MultiVocal Bus Net: Automated Multilingual Bus Route Announcement System for KSRTC Buses

INTRODUCTION

- Our project introduces a groundbreaking solution to enhance the bus travel experience, particularly for KSRTC passengers.
- By automating bus route announcements, we aim to provide real-time information to all passengers, with a special focus on those with special needs.
- Our initiative addresses the pressing challenges faced by commuters utilizing KSRTC buses in the current scenario.

PROBLEM DEFINITION

- Many individuals face language barriers while navigating public transportation systems.
- Identifying buses and routes can be challenging, especially in regions with diverse linguistic backgrounds.
- Persons with disabilities encounter obstacles in accessing and utilizing public transportation services effectively.
- Existing solutions often lack inclusivity and fail to address the diverse needs of passengers.
- There is a pressing need for innovative technologies to enhance accessibility and usability in public transportation systems.

EXISTING METHODS & ITS DISADVANTAGES

1. **Destination Board Display on Buses**

- Disadvantage: Most destination boards are in Malayalam, hindering those with language barriers. Relying solely on these boards limits route information, impacting passengers' access. Our project addresses this limitation.

2. **Manual reading of bus numbers and routes in regional languages.**

- Disadvantage: Inaccessible to non-natives, people with disabilities, and children. Prone to errors, not universally available.

3. **Smartphone Apps with User Interaction**

- Disadvantage: Relies on user input, causing errors and outdated data. Limited language support confuses non-natives. Excludes some users, depends on internet, limiting usage.

RELEVANCE OF THE PROJECT

- Multilingual Support: Language barriers overcome with information available in multiple languages.
- Detailed Routes: Comprehensive route details provided, including stops and announcements.
- Accessibility Features: Tailored for non-natives, people with disabilities, and children for inclusive access.
- Effortless Navigation for Every Passenger

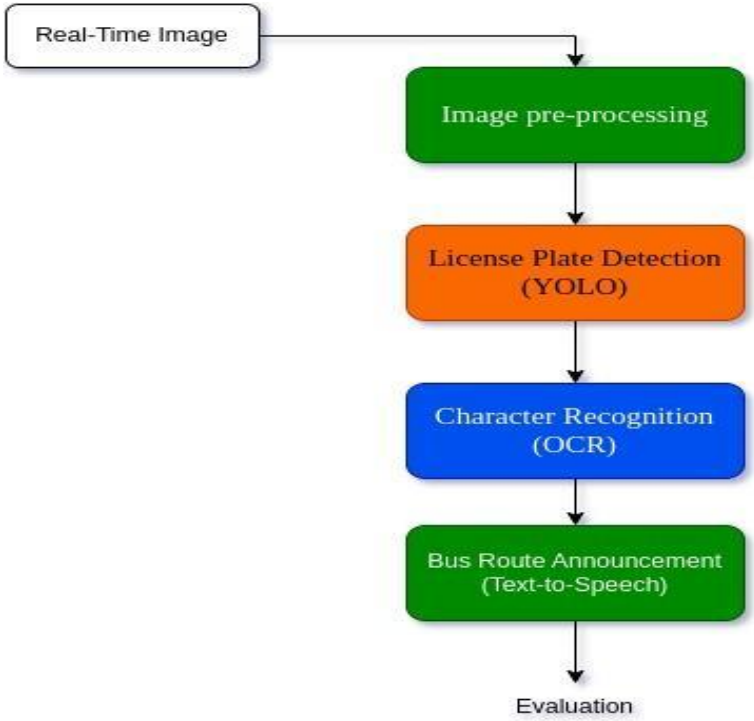
NOVELTY OF IDEA

- Integration of Advanced Technologies: Utilizes cutting-edge technologies such as YOLOv8, EasyOCR, and GTTS for automated multilingual bus route announcement.
- Multilingual Support: Offers real-time announcements in multiple languages (Malayalam, Hindi, English), catering to diverse passenger needs.
- Targeted Accessibility Features: Specifically designed to assist children, individuals with language barriers, and people with disabilities, enhancing their experience with public transportation.
- Real-Time Detection and Announcement: Provides instant identification of KSRTC buses upon entry to bus stands and delivers route announcements in real-time, improving efficiency and convenience for passengers.
- Innovation in Public Transportation: Introduces a novel solution to address language barriers and accessibility issues in public transportation systems, setting a precedent for future innovations in the field.

IMPLEMENTATION APPROACH

- Object Detection & OCR Integration: YOLO v8 and EasyOCR join forces for real-time license plate detection and text extraction from video feeds.
- Real-Time Processing: Webcam-based system swiftly identifies vehicles and extracts license plate information, ensuring prompt updates.
- Multilingual Announcements: Our system converts extracted text into English, Malayalam, and Hindi audio announcements, catering to diverse language preferences.
- Dynamic Announcement Generation: Using dynamic techniques, announcements are triggered based on detected license plates, providing real-time destination update

PROJECT DESIGN



TECH STACK

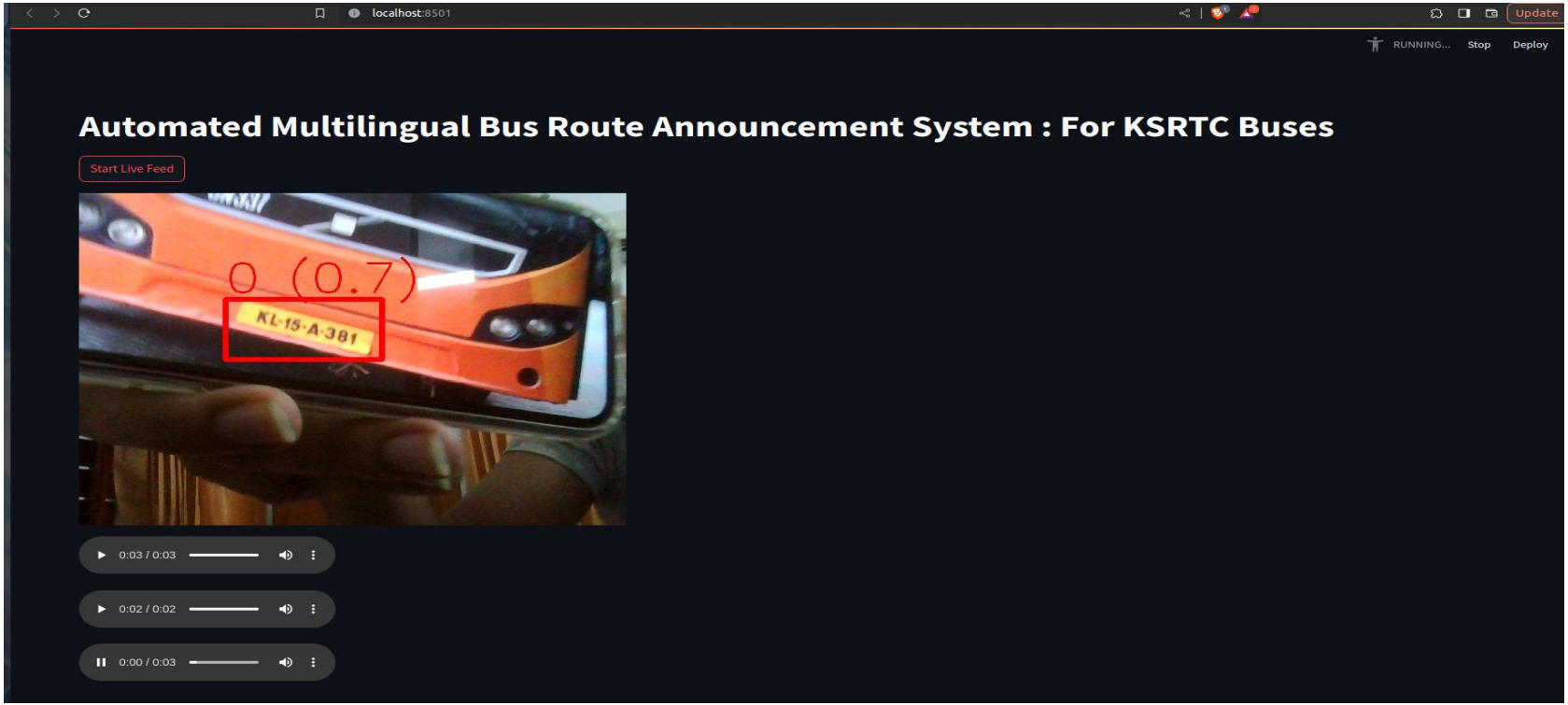
1. Yolo V8
2. EasyOCR
3. GTTS
4. Python 3
5. Streamlit

RESULT

- License Number Recognition and Announcement

RESULT

- UI Implementation



ANALYSIS

Metric	Value
Accuracy	93.89
F1 score	96.85
Recall	97.6
Precision	96.0

Table 1. Performance Evaluation of Proposed Model

For evaluating license plate recognition and announcement, we conducted manual tests with buses. We iteratively modified the system based on areas of improvement identified during testing, ensuring optimal performance.

FUTURE SCOPE

- Enhancements in accuracy and speed of license plate detection
- More Languages: Add more languages for wider passenger coverage.
- Enhanced Accessibility: Implement voice commands and visual aids for better assistance.
- Integration with Navigation: Provide real-time route guidance and bus tracking.
- Smart City Collaboration: Integrate with smart city initiatives for urban mobility.
- Integration with mobile applications for real-time updates and personalized assistance
- Nationwide Expansion: Extend the system to other transit authorities.
- Research and Development: Explore emerging technologies for further improvement.

Thank You