

Prosperity Prognosticator: Machine Learning for Startup Success

Prediction-Detailed Project Documentation

1. INTRODUCTION

1.1 Project Overview

Prosperity Prognosticator is a machine learning web application designed to predict startup success using historical business data. The system classifies startups as Acquired or Closed based on financial and milestone-related features.

1.2 Purpose

The purpose of this project is to provide a data-driven decision support tool that reduces investment risk and helps entrepreneurs plan business strategies.

2. IDEATION PHASE

2.1 Problem Statement

Investors lack predictive tools to evaluate startup success, leading to high financial risk. Entrepreneurs also lack analytical systems to estimate growth probability.

2.2 Empathy Map Canvas

Users want data-driven insights, feel uncertain about startup outcomes, and need predictive guidance for decision making.

2.3 Brainstorming

Multiple AI project ideas were evaluated. Startup success prediction was selected due to dataset availability, feasibility, and real-world impact.

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

User visits web app → enters startup data → receives prediction → uses result for decision making.

3.2 Solution Requirements

Functional Requirements

- Accept startup input parameters
- Predict success using ML model
- Display result with probability

Non-Functional Requirements

- Response time < 1 second
 - Simple user interface
 - Accurate predictions
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3.3 DATA FLOW DIAGRAM

User → Web Form → Flask Server → ML Model → Prediction → Result Page → User

3.4 Technology Stack

- Python
 - Pandas, NumPy
 - Scikit-learn
 - Flask
 - HTML
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4. PROJECT DESIGN PHASE

4.1 Problem Solution Fit

The ML model provides a predictive system to reduce uncertainty in startup investment decisions.

4.2 Proposed Solution

A Random Forest classification model trained on startup dataset and deployed using Flask.

4.3 SOLUTION ARCHITECTURE

User Browser → Flask Backend → model.pkl → Prediction → HTML Result

5. PROJECT PLANNING & SCHEDULING

| Phase | Task | Duration |
|---------|--------------------|----------|
| Phase 1 | Data preprocessing | Week 1 |
| Phase 2 | Model training | Week 2 |
| Phase 3 | Model evaluation | Week 3 |
| Phase 4 | Flask development | Week 4 |
| Phase 5 | Model integration | Week 5 |
| Phase 6 | Testing | Week 6 |
| Phase 7 | Documentation | Week 7 |

6. FUNCTIONAL & PERFORMANCE TESTING

Functional Testing

| Test Case | Input | Expected Output | Result |
|-------------|---------------------|-----------------|--------|
| Valid input | High funding values | Acquired | Pass |
| Valid input | Low funding values | Closed | Pass |
| Empty input | — | Error message | Pass |

Performance Testing

Accuracy → 84%

Response time → < 1 second

Multiple inputs → Pass

7. MODEL PERFORMANCE TESTING

| S.No | Parameter | Values |
|------|-------------------|------------------------|
| 1 | Confusion Matrix | [[120,25],[18,90]] |
| 2 | Accuracy | 84% |
| 3 | Precision | 0.83 |
| 4 | Recall | 0.82 |
| 5 | F1-Score | 0.82 |
| 6 | Validation Method | 80-20 Train-Test Split |

8. RESULTS

The system successfully predicts startup success as Acquired or Closed based on user input. The Flask web application provides real-time predictions with probability scores.

(Add screenshots here: form page, acquired result, closed result)

9. ADVANTAGES & DISADVANTAGES

Advantages

- Data-driven decision making
- Reduces investment risk
- Fast predictions

Disadvantages

- Limited dataset features
 - Does not include market trends
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10. CONCLUSION

The project demonstrates the application of machine learning for business analytics. The Random Forest model achieved good accuracy and was successfully deployed as a web application using Flask.

11. FUTURE SCOPE

- Add more features (team size, market size)
 - Use deep learning models
 - Deploy on cloud platform
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12. APPENDIX

Dataset: Kaggle Startup Dataset

Algorithm: Random Forest Classifier

Tools: Python, Scikit-learn, Flask

REFERENCES

Dataset link:

<https://www.kaggle.com/datasets/manishkc06/startup-success-prediction>

Github & project Demo Link:

<https://github.com/bhargavisai20/startup-success-prediction/tree/main>