Work Case: Flight Risk Assessment Tool (FRAT)

Project Overview

The Flight Risk Assessment Tool (FRAT) is a mobile application developed to aid pilots and flight operators in assessing flight-related risks. This tool facilitates the creation and management of flight records, conducts comprehensive risk assessments, and provides recommendations to enhance flight safety. The FRAT application supports offline data collection and ensures synchronization with backend services when an internet connection is available.

Client Requirements

- **Flight Management**: Ability to create, manage, and store flight records.
- **Risk Assessment**: Structured assessments through questionnaires to evaluate various risk factors associated with flights.
- **Offline Functionality**: Support for offline data collection with synchronization capabilities when online.
- **User-Friendly Interface**: An intuitive and user-friendly interface for ease of use by pilots and flight operators.
- **Data Security**: Secure handling and encryption of user data both in transmission and storage.

Solution and Features

1. **Functional Modules**:
   - **Flight Creation and Management**:
     - **Description**: Users can create and manage detailed flight records including flight ID, destination, and date.
     - **Inputs**: Flight details provided by the user.
     - **Processing**: Store flight details locally and sync with backend services when online.
     - **Outputs**: Confirmation of flight creation and synced records.
   - **Risk Assessment (FRAT Detail Screen)**:
     - **Description**: Displays detailed FRAT information, including risk assessment questions and input methods.
     - **Inputs**: FRAT ID and Assessment ID.
     - **Processing**: Fetch and display FRAT details, collect user responses, and submit responses for processing.
     - **Outputs**: Structured display of questions, user responses, and navigation to results.
   - **Risk Calculation**:
     - **Description**: Aggregates user responses to calculate a total risk score.
     - **Inputs**: User responses, item scores, and risk flags.
     - **Processing**: Calculate total risk score and apply necessary modifiers.
     - **Outputs**: Total risk score and risk level determination.
   - **Results and Recommendations (FRAT Results Screen)**:
     - **Description**: Displays the results of the risk assessment, including risk level and recommendations.

- **Inputs**: Total risk score and assessment data.
- **Processing**: Determine risk level and provide recommendations.
- **Outputs**: Display risk level, recommendations, and mitigation options.
  - **Mitigation Selection**:
    - **Description**: Allows users to select mitigations to reduce the risk score.
    - **Inputs**: User-selected mitigation measures.
    - **Processing**: Adjust scores based on selected mitigations and recalculate total score.
    - **Outputs**: Updated risk scores and results.
  - **Data Sync and Offline Mode**:
    - **Description**: Ensures that data collected offline is synchronized with backend services when an internet connection is available.
    - **Inputs**: User responses collected offline.
    - **Processing**: Store responses locally and sync with backend services upon connectivity.
    - **Outputs**: Synced data with backend services.

2. **External Interface Requirements**:
   - **User Interfaces**: The app includes interfaces for creating flights, displaying questionnaires, collecting responses, and showing results.
   - **Hardware Interfaces**: Interaction with device sensors if necessary for additional data.
   - **Software Interfaces**: Integration with backend APIs for data operations.
   - **Communication Interfaces**: RESTful APIs for backend communication.
3. **Non-Functional Requirements**:
   - **Performance**: Quick loading of questionnaires and response submissions (under 2 seconds).
   - **Safety**: Ensuring data integrity during offline collection and synchronization.
   - **Security**: Data encryption during transmission and storage.
   - **Usability**: Intuitive design for easy navigation and operation.

Impact and Benefits

The FRAT application enhances flight safety by providing a systematic method for assessing and mitigating risks associated with flights. Its offline capabilities ensure continuous data collection even in remote areas, while synchronization features keep all data up-to-date. The user-friendly interface and secure data handling make it an essential tool for pilots and flight operators, contributing to better decision-making and compliance with safety standards.

Future Enhancements

Future improvements may include more advanced predictive analytics features, integration with additional external data sources, and enhanced UI/UX design based on user feedback.