FYP Proposal Submission Form – FA’22 & onwards

DO NOT SUBMIT HANDWRITTEN FORM

FYP/CUI/CS-WAH/015

*** Project Title:**

(150 characters)

SmartVision: An AI-Powered Mobile Assistant for Visually Impaired Individuals

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*** Which real world problem shall be solved by this FYP?**

(800 characters)

The visually impaired individuals face significant challenges in their daily lives due to the inability to recognize objects, read printed text, and navigate their surroundings without external assistance. This lack of independence affects their ability to perform essential tasks such as identifying household items, reading signboards, and seeking help in emergencies. While some assistive technologies exist, they often rely on expensive hardware or require constant human intervention, making them impractical for real-time use. To address this issue, our project aims to develop an AI-powered mobile application that provides real-time object recognition, text-to-speech conversion for printed text, and hands-free voice command navigation. The application will utilize advanced AI techniques to process visual and textual information, ensuring a seamless and interactive user experience. Additionally, it will feature an automatic flashlight activation system for low-light conditions. By integrating these capabilities into a single accessible mobile platform, this solution will empower visually impaired individuals, promoting greater autonomy in their everyday activities while enhancing safety and accessibility.

Detail of Project Members:

1: CIIT/____-___-___/WAH NAME_OF_Student_1

2: CIIT/____-___-___/WAH NAME_OF_ Student_2

3: CIIT/____-___-___/WAH NAME_OF_ Student_3

Supervised By:

Supervisor Name

Project Streams:

☐Web-based FYPs

☐Desktop Applications

☒Mobile Apps FYPs

☐Game-based FYPs

☐Hardware-based

*** Project Description:**

(3000 characters)

Note: Login/logout and authentication/authorization shall be the default functionalities of Web/Gaming/Mobile/Desktop FYPs.

(a) What is the overall working/summary of this FYP? (1000 characters)

The Blind Vision App is an AI-driven mobile application designed to provide real-time assistance to visually impaired individuals by helping them recognize objects, read printed text, and navigate their surroundings independently.

The application functions through an intuitive interface where users can interact via voice commands, allowing for hands-free operation. Upon activation, the camera captures the surrounding environment, and the AI-powered object detection system identifies and announces the objects in view.

The integrated OCR module further enables users to scan and convert printed text into speech, providing a seamless way to read signboards, documents, or labels. To ensure usability in various lighting conditions, the app includes an automatic flashlight feature that activates in low-light environments.

The Blind Vision App merges the power of Flutter for a user-friendly experience with advanced AI for object recognition and text processing, ultimately offering an accessible, reliable, and intelligent solution for visually impaired users to navigate their daily lives with greater independence and safety.

(b) Write name and detail of each module in your FYP.

Camera & Object Detection Module:
- Image Processing: Captures and processes images from the camera.
- Real-Time Object Recognition: Detects objects and announces them using AI.

2. Voice Command Module:
- Speech-to-Text Processing: Converts spoken commands into actions.
- Hands-Free Navigation: Enables users to control the app using voice commands.

3. Text Recognition (OCR) Module:
- Text Extraction: Reads printed text from images (e.g., signboards, labels).
- Text-to-Speech Conversion: Converts extracted text into audible speech output.

4. Auto Flashlight Module:
- Low-Light Detection: Detects ambient light levels.
- Automatic Flashlight Activation: Turns on the flashlight in dark conditions.

5. Mobile Application Interface Module:
- User Authentication: Implements sign-in, sign-up, and profile management.
- User-Friendly UI: Ensures accessibility for visually impaired users.
- Navigation & Settings: Provides easy-to-use controls and app settings.

6. AI Model Training & Optimization Module:
- Custom AI Model Training: Develops an object detection model for better accuracy.
- Performance Optimization: Ensures the AI model runs efficiently on mobile devices.

7. Backend & Database Management Module:
- Cloud Storage: Manages user data and preferences using Firebase Firestore.
- Data Communication: Facilitates interaction between the mobile app and AI models.

(c) Member-wise Module Information

1: Which module shall be developed by student-1?

(500 characters)

IMRAN

1. **Develop AI/ML Models**:
   - Train object detection models (e.g., YOLO, TensorFlow Lite) for real-time object recognition.
   - Build an OCR model (e.g., Google ML Kit, Tesseract) for text extraction from images.
2. **Optimize Models**:
   - Optimize models for mobile devices to ensure efficiency and low latency.
3. **Integrate with Flutter**:
   - Use **tflite_flutter** to integrate models into the app.
4. **Audio Feedback**:
   - Convert detected objects and text into audio using **flutter_tts**.
5. **Testing**:
   - Test models in real-world scenarios and evaluate performance.

2: Which module shall be developed by student-2?

QASIM

1. **Voice Command Navigation**:
   - Implement voice commands using the **speech_to_text** package.
   - Link voice commands to app actions (e.g., "Start object detection").
2. **Emergency SOS Feature**:
   - Develop the SOS feature using **sensors_plus** (for shake detection) and **flutter_sms** (for sending emergency alerts).
   - Add real-time location sharing using the **geolocator** package.
3. **Auto Flashlight**:
   - Implement auto flashlight activation using **torch_light** and **sensors_plus** for low-light detection.
4. **Integration**:
   - Ensure smooth integration of all modules into the Flutter app.
5. **Testing**:
   - Test features in real-world scenarios and ensure functionality.

(d) Were similar FYPs already developed on the same topic in your department?

◉ Yes ○ No

(d-1) Copy name(s) of latest one or two similar FYPs from RMS student console and paste below. (150 characters)

An AI based mobile app working as a sight for blind and visually impaired

(d-2) Mention below the three (3) new, but main, functionalities you are adding to this FYP. (600 characters)

1. 1. **Multi-Language Support**: Recognizes and speaks text in multiple languages.

1. 2. **Emergency SOS**: Sends real-time location to a contact in emergencies.

3. **Auto Flashlight in Low Light**: The app will automatically turn on the flashlight in low-light conditions to ensure proper object detection.

Development Environment:

- **Tools** (e.g.Dot Net platform, Android Studio,
- Xcode, Swift, Ionic, Xamarin, PhpStorm
- /Php Laravel, WordPress, Maya, Unity 3D,
- Photoshop, MATLAB, ns-2, Python,
- Java EE, Java ME, NetBeans, Java Script,
- Node.js, Angular.js, JSON, OpenCV)
- **DBMS** (e.g. SQL Server, MySQL, SQLite,
- Oracle, Teradata)
- **Platform** (e.g. Windows, Linux

Select tools, DBMS and platform as per above stream that you have chosen.

Tool(s) : Flutter, TensorFlow Lite, Google ML Kit, OpenCV, Python

DBMS : SQLite (for local storage of user preferences and contacts)

Platform : Android (with future support for iOS)

Evaluation Criteria for 7th Semester:

(Week 14 - 16)

1. SRDS (Functional & Non-functional requirements, Use case diagram, Sequence diagram, Class diagram, Entity relationship diagram / Detailed hardware configuration)

2. Implementation of ONE major use case (>=30% FYP work), which does not includelogin/logout.

3. Interface with complete functionality of major use case / In case of hardware, provideconfiguration of major use case functionality.

Evaluation Criteria for Internal 8th Viva:

(Week 12 & 13)

1. Implementation of all use cases (>=90% FYP work)

2. Project in running and working form as per Use case, Class and Sequence diagrams asmentioned in SRDS

3. Initial FYP report

4. Deployment
   - Web: Your website must be online on any free/paid hosting service
   - Mobile App: Your app must be in APK/iOS form so that it can be installed
   - Gamimg: Your game must be in executable form so that it can be installed
   - Desktop Application: Your application must be in executable form so that it can beinstalled
   - Hardware: Your final product must be in proper casing and should give look and feelof sellable item