Softwarica
COLLEGE OF IT & E-COMMERCE

in collaboration with

Coventry
University

BANKING ROBOT

WITH NLP AND COMPUTER VISION

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To Tulasi Kattel

Banking Robot with Natural Language Processing and Computer Vision

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Introduction

People in Nepal find the account opening and KYC (Know Your Customer) automation processes difficult. To simplify these procedures, an AI-powered banking robot was developed. The robot uses NLP (Natural Language Processing), OCR (Optical Character Recognition), and Facial Recognition to facilitate conversations, extract text from documents, and identify people. A loan prediction module was also included, in which particular questions are given using NLP and loan eligibility is projected based on the answers. The robot's capacity to travel throughout a bank is achieved using line identification algorithms, allowing customers to easily access preferred departments.

By combining OCR, NLP, Facial Recognition, line following, and loan prediction, "Banking Robot" provides the ideal system for account creation and KYC automation. It not only improves productivity but also provides a positive customer experience, setting a new standard for modern banking services.
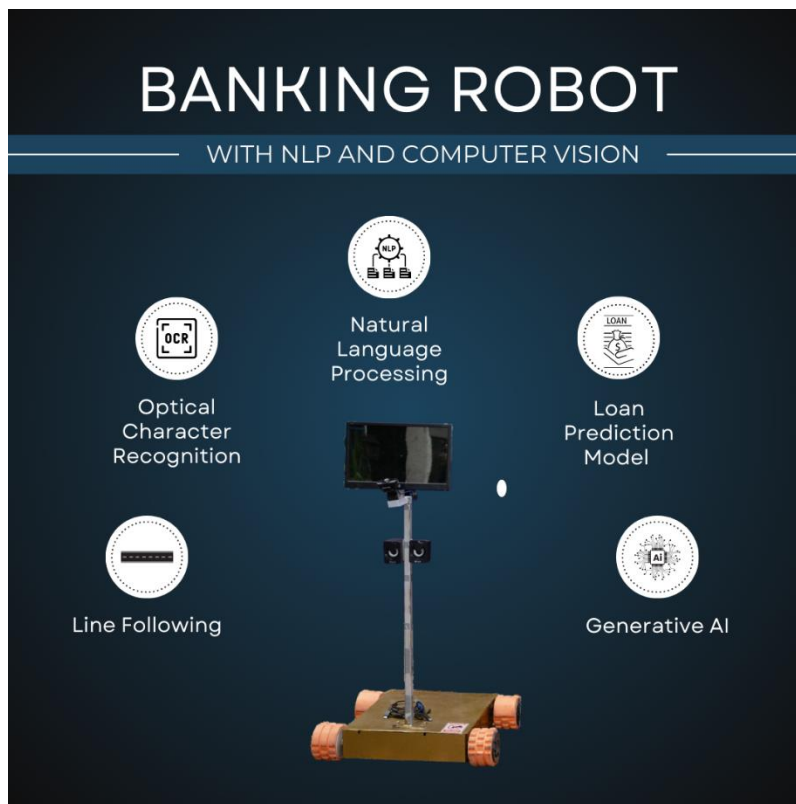

Figure 1:

Features

Roles and Responsibilities

The project needed different responsibilities with a focus on both team unity and technological execution. The task was to generate responses depending on user intents using the RASA framework. Models were created and trained to precisely understand inputs and behave accordingly. In addition, the Gemini API key was linked into the NLP system to enable responses that go beyond banking intentions. To extract text from documents such as citizenship , collaboration was made with a teammate. To get the necessary results, this effort required the usage of the PyTesseract library, as well as the "nep.traineddata" and "eng.traineddata" modules. The Firebase Realtime Database was designed and developed to store information provided by customers via NLP and OCR. This includes adding the Firebase configuration file, creating the database structure, and ensuring smooth data retrieval and storage for real-time interactions with the robot. Assistance was provided to the team in implementing the line-following algorithm, enabling the robot to navigate paths within the bank.

Challenges Faced

A number of challenges occurred during the process. A major problem was created by NLP, where responses were generated only from the Gemini model rather than the trained model. Additionally, the project was delayed due to the poor quality of the given camera, which made it impossible to capture citizenship documents for OCR. The low resolution caused incorrect text extraction. During testing, it was discovered that the robot lacked the ability for 360-degree rotation, and when this rotation was reached, the motor frequently separated from the tire, resulting in mechanical instability. Similarly, there were difficulties in integrating the project with Firebase, where text data was correctly written to the database, but retrieval became challenging.

Solutions

To overcome the challenges, the team worked together to resolve the NLP and Gemini issues by incorporating the Gemini code into the "actions.py" file, which solved the problem. To address the limitations of the low-quality camera, a new higher-resolution camera was purchased, considerably boosting text extraction quality and OCR performance. Challenges with hardware

and Firebase integration were overcome by obtaining advice from seniors and faculty members, whose ideas were helpful for tackling data retrieval issues.

Learnings Outcomes

This project offered an opportunity to improve both technical skills and teamwork abilities. Practical experience was gained by integrating AI technologies such as NLP and OCR into a system, which efficiently addressed real-world difficulties such as account opening and KYC automation in the banking sector. Problem-solving and debugging abilities were refined particularly with respect to database difficulties, hardware restrictions, and database integration.

Furthermore, teamwork improved collaboration and communication abilities by addressing different project steps, resolving challenges, and sharing information. The successful implementation of line following for robot movement, as well as the creation of database architecture utilizing Firebase, which enabled theoretical knowledge to be properly put into practice and reducing the gap between academic learning and real-world applications.

Conclusion

To conclude, the AI-powered banking robot effectively simplifies account opening and KYC automation by integration NLP, OCR, Facial Recognition, and machine learning based loan prediction. The team resolved challenges through collaboration and technical improvements. This project not only enhances banking efficiency but also provides valuable learning experiences in AI integration and teamwork.