI Reviewed data bias and model bias to ensure fair risk scoring and accurate prediction of data		
			02	Secure Development & Reproducibility Employed VCS, code reviews, documented dependencies, licensed datasets
	03	Clear Communication & Collaboration Clear communication between team members, regular updates and checks		

Followed Professional Practices (2/2)

	04	Ethics & Professional Conduct Carried the project with ethics and professional conduct		
			05	Adherence to Software Engineering Codes Applied software engineering codes of conduct, & software engineering principles
	06	Continuous Learning & Improvement Used multiple models during testing and deployed the best from their learnings		

Team Responsibilities

Abdullah Imran (30%)	Shanzy Abid (20%)	Eman Ali (22%)		Malik Affan (21%)		Ahmer Nazeer (7%)
Cleaning the datasets, development , testing, and deployment of the AI models and ensuring correct predictions	Leading the meetings, deciding the project timelines, budget constraints, and defining the project flow	Arranging and leading responsibilities related to company visit and idea pitching		Deciding and documenting the detailed 5Ws and 1H of the project and defining the project structure		From the given set of the ideas, deciding the pros and cons of each idea and matching it with the project constraints



Project Showcase



 Bankruptcy Risk Assessment

Risk Analysis

Total Companies: 5

Safe: 0

At Risk: 5

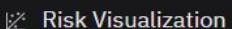
 Anomaly Detection

Anomaly Analysis

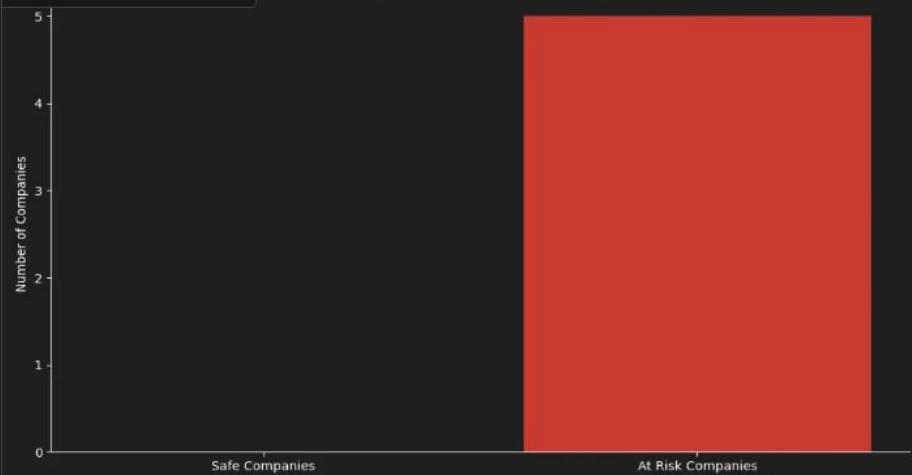
Average Anomaly Score: -0.911

High Risk Companies: 0/5

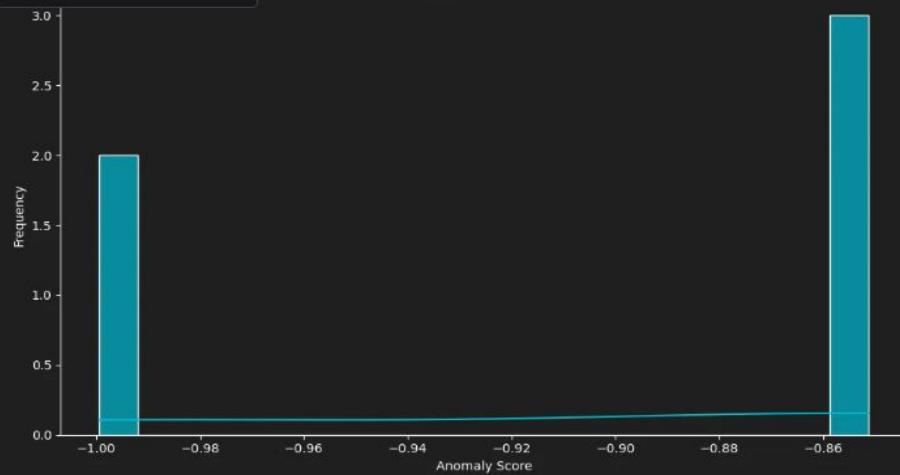
Score Range: -0.999 - -0.851

 Risk Visualization

Bankruptcy Analysis for 5 Companies

 Score Distribution

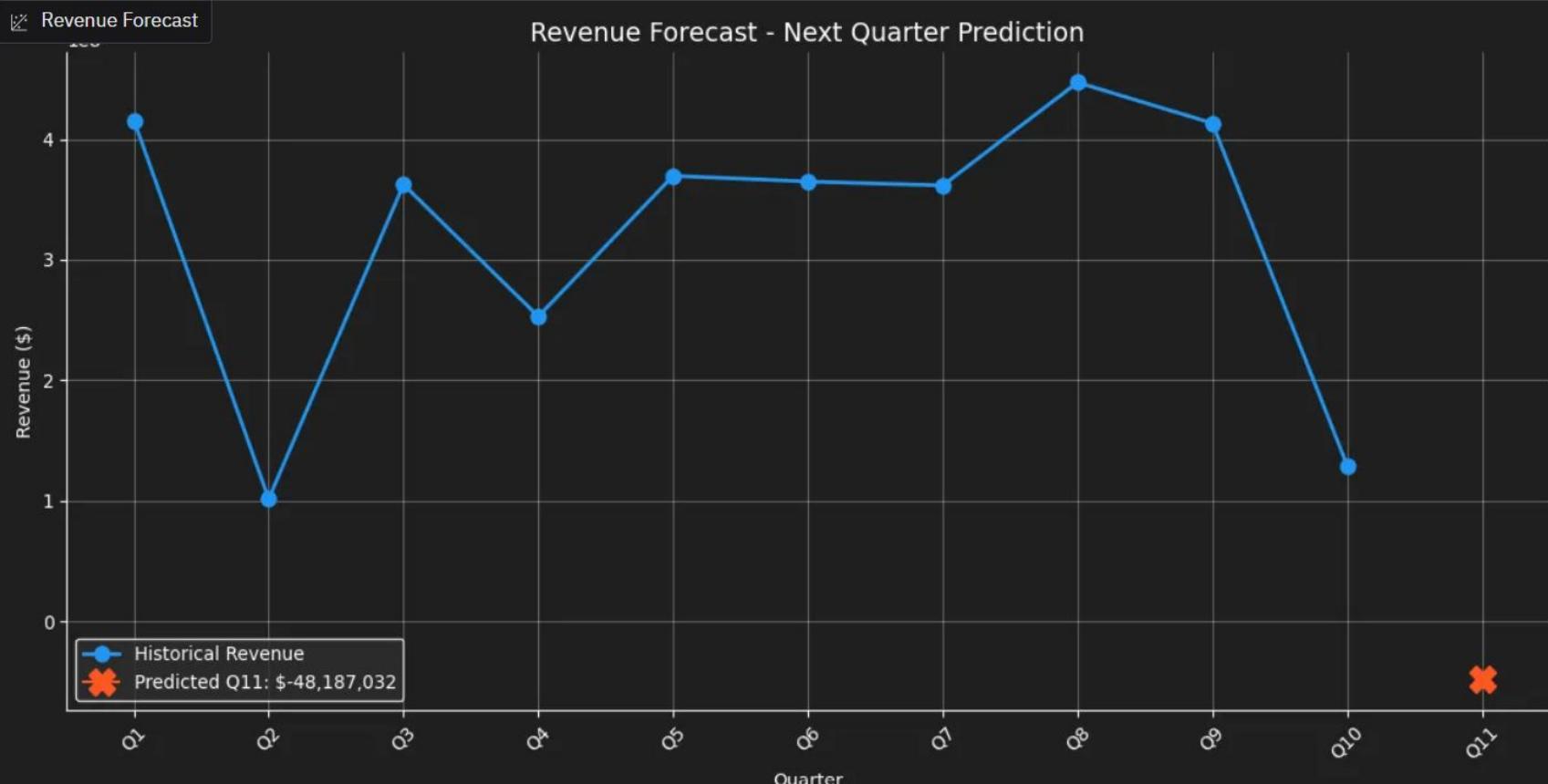
Anomaly Score Distribution



Predicted Q11 Revenue: \$-48,187,032

Growth from Q10: -137.2%

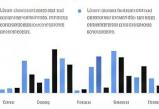
Last Quarter (Q10): \$129,468,483



AI Project Showcase Conclusion

CONCLUSION

Key Findings



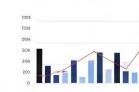
Key Findings

- **One Word**
 - Users find the AI system most impressive in its ability to predict future trends.
 - Users believe the system can help them make better decisions by providing accurate information.
- **Blind Population**
 - Cross-blinded users report higher levels of satisfaction with the AI system's performance.
 - Cross-blinded users believe the system can assist them in their daily lives.



CONCLUSION

Future Prospects



Future Prospects

- **Miami Prospection**
 - Cross-blinded users expect the AI system to continue improving its predictive accuracy.
 - Users believe the system will become more user-friendly and accessible.
- **Arrestation**
 - Cross-blinded users expect the AI system to play a role in law enforcement, particularly in identifying potential threats.
 - Users believe the system can help reduce crime rates.

CONCLUSION

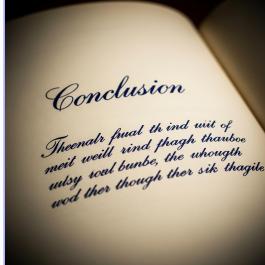


Overall Progress

Conclusion



Conclusion



- This project showcases teamwork, professional practices and a very good depiction of innovation using our respective expertise in Machine Learning.
- This project can be used by the industries, banks, individuals, organizations, or companies to predict the bankruptcy behaviour to know their future state of financials.
- The likely business impact of this project will be
 - Reduced costs to deal with bankruptcy and financial predictions
 - Less time required for the calculation of the financial data
 - Accessible to anyone and everyone as long as they have the relevant data





Evidences



41:34

Chat

People

Raise

React

View

Rooms

...

More

Camera

Mic

Stop sharing

Leave room



Abdullah Imran (F2021105135)



Eman Ali (F2022105118) (Unverified)



shanzay (Unverified)

zoom
Workplace Meeting 40 Minuteszoom
Workplace Meeting 40 Minuteszoom
Workplace Meeting 40 Minutes

Participants (5)

	Abdullah Imran (Me)		
	Affu (Host)		
	Ahmer Nazeer		
	Eman Ali		
	Shanzay		

Ahmer Nazeer

Shanzay

Ahmer Nazeer

Audio Video Participants Chat React Share Apps More

Invite Unmute me

Shanzay

Audio Video Participants Chat React Share Host tools Notes More

End

Project Pitch Pictures



THANK YOU

Please let us know if you have any questions related to the project. Wishing you all best of luck!