# AI-Driven Financial Advisory App for Small & Medium Enterprises PROJECT REPORT

### Submitted by

#### MUKUND BALDEWA[RA2111003011432]

#### DEVANSH[RA2111003011451]

Under the guidance of

#### Dr. Anto Arockia rosaline

Assistant Professor, Department of Computer Science and Engineering

in partial fulfillment for the award of the degree of

#### **BACHELOR OF TECHNOLOGY**

in

#### **COMPUTER SCIENCE & ENGINEERING**

of

#### FACULTY OF ENGINEERING AND TECHNOLOGY



S.R.M. Nagar, Kattankulathur, Chengalpattu District

August 2024

# SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

(Under Section 3 of UGC Act, 1956)

#### **BONAFIDE CERTIFICATE**

Certified that the project report titled "AI-Driven Financial Advisory App for Small & Medium Enterprises" is the bonafide work of Devansh (RA2111003011451) and Mukund Baldewa (RA2111003011432) who carried out the project under my supervision. Certified further, that to the best of my knowledge, the work reported herein does not form the basis of any other project report or dissertation on which a degree or award was conferred on an earlier occasion on this or any other candidate.

**Signature** 

Dr. Anto Arockia Rosaline

[Associate Professor]

**SRM Institute of Science and Technology** 

# **Table of Content**

S.No.	Content	Page
1	Abstract	1
2	Introduction	2
3	<b>Problem Statement</b>	3
4	Existing System and Proposed System	4
5	Literature Survey	6
6	System Design	8
7	System Implementation	10
8	System Requirements	12
9	Conclusion	13
10	References	14

# **Abstract**

This paper carries out a fresh approach to the automation of financial decisions for small and medium-sized enterprises through the use of an AI-based advisory tool, the AI SME Advisor. The whole aim of the present work is to create an all-in-one tool that combines machine learning and AI to give specific financing suggestions, anticipate the probability of a loan being approved and generate business solutions specific to market conditions and the capability of the customer. The Python implemented platform leveraged to the cloud framework integrates predictive analytics and AI models to guide SMEs to success in terms of the financial dimension of their business. Initial findings show that this strategy not only boosts financial planning for SMEs but also enables sustainable business growth by supporting it with analytical, fact-based strategies.

Keywords—Financial Advisory, Small and Medium Enterprises, AI, Machine Learning, Predictive Analytics, Business Strategy, Python Programming.

# Introduction

Small and Medium Enterprises (SMEs) are the lifeblood of the global economy their leadership is seen in the development of innovations, creation of employment as well as fostering economic growth. However, SMEs are often eventually used to common mistakes that arise from a lack of guidance and proper access to financial resources. Financial instability, complicated loan approval processes, and the absence of specially prepared business strategies add to handicap the situation for the SMEs. The conventional financial advisory services, although efficient in larger organizations, still fail to tackle the particular SMEs needs and constraints, but they fill a market gap for easily understandable, accessible, and customized financial consultancy. The technological developments in artificial intelligence (AI) and machine learning are recently offering an opportunity to adapt new systems for financial advisory services that heretofore are not seen to be realized. Instead of relying on general data and broad financial strategies alone, AI-based platforms collect vast datasets and adapt to the fluctuating markets so that they can make personalized suggestions to the clients. On the other hand, AI despite being promising still has a lot of challenges such as integration of the many financial data and providing actionable insights to the SME owners. Ranking out a project that is supposed to provide a solution through the utilization of highly advanced AI and machine learning within the field, to the issues of lack of AI in the segment of SMEs is the primary goal of this initiative. If we incline towards an effective and efficient system, we can introduce the required accurate loan prediction, business ideas customized just for that business, and the correct strategic financial advice. Essentially, this initiative is not only intended to promote the financial skills of the SMEs but also, to train them in the winning qualities they require so as to grow and effectively resist the competition that the market presents to them. Ultimately, this platform has special software for the SME sector to change the course of financial stability for small businesses. It empowers them with the insights and tools required to make the most of the finance opportunities and to do safe dealings going forward if the ecosphere evolves into a contradicting landscape.

# **Problem Statement**

Small and Medium Enterprises (SMEs) are pivotal to economic growth and development but often encounter substantial obstacles in managing their financial needs and making informed business decisions. The primary challenges faced by SMEs include:

- 1. Loan Approval Uncertainty: The process of obtaining loans is frequently complex and opaque, creating significant barriers for SMEs. The intricate requirements and inconsistent evaluation criteria can result in frequent loan rejections. This uncertainty not only hampers their ability to secure necessary capital but also contributes to financial instability. SMEs often lack a clear understanding of what factors influence loan approval, making it difficult for them to navigate the process effectively.
- 2. Lack of Tailored Business Ideas: SME owners often struggle to identify viable business ideas that are both financially feasible and aligned with current market opportunities. The process of generating business ideas that fit within their financial constraints and leverage market potential is challenging. Without tailored, actionable insights, SMEs may miss out on lucrative opportunities or pursue ideas that are not sustainable, leading to inefficient resource allocation and potential business failure.
- 3. **Inadequate Financial Guidance:** SMEs frequently lack access to personalized and expert financial advice that is specifically tailored to their unique business scenarios. Traditional financial advisory services may not address the specific needs and constraints of SMEs, leading to suboptimal decision-making. The absence of customized financial guidance results in poor strategic planning and financial management, adversely affecting the growth and sustainability of these enterprises.

Addressing these challenges requires a comprehensive solution that simplifies the loan approval process, provides tailored business ideas, and offers expert financial guidance. An AI-driven financial advisory application can play a crucial role in mitigating these issues by leveraging data-driven insights to streamline loan approvals, suggest viable business ideas, and deliver personalized financial advice to SMEs.

# **Existing System & Proposed System**

# **Existing System:**

The AI SME Advisor distinguishes itself from existing solutions through several innovative features and approaches:

- Targeted Focus on SMEs with Integrated Solutions: Unlike generic financial advisory tools that cater to a broad audience, our project is exclusively tailored for SMEs. It offers a holistic approach by integrating loan prediction, business idea generation, and financial advice into a single platform. This specialized focus ensures that the solutions provided are directly relevant to the specific needs and challenges faced by SMEs, which is often overlooked in broader financial tools.
- AI-Enhanced Predictive Analytics for Loan Approval: While many financial tools offer loan calculators or basic risk assessments, AI SME Advisor uniquely integrates AI-driven predictive analytics to assess loan approval outcomes. This feature not only predicts whether a loan is likely to be approved but also provides actionable insights into factors that might influence the approval, empowering SMEs to optimize their loan applications.
- Personalized Business Idea Generation: Business idea generation is often generic in existing models. Our application uses AI to generate business ideas that are customized to the user's financial situation, market trends, and industry-specific challenges. This level of personalization ensures that the advice is practical and tailored to the user's unique circumstances, offering a competitive edge over more generalized tools.
- Deployment on Render for Accessibility and Scalability: While many applications are deployed on traditional platforms, our choice to deploy on Render offers advantages in terms of scalability, performance, and ease of updates. This ensures that the application can grow with the user base and adapt to changing technological requirements without compromising on accessibility.
- Seamless User Experience with a Dynamic Interface: The user interface is
  designed to be intuitive and dynamic, ensuring a seamless experience for users.
  This focus on user experience, combined with the powerful backend capabilities,
  differentiates our project from more technically complex but user-unfriendly
  financial tools.
- Continuous Learning and Adaptation: The AI model employed in FinAI SME Advisor is designed to learn and adapt over time, improving its predictive accuracy and the relevance of its advice. This continuous learning capability sets it apart from static models that may become outdated as market conditions and financial landscapes evolve.

# **Proposed System:**

#### 1. Interactive User Interface:

A user-friendly interface designed with HTML, CSS, and JavaScript, ensuring an intuitive and seamless user experience.

The UI is designed to be responsive and visually appealing, making it easy for users to navigate and utilize all the features efficiently.

#### 2. Robust Backend with Flask:

The backend of the application is built using Flask, a lightweight yet powerful Python web framework, ensuring smooth and reliable performance.

Flask's flexibility allows for easy integration with AI models and database systems, enhancing the overall functionality of the application.

### 3. Online Accessibility:

The application is hosted on Render, providing scalable, secure, and always-on access to users from anywhere with an internet connection.

This cloud-based deployment ensures that the application is accessible without the need for local installations, enhancing user convenience.

#### 4. Visual Presentation of Interfaces:

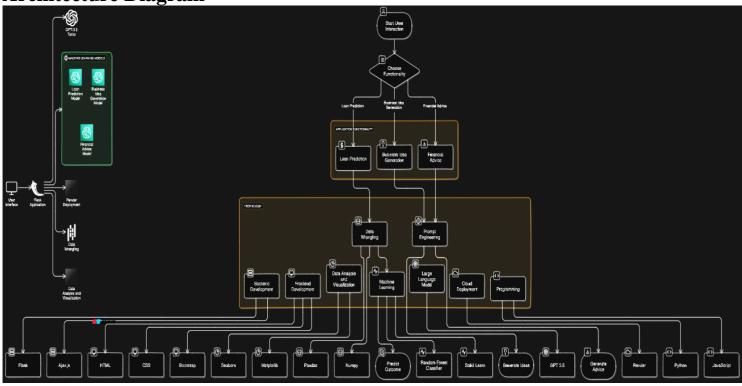
The application's interfaces are visually documented with neatly organized sections and screenshots.

These visuals offer clear insights into the user experience and functionality of each service, making the documentation comprehensive and aesthetically pleasing.

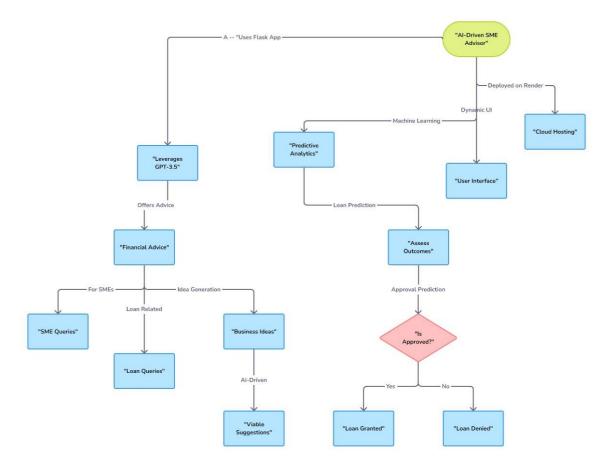
This slide presents a concise overview of the proposed system, highlighting the interactive interface, robust backend, online accessibility, and the visual documentation of the application's features.

# **System Design**

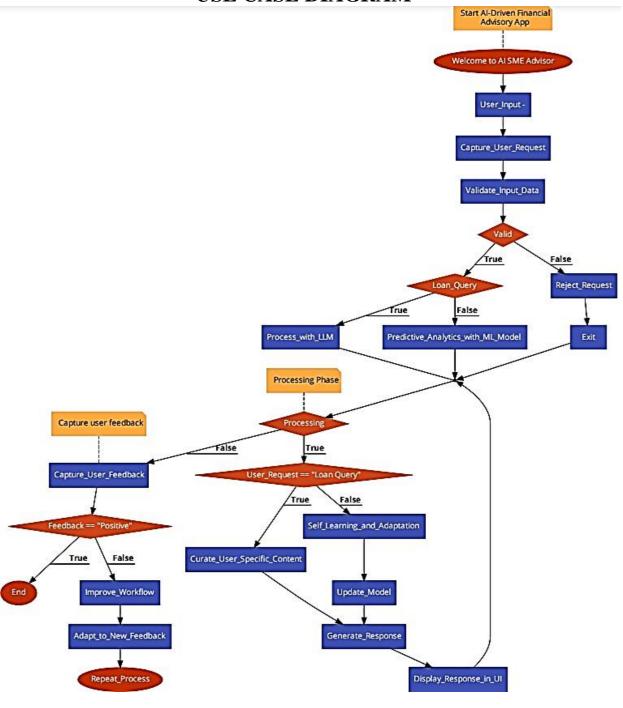
**Architecture Diagram** 



## **STATE DIAGRAM**



# **USE CASE DIAGRAM**



# **System Implementation for AI-Driven Financial Advisory App**

#### 1. Set Up the Development Environment

#### 1.1 Install Required Tools:

- **Python:** Download and install Python from <a href="mailto:python.org">python.org</a>.
- **IDE:** Install an Integrated Development Environment (IDE) such as PyCharm or Visual Studio Code.
- **Libraries:** Install essential Python libraries via pip:

bash Copy code pip install pandas numpy scikit-learn flask openai

#### 1.2 Configure Cloud Services:

- Cloud Platform: Choose a cloud provider like AWS, Azure, or Google Cloud.
- **Deployment:** Set up a virtual server or container for deploying the application.

#### 2. Develop the Backend

#### 2.1 Create a Flask Application:

• Initialize Flask:

```
python
Copy code
from flask import Flask, request, jsonify
app = Flask(__name__)
```

Define Endpoints:

```
python
Copy code
@app.route('/loan_prediction', methods=['POST'])
def loan_prediction():
    data = request.json
    # Process data and return prediction
    return jsonify(prediction=predicted_value)

@app.route('/business_ideas', methods=['POST'])
def business_ideas():
    data = request.json
    # Generate business ideas
    return jsonify(ideas=generated_ideas)
```

#### 2.2 Integrate AI Models:

• Load and Train Models:

```
python
Copy code
from sklearn.ensemble import RandomForestClassifier
model = RandomForestClassifier()
model.fit(X_train, y_train)
```

#### 2.3 Connect to OpenAI API:

• Setup OpenAI:

```
python
Copy code
import openai
openai.api_key = 'your_api_key'

def generate_ideas(prompt):
    response = openai.Completion.create(
        engine="text-davinci-003",
        prompt=prompt,
        max_tokens=150
    )
    return response.choices[0].text.strip()
```

#### 3. Develop the Frontend

#### 3.1 Design User Interface:

• HTML/CSS Layout:

```
html
Copy code
<html>
<head><title>AI SME Advisor</title></head>
<body>
<h1>Welcome to AI SME Advisor</h1>
<form id="loanForm">
<input type="text" id="loanAmount" placeholder="Loan Amount">
<button type="submit">Predict Loan Approval</button>
</form>
<div id="loanResult"></div>
</body>
</html>
```

#### 3.2 Implement JavaScript for Interactivity:

• AJAX Requests:

```
javascript
Copy code
document.getElementById('loanForm').addEventListener('submit', function(e) {
    e.preventDefault();
    let loanAmount = document.getElementById('loanAmount').value;
    fetch('/loan_prediction', {
        method: 'POST',
        headers: {'Content-Type': 'application/json'},
        body: JSON.stringify({amount: loanAmount})
    }).then(response => response.json())
    .then(data => document.getElementById('loanResult').innerText = `Prediction:
${data.prediction}`);
});
```

#### 4. Deploy the Application

#### 4.1 Deploy on Cloud Platform:

- **Upload Code:** Transfer the Flask application and frontend files to the cloud server.
- **Run Application:** Start the Flask server:

bash

Copy code

python app.py

#### 4.2 Set Up Domain and SSL:

- **Domain Configuration:** Register a domain and link it to your cloud server.
- SSL Certificate: Secure your application with an SSL certificate.

#### 5. Test the Application

#### **5.1 Run Functional Tests:**

- Unit Tests: Test individual components and functionalities.
- **Integration Tests:** Ensure all parts of the application work together.

#### **5.2 Monitor Performance:**

- Logging: Implement logging to track performance and issues.
- **Analytics:** Use analytics tools to monitor user interactions and application performance.

#### 6. Save and Share Your Work

#### **6.1 Version Control:**

- Commit Changes: Regularly commit your code to a version control system like Git.
- **Push to Repository:** Share your code on platforms like GitHub or GitLab.

#### **6.2 Documentation:**

- Create Documentation: Write comprehensive documentation covering setup, usage, and troubleshooting.
- Share Documentation: Distribute documentation to users and collaborators.

# **SYSTEM REQUIREMENTS**

The software requirements specification is produced at the culmination of the analysis task. The function and performance allocated to software as part of system engineering are refined by establishing a complete information description as functional representation of system behavior, an indication of performance requirements and design constraints, appropriate validation criteria.

	Category	Requirement
1	- Operating System	Windows 10/11, macOS Mojave or later, or a Linux distribution (e.g., Ubuntu 20.04+)
2	- IDE/Text Editor	PyCharm, Visual Studio Code, or any preferred code editor
3	- Python	Version 3.8 or higher
4	- Python Libraries	<ul> <li>- Data Processing: pandas, numpy</li> <li>- Machine Learning: scikit-learn</li> <li>- Web Framework: flask</li> <li>- API Integration: openai</li> <li>- Others: requests, pytest</li> </ul>
5	- Web Server	Apache, Nginx (for serving the application)
6	- Cloud Services	AWS, Azure, or Google Cloud for hosting the application

# **Conclusion**

The study was aimed to create a predictive model for loan approval through a variety of machine learning algorithms. The results of the research show that the Random Forest Classifier enjoyed the biggest success of all in terms of its accuracy, precision, and recall because of the skills of the classifier to deal with the huge variety of data and to detect interactions that have proven useful for this specific task. While other models such as Logistic Regression, Decision Trees, and Support Vector Machines showed different degrees of performance, none of them matched Random Forest's overall performance. The results served as a guide to the strengths of ensemble methods like Random Forest in the provision of durable and consistent predictions in financial institutions which are in the quest to improve loan approval processes. The accurate forecasting of loan approval outcomes holds great promise for these models in the context of financial inclusion. Additionally, they can attract new underrepresented areas. Furthermore, studies such as these could further develop indicators and find new ways, such as deep learning or hybrid models, to not only predict outcomes more accurately but also facilitate technology innovations in the future. This study does not only prove the relevance of machine learning in the financial sector by fastforwarding the process of and making it better but also lays a path for further studies in the process of optimizing the lending system to back the general economic enhance and inclusion.

### **References**

For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation [6].

- [1] Noise2Noise: Learning Image Restoration without Clean Data: https://arxiv.org/pdf/1803.04189
- [2] Bringing Old Image to Life: https://analyticsindiamag.com/ai-mysteries/restore-oldphotos-back-to-life-using-deep-latent- space translation-pytorcg-python-demo/
- [3] V. Bruni and D. Vitulano, "A generalized model for scratch detection," IEEE transactions on image processing, vol. 13, no. 1, pp. 44–50, 2004.
- [4] K. Yu, C. Dong, L. Lin, and C. Change Loy, "Crafting a toolchain for image restoration by deep reinforcement learn- ing," in Proceedings of the IEEE conference on computer vision and pattern recognition, 2018, pp. 2443–2452
- [5] Ran Li, Lin Luo and Yu Zhang in "Convolutional Neural Network Combined with Half-Quadratic Splitting Method for Image Restoration.
- [6] Y. Yorozu, M. Hirano, K. Oka, and Y. Tagawa, "Electron spectroscopy studies on magnetooptical media and. J. Magn. Japan, Magnetics Japan, p. 301 1982].
- [7] M. Young, The Technical Writer's Handbook. Mill Valley, CA: University Science, 1989.
- [8] M. O. Macaulay and M. Shafiee, "Machine learning techniques for robotic and autonomous inspection of mechanical systems and civil infrastructure", Auto. Intel. Syst., vol. 2, no. 1, pp. 1-25, Dec. 2022.
- [9] A. Aakerberg, A. S. Johansen, K. Nasrollahi and T. B. Moeslund, "Semantic segmentation guided real-world super-resolution", Proc. IEEE/CVF Winter Conf. Appl. Compute. Vis. Workshops (WACVW), pp. 449-458, Jan. 2022.
- [10] L. Chen, X. Chu, X. Zhang and J. Sun, "Simple baselines for image restoration", arXiv:2204.04676, 2022.