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Ai Startup Idea Validator Using Ml And Llm Agents

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Abstract- — The project proposes an AI Startup Idea Validator that helps users evaluate startup ideas automatically using Artificial Intelligence and Large Language Models (LLMs). The system allows users to input their startup ideas through a web interface and analyzes them by considering factors such as market potential, competition, feasibility, and innovation. It uses AI-based processing to generate outputs including feasibility score, SWOT analysis, and improvement suggestions, providing users with clear insights into the strengths and weaknesses of their ideas. The system integrates external data sources and intelligent models to ensure accurate and data-driven decision-making. It is designed to be fast, cost-effective, and user- friendly, making it suitable for students, entrepreneurs, and startup incubators.

Keywords – Artificial Intelligence, Startup Validation, Large Language Models, SWOT Analysis, Feasibility Analysis, Flask, MongoDB.

I. INTRODUCTION

The rapid growth of Artificial Intelligence has changed how startup ideas are evaluated. Traditional validation methods are slow, costly, and require expert knowledge, making them difficult for students and beginners. The AI Startup Idea Validator is designed to solve this problem by automatically analyzing startup ideas using AI and Large Language Models (LLMs).

In existing approaches, entrepreneurs depend on manual research and expert advice, which may not always be accessible or efficient. This creates challenges in making quick and informed decisions.

To overcome this, the proposed system uses a web-based platform where users can submit their startup ideas. The system processes the input using AI models to generate insights such as feasibility score, SWOT analysis, and suggestions. Technologies like Flask and AI APIs ensure smooth performance.

Overall, the system provides a simple, fast, and cost- effective solution for startup idea validation.

II. LITERATURE SURVEY

Many researchers have explored the use of machine learning, artificial intelligence, and data-driven approaches for startup evaluation and decision support systems. The following studies provide useful insights into existing approaches and highlight their limitations.

A.Cemri et al. (2025)
This study focuses on analyzing failures in multi-agent LLM systems and highlights issues such as poor coordination and reasoning limitations. However, it does not address practical applications like startup idea validation.

.B. Oche et al. (2025)
This research presents a review of retrieval-augmented generation (RAG) systems, improving information retrieval and response accuracy. While effective, it does not focus on real-time startup evaluation systems.

C. Razaghzadeh et al. (2024)
This work proposes a machine learning approach to predict startup success using structured datasets. Although it improves prediction accuracy, it depends on historical data and lacks real-time idea analysis.

D. D. Yu et al. (2024)
This study evaluates RAG-based systems for generating context-aware responses. While it enhances AI performance, it does not provide user- friendly solutions for startup validation.

E. Hager et al. (2024)
This research discusses the limitations of large language models in decision-making systems. It improves reliability but does not focus on applications in entrepreneurship or startup idea validation.

III. SYSTEM ARCHITECTURE

The proposed system follows a structured architecture consisting of user input module, backend processing module,

AI analysis module, database module, and output display module.

The system begins with the user input module, where users enter startup idea details such as problem statement, solution, industry, and target market through a web interface. This input is then sent to the backend server for further processing.

The input data is processed by the backend module, developed using Flask, which handles request validation and prepares the data for analysis. This module ensures smooth communication between frontend, database, and external APIs.

The processed data is then passed to the AI analysis module, where a Large Language Model (Gemini API) analyzes the idea. Based on the input, the system generates outputs such as feasibility score, SWOT analysis, competitor insights, and improvement suggestions.

The generated results are stored in the database module, which maintains user data and validation history for future reference. This enables features like tracking past ideas and user management.

Finally, the output display module presents the results to the user in a clear and structured format through the web interface. The system ensures real-time response, allowing users to easily understand and evaluate their startup ideas.

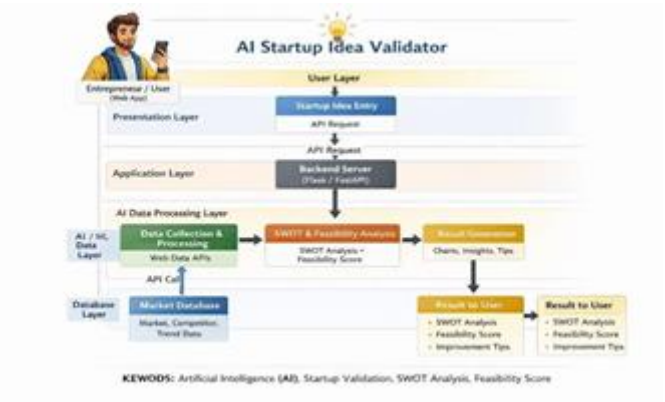

Fig 1: System Architecture for AI STARTUP IDEA VALIDATOR USING ML AND LLMs

IV. PROPOSED METHODOLOGY

The proposed methodology consists of multiple stages for analyzing and validating startup ideas using Artificial Intelligence and Large Language Models.

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V. EVACUATION ALGORITHM

- Initialize the Flask application and database connection.
- Accept user input containing startup idea details (problem, solution, market).
- Validate the input data to ensure required fields are provided.
- Preprocess the input and structure it into a proper format.
- Generate a prompt based on the startup idea details.
- Send the prompt to the AI model (Gemini API) for analysis.
- Receive the response from the AI model in JSON format.
- Extract key outputs such as feasibility score, SWOT analysis, and suggestions.
- Determine the overall verdict based on the feasibility score.
- Store the input and generated results in the database.
- Return the processed results to the frontend.
- Display the results to the user and allow further interactions.

VI . RESULTS AND DISCUSSION

The AI Startup Idea Validator system was tested with different startup ideas. The system successfully analyzed inputs and generated outputs such as feasibility score, SWOT analysis, and suggestions.

The results show that the system provides higher scores for strong ideas and lower scores with improvement suggestions

for weaker ideas. It delivers results quickly and works efficiently for idea evaluation.

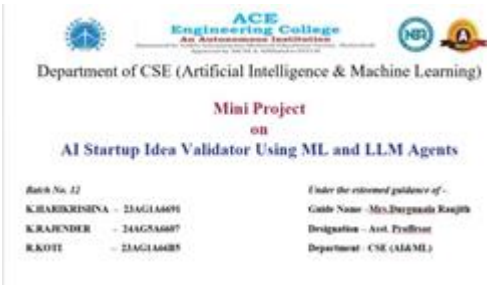

Fig 2: PPT initial slide

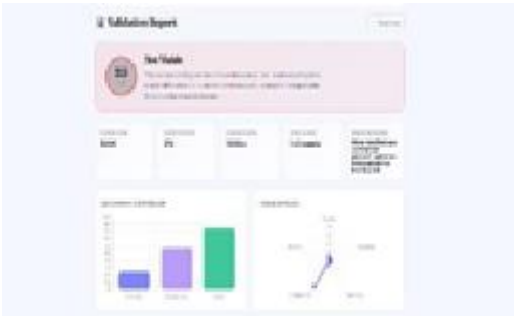

Fig 3: After Pridicting Feasability Score With Visualization

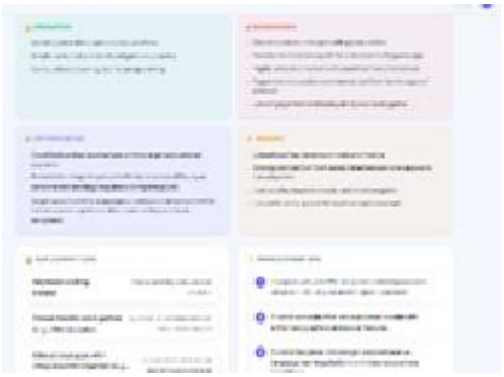

Fig 4: After Pridicting SWOT Analysis and Improvement Tips

VII. CONCLUSION

This paper presented the AI Startup Idea Validator system for improving the process of startup idea evaluation using Artificial Intelligence. The system enables users to analyze their ideas automatically without relying on manual methods.

The proposed approach effectively processes user input and generates outputs such as feasibility score, SWOT analysis, and suggestions in real time. The results demonstrate that the system is fast, reliable, and helpful for better decision-making. The system also provides a user-friendly interface, making it accessible for students and entrepreneurs. Future work can focus on improving AI accuracy, integrating more real-time data sources, and expanding the system for large-scale applications.

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