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STARTWISE AI: AI-Based Startup Idea Validation and Franchise Recommendation System

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Abstract—

Entrepreneurs often face significant challenges in evaluating startup ideas, assessing business feasibility, identifying potential risks, and selecting suitable franchise opportunities due to limited access to structured market information and expert guidance. This paper presents STARTWISE AI, an AI-based decision-support framework designed to assist aspiring entrepreneurs in startup idea validation and personalized franchise recommendation. The proposed framework integrates machine learning, data analytics, and Explainable Artificial Intelligence (XAI) to provide structured insights into early-stage business opportunities.

The startup validation module analyzes user-provided information, including business domain, target audience, estimated investment, geographical location, and business objectives, to support feasibility assessment and identify potential risk factors. Machine learning techniques can be incorporated to estimate business viability, while SHapley Additive exPlanations (SHAP) can be used to interpret model predictions by identifying the relative contributions of input features. In addition, the franchise recommendation module matches user preferences, investment capacity, industry interests, and location requirements with relevant franchise opportunities. The framework is designed using React, Vite, and Tailwind CSS for the frontend, Python and FastAPI for backend services, and Neon PostgreSQL for data storage.

STARTWISE AI aims to improve the accessibility, interpretability, and organization of preliminary entrepreneurial decision-making. By combining startup assessment with personalized franchise discovery, the framework provides a unified platform for exploring business opportunities. The system is intended to support, rather than replace, professional market research and financial evaluation. Its practical effectiveness must be established through appropriate experiments, comparative evaluation, and user testing.

Keywords— Startup Idea Validation, Artificial Intelligence, Machine Learning, Explainable Artificial Intelligence, SHAP, Franchise Recommendation System, Business Feasibility Analysis, Decision Support System..



I. INTRODUCTION

Entrepreneurship plays a significant role in economic development by encouraging innovation, generating employment opportunities, and creating new business models. However, transforming a business idea into a viable enterprise requires careful evaluation of market demand, investment requirements, competition, operational feasibility, and potential risks. Aspiring entrepreneurs, particularly students and small business owners, may lack the financial resources, industry knowledge, and professional guidance needed to conduct comprehensive business feasibility studies. Consequently, early-stage business decisions are often made using incomplete information or subjective assumptions, increasing uncertainty during the planning process.

Recent advancements in Artificial Intelligence (AI) and Machine Learning (ML) have created opportunities to improve business decision-making through data-driven analysis and predictive modelling. AI-based systems can process multiple business-related factors, identify patterns in available data, and generate insights that support the preliminary assessment of entrepreneurial opportunities. In the context of startup validation, these technologies can assist in organizing business information, evaluating relevant feasibility indicators, identifying potential risk factors, and suggesting areas that require further investigation. Nevertheless, the reliability of such assessments depends on the quality, representativeness, and availability of the underlying data..

II. LITERATURE REVIEW

Startup idea validation and franchise recommendation have become relevant research areas in Artificial Intelligence (AI), Machine Learning (ML), Explainable Artificial Intelligence (XAI), and recommendation systems. Researchers have explored various methods for predicting startup success, evaluating business opportunities, interpreting machine learning predictions, and providing personalized recommendations. Existing studies demonstrate the potential of data-driven decision-support systems while highlighting challenges related to data availability, prediction reliability, model interpretability, and recommendation accuracy.

[1]. Kim et al. – Machine Learning-Based Startup Success Prediction

Researchers investigated the use of machine learning techniques to predict startup success by analysing company characteristics and business-related factors. Their work explored how historical startup data can be used to identify patterns associated with business outcomes. This research supports the application of predictive analytics in startup evaluation. However, prediction reliability depends on the quality of the dataset and the definition of startup success. STARTWISE AI builds on this research direction by organizing business-related information to support preliminary startup assessment.

[2]. Lundberg and Lee – Explainable Artificial Intelligence Using SHAP

Lundberg and Lee introduced SHapley Additive exPlanations (SHAP), a method for interpreting machine learning model predictions. The technique estimates the contribution of individual input features to a prediction, helping users understand the factors influencing a model's output. This research provides a foundation for incorporating explainability into startup validation. In STARTWISE AI, SHAP can help explain the influence of business-related factors on model predictions, provided that a suitable trained model is available.



III. METHODOLOGY

The proposed STARTWISE AI system follows a systematic approach to validate startup ideas and recommend suitable franchise opportunities using Artificial Intelligence, Machine Learning, and data analytics. Initially, users enter relevant business information, including their startup idea, industry, target audience, estimated investment, geographical location, and business objectives through a web-based interface. The collected data are processed by the backend developed using Python and FastAPI, where input validation and preprocessing are performed to prepare the information for further analysis.

The next stage involves startup idea validation, in which the system evaluates the provided business information to generate preliminary feasibility insights and identify potential risks. Where a suitable trained machine learning model is available, predictive techniques can be used to estimate business-related outcomes. Explainable Artificial Intelligence techniques, particularly SHapley Additive exPlanations (SHAP), can be applied to interpret model predictions and identify the factors influencing the assessment results.

The franchise recommendation module analyses user preferences, including investment capacity, preferred industry, location, and business requirements. The system compares these preferences with available franchise information and identifies relevant opportunities using filtering and recommendation techniques. The resulting recommendations enable users to compare potential franchises and make more informed preliminary business decisions.

The application is developed using React, Vite, and Tailwind CSS for the frontend, Python and FastAPI for backend services, and Neon PostgreSQL for database management. The system supports user interaction, startup assessment management, franchise discovery, and the storage of relevant business information.

IV RESULTS AND DISCUSSION

The proposed STARTWISE AI system aims to support startup idea validation and franchise recommendation by analysing user-provided business information using AI, Machine Learning, and data analytics techniques. The system evaluates startup ideas based on relevant factors, such as industry, target audience, estimated investment, location, and business objectives, to generate preliminary feasibility insights and identify potential risks. The franchise recommendation module matches user preferences with available franchise opportunities to provide relevant business suggestions.

1 Homepage And Login Page

1.a Home Page

The home page of STARTWISE AI serves as the main entry point for users to access the startup idea validation and franchise recommendation features. It provides a user-friendly interface with a navigation bar containing links to Home, Startup Validation, Franchise Recommendations, About Us, and Login/Register. The main section introduces the platform with a headline such as “Validate Your Startup Idea with AI” and a brief description of how the system helps entrepreneurs evaluate business ideas and discover suitable franchise opportunities.

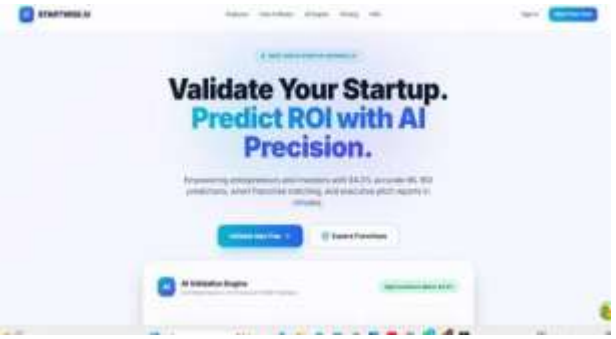


Fig 1.a Home page

1.b Login page

The login page of STARTWISE AI provides secure access to registered users, allowing entrepreneurs to use the startup idea validation and franchise recommendation features. The page contains input fields for email address and password, along with a **Login** button to authenticate users. It also provides



a **Forgot Password** option to help users recover access to their accounts and a **Register** link for new users to create an account.

Fig 1.b Login page

2. Dashboard

The dashboard of STARTWISE AI serves as the central workspace for users to access and manage the platform's main features. After successful login, users are directed to the dashboard, which provides an overview of startup idea validation, previous assessment reports, franchise recommendations, and business-related insights.

It includes options to submit a new startup idea, evaluate business feasibility, identify potential risks, and explore franchise opportunities based on investment capacity, preferred industry, and location. The dashboard can display summary cards showing the total number of startup assessments, saved reports, and franchise opportunities explored.

It also provides navigation to assessment history, detailed reports, user profile settings, and account management. Where machine learning and Explainable AI features are implemented, the dashboard can present prediction results and SHAP-based explanations to help users understand the factors influencing startup assessments. The frontend is developed using React, Vite, and Tailwind CSS, while Python with FastAPI handles backend operations and Neon PostgreSQL manages relevant user and assessment data.

The dashboard provides a centralized and user-friendly interface to support entrepreneurs in organizing their business ideas and making informed preliminary decisions.



Fig 2. Dashboard

3. Registration page

The registration page of STARTWISE AI allows new users to create an account and access the platform's startup idea validation and franchise recommendation services.

The page contains input fields for full name, email address, password, and confirm password, along with a **Register** button to submit the details. Input validation is performed to ensure that the required information is provided correctly and that the password and confirm password fields match.

The page also includes a link to the login page for users who already have an account. After successful registration, the user's account information is stored in the Neon PostgreSQL database through the backend developed using Python and FastAPI. Passwords are securely hashed before storage to protect user credentials.

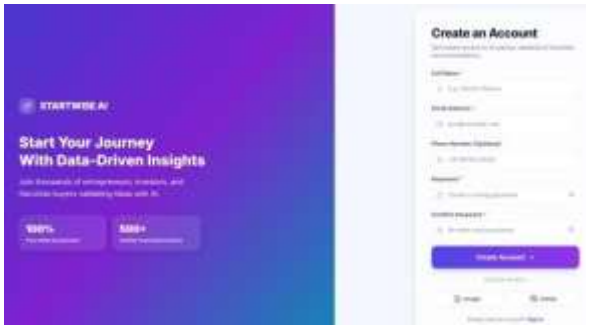
Once registration is completed, users can log in to the application and access their dashboard to validate startup ideas, view assessment history, and explore suitable franchise opportunities.

The registration page is developed using React, Vite, and Tailwind CSS to provide a responsive, accessible, and user-friendly interface.relevant user and detection information when this functionality is implemented.

Overall, the Admin Page supports the management and supervision of the NidraNet



application while helping maintain organized records and controlled access.



4. Working page

The Startup Validation page of STARTWISE AI enables users to evaluate their startup ideas by providing relevant business information. The page contains input fields for startup name, business idea description, industry category, target audience, estimated investment, geographical location, and business objectives.

Users can submit the information through a **Validate Startup** button, which sends the data to the backend developed using Python and FastAPI for processing and analysis. The system evaluates the submitted information to generate preliminary business feasibility insights, identify potential risks, and suggest areas for improvement. Where a trained machine learning model is implemented, the page can display predictive assessment results along with SHAP-based explanations to help users understand the factors influencing the predictions.

The validation results may include investment considerations, market-related indicators, identified challenges, and recommendations for further research. Users can also access previous assessments and save or download reports if these features are implemented. The frontend is developed using React, Vite, and Tailwind CSS, while Neon PostgreSQL can store startup details and assessment history.

The page provides a structured interface to help entrepreneurs assess their ideas and make informed preliminary business decisions.

V. CONCLUSION

STARTWISE AI is an AI-based web application developed to assist aspiring entrepreneurs, students, and small business owners in evaluating startup ideas and identifying suitable franchise opportunities.

In the modern business environment, entrepreneurs often face challenges in assessing market demand, estimating investment requirements, understanding potential risks, and selecting appropriate business opportunities.

The proposed system addresses these challenges by providing a unified platform that combines startup idea validation, business feasibility assessment, and personalized franchise recommendation.

The startup validation module analyses user-provided information, including the business domain, target audience, estimated investment, geographical location, and business objectives, to generate structured insights into potential business feasibility.

By incorporating Machine Learning techniques where appropriate, the system can support predictive analysis of startup-related outcomes. Furthermore, Explainable Artificial Intelligence techniques, such as SHapley Additive exPlanations (SHAP), can help users understand the factors influencing model predictions, provided that a suitable trained model is available. This improves the interpretability of automated assessments and helps users identify areas that may require additional research or improvement.

The franchise recommendation module provides users with relevant business opportunities based on their investment capacity, preferred industry,



location, and other business requirements. By organizing franchise information and matching available opportunities with user preferences, the system helps simplify the initial process of franchise discovery and comparison. This integrated approach enables users to explore different entrepreneurial pathways within a single application rather than managing startup evaluation and franchise discovery separately.

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