Department of Artificial Intelligence & Machine Learning

Project to Product (Academic Year: 2024-25)

1. **Future Classroom: AI-Powered Smart Teaching Robot:** The project mainly aims on enhancing education by providing an interactive, AI driven learning assistant for the students. It mainly involves curriculum digitization, for Kannada and English, speech recognition and adaptive learning techniques to improvise student interactions. The Model will be providing access to lessons, quizzes and real-time assessments.

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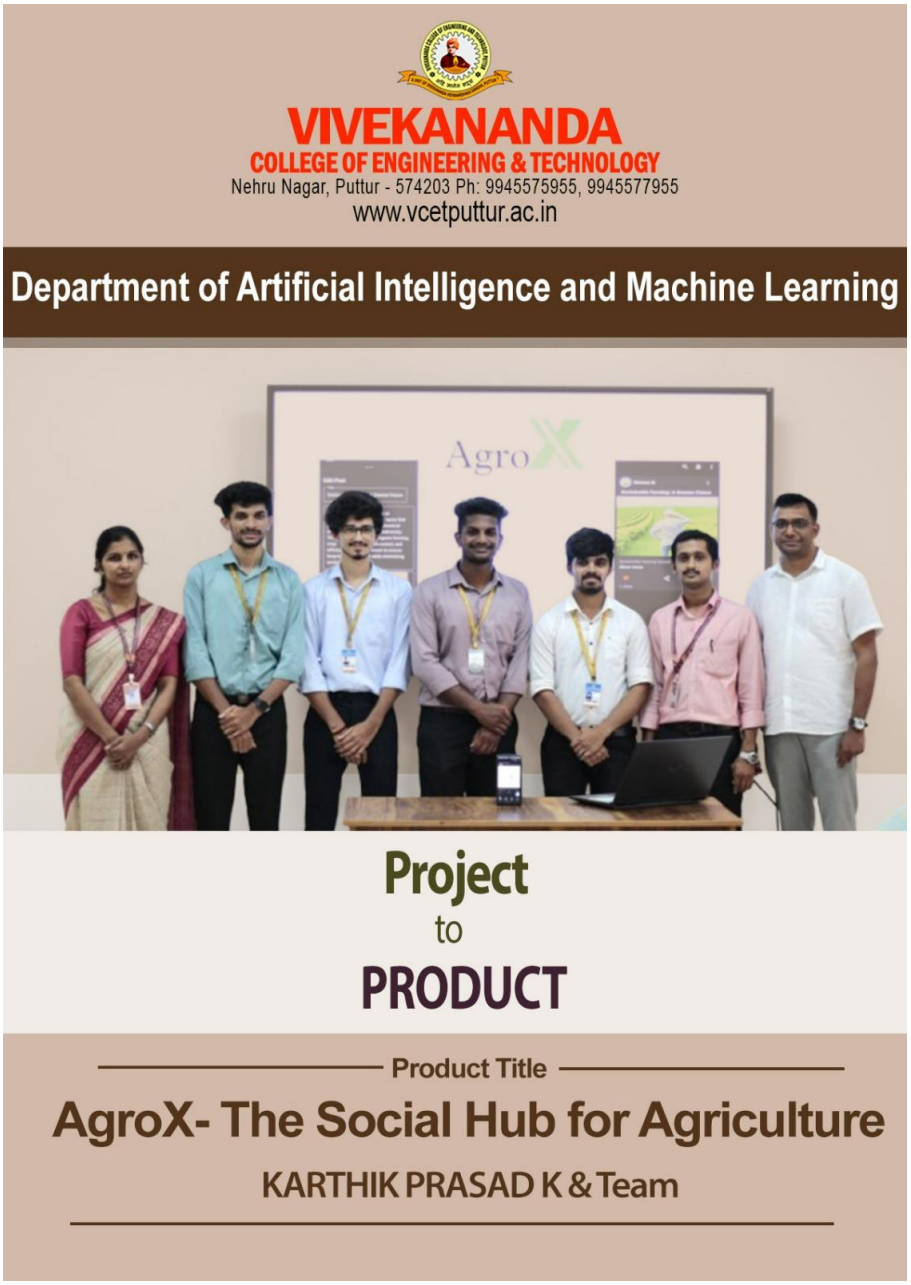
Under the guidance of:

Prof. Abhishek Kumar K, Assistant Professor, Department of AI & ML

2. **AgroX- The Social Hub for Agriculture:** Agriculture plays a crucial role in the economy, yet farmers often face challenges such as lack of real-time farming guidance, limited access to modern equipment, and disconnected agricultural communities. AgroX is a comprehensive digital platform designed to bridge these gaps by integrating an AI-powered chatbot, a social networking space for farmers, and a rental marketplace for agricultural equipment. The platform enables farmers to share insights, access expert advice, and stay updated on the latest agricultural trends through an interactive tweet-style posting system. Additionally, an AI-powered chatbot provides real-time crop recommendations, weather-based insights, and market trends to assist in informed decision-making. AgroX also features a machine rental and labor hiring service, making essential farming tools and workforce more accessible to small-scale farmers. Developed as a mobile application using Kotlin with Jetpack Compose, and supported by a Ktor-based backend with MongoDB Realm, the platform ensures scalability, security, and seamless user experience. Secure payment gateways are integrated to facilitate hassle-free transactions for rentals and labor hiring. AgroX aims to enhance agricultural productivity, improve farmer connectivity, and promote knowledge sharing, making it a one-stop solution for modern farming challenges. Future enhancements include weather-based recommendations, government scheme integrations, and multilingual support to expand its reach and impact.



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Prof. Naveen C, Assistant Professor, Department of AI & ML

3. **Silkworm Disease Detection and Classification:** This project presents a silkworm disease classification system integrating deep learning and machine learning for high-accuracy disease identification. The system utilizes EfficientNetB0 as a feature extractor, leveraging its pre-trained architecture for extracting deep hierarchical features. Principal Component Analysis (PCA) is applied for dimensionality reduction, optimizing computational efficiency while retaining essential discriminative features. Classification is performed using a Random Forest model, ensuring robust performance with high precision and recall. Images are acquired using an ESP32-CAM module and processed on a computer, enabling disease detection without relying on cloud-based systems. The captured images undergo Contrast Limited Adaptive Histogram Equalization (CLAHE) to enhance contrast, improving the classification performance. The entire classification process is executed on the ESP32 itself, making it an efficient, standalone system without relying on cloud processing. A key innovation in this project is the LED-based alert mechanism, which provides instant visual feedback on the silkworm's health status. This real-time feedback enables farmers to quickly identify and separate diseased silkworms, reducing disease spread and minimizing losses. If disease occurs new sericulture practitioners might need to visit research centers or experts for disease diagnosis, causing delays in treatment. By providing instant classification, the system allows to detect diseases early, reducing the risk of widespread infections.

Project by:

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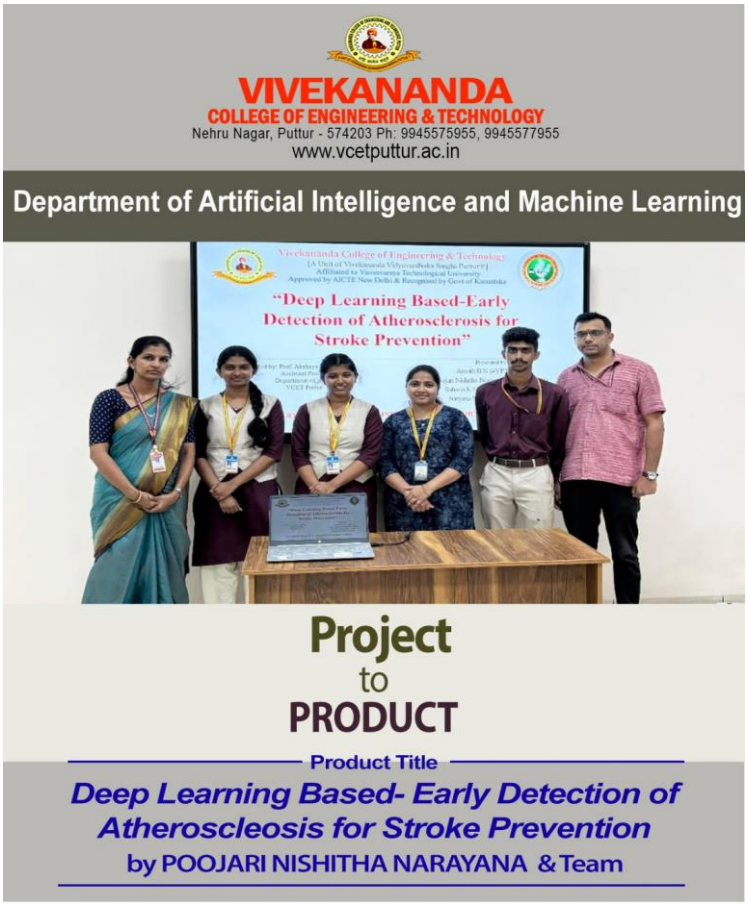
4. **Deep Learning Based- Early Detection of Atheroscleosis for Stroke Prevention:** Atherosclerosis is a leading cause of cardiovascular diseases, often progressing silently until severe complications arise. This project aims to develop a real-time monitoring system for early detection of atherosclerosis by integrating ECG (Electrocardiogram), PPG (Photoplethysmography), GSR (Galvanic Skin Response), and Blood Pressure sensor along with glucose and cholesterol levels from blood tests. The system collects multi-modal physiological and biochemical data, including heart rate variability, arterial stiffness, skin conductance, and biomarkers such as Low-Density Lipoprotein (LDL), and glucose. A Deep learning-based approach will be employed to analyze sensor data trends and detect early atherosclerotic changes. The data will be continuously monitored on a daily basis using real-time acquisition from Arduino hardware connected to the sensors. Advanced signal processing and feature extraction techniques will be applied to enhance accuracy. The ultimate goal is to develop a non-invasive, cost-effective, and real-time risk assessment tool that aids in the early detection of atherosclerosis, potentially improving preventive healthcare strategies.



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