A Smart Door System

Built with

- Python
- scikit-learn
- Raspberry Pi

Achievements

- Developed an IoT-based smart door access control system using Raspberry Pi computers, along with a camera and ultrasonic sensors
- Implemented MLPs for movement detection, achieving a validation accuracy of 97%, and weather classification using sklearn

Description

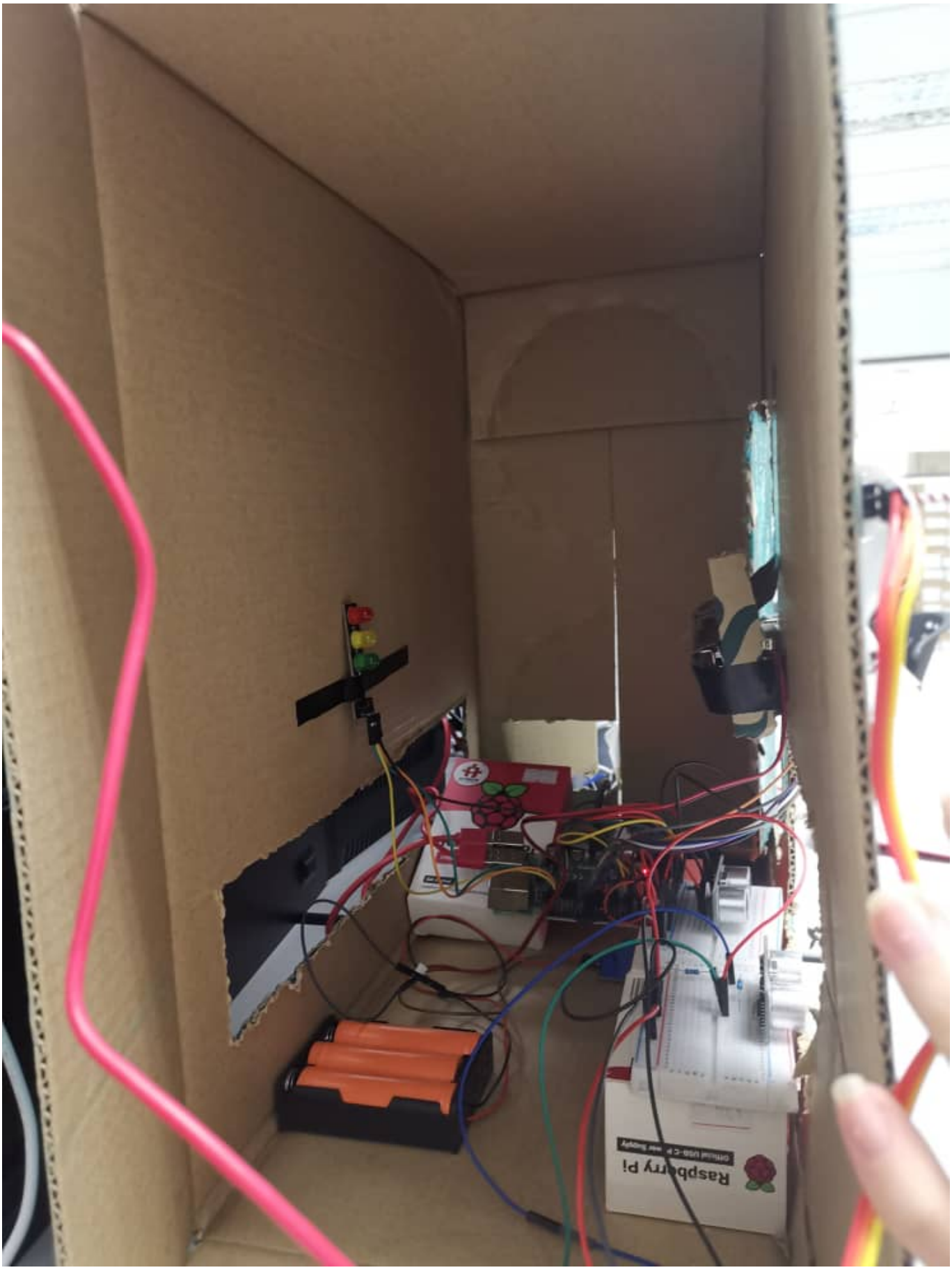
This project aims to design a smart door system that can be used to detect presence and authenticate the personnel that want to enter the protected premise. The system has several key features:

1. IoT Sensor and Network System to Gain Access
2. Machine Learning System for Movement Detection
3. Temperature and Humidity Detection
4. Physical Security Door Lock
5. Security – Encryption and Decryption Algorithm
6. Database management and door access system

Prototype

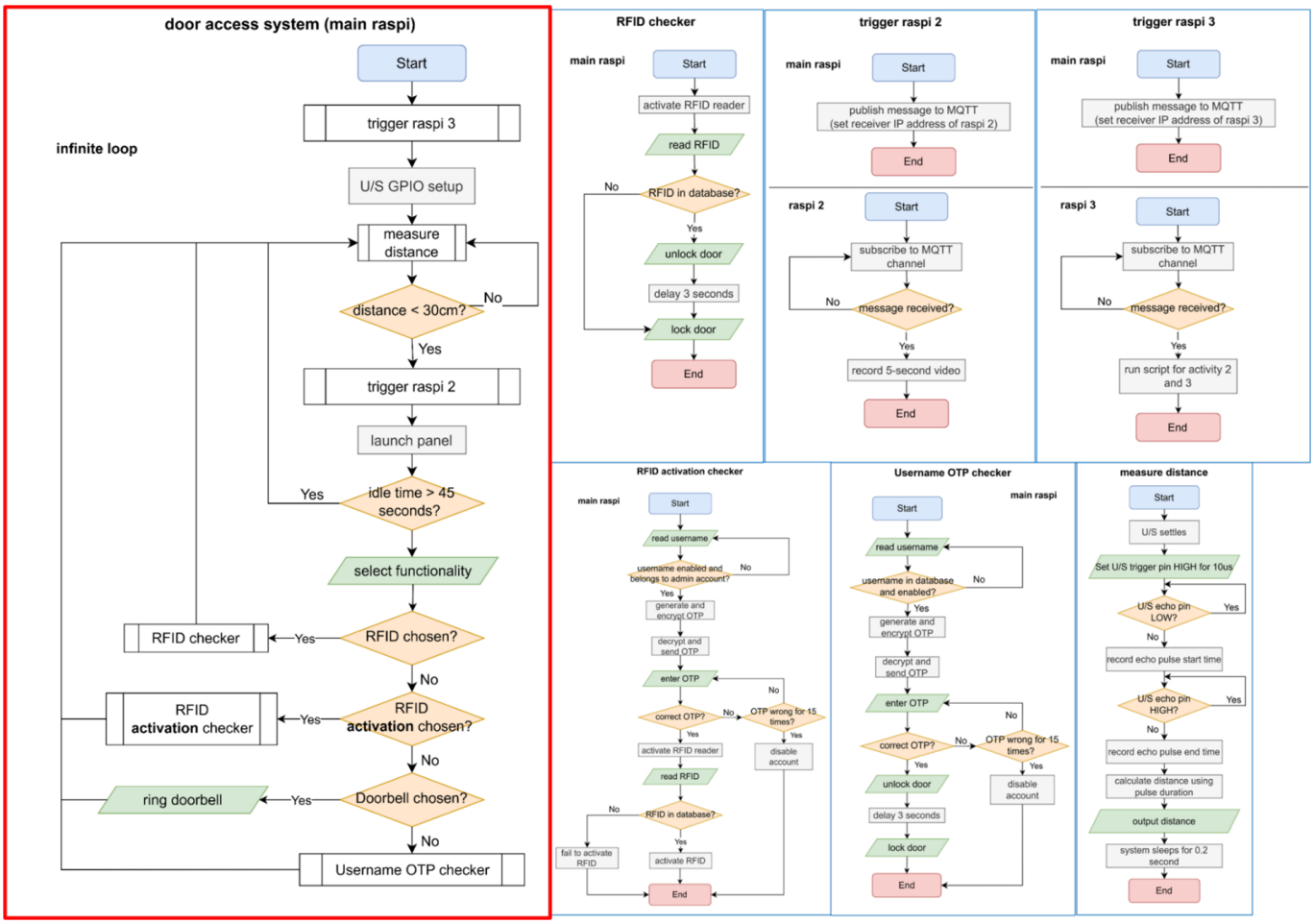
Please don't mind the ugly prototype... We rushed it out for demonstration purpose only (aesthetics and tidiness put aside for a moment 😄).


KELUAR
RITZER
ERAL SEMULAJADI
AL WATER
2 x 9.5 Liter



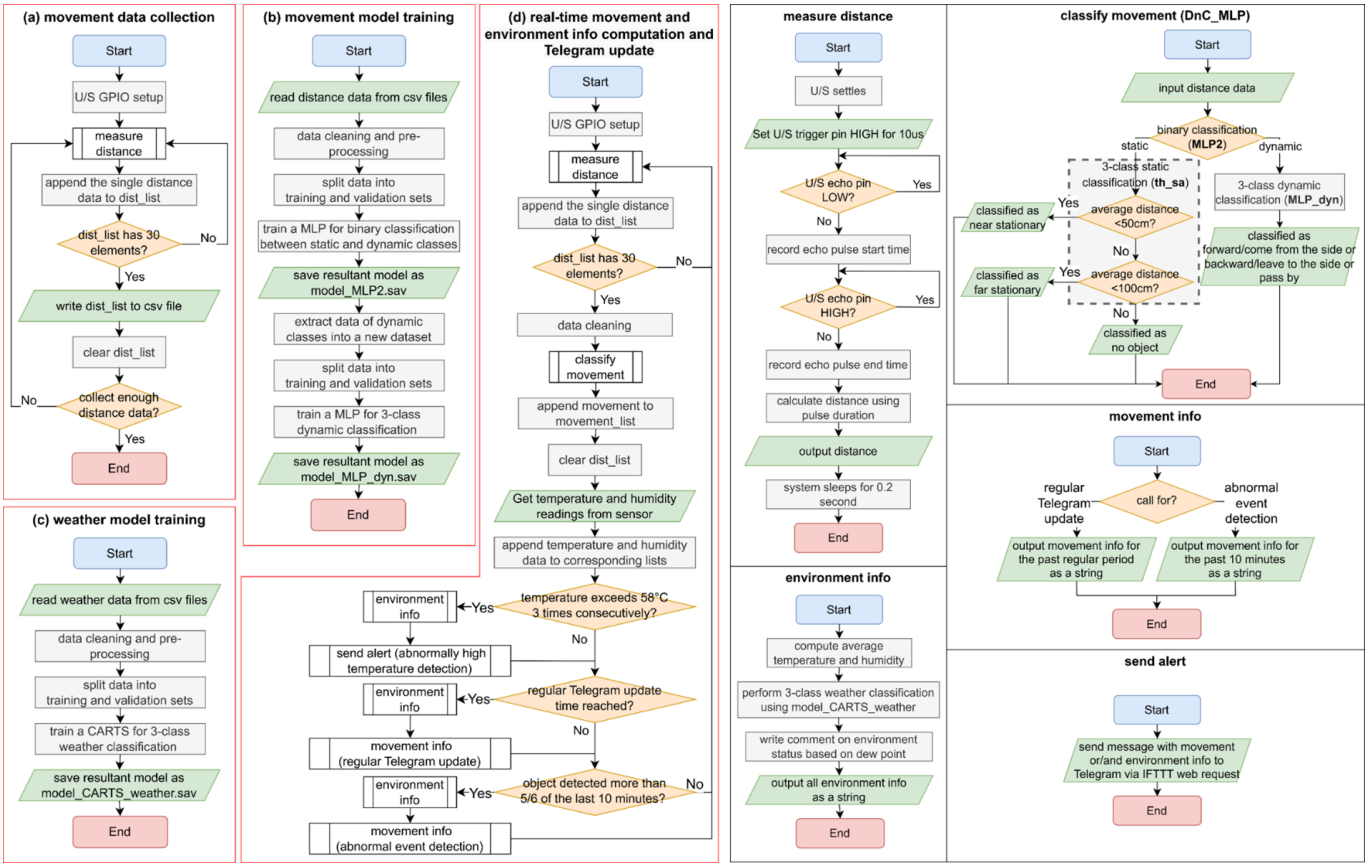
System Design

Features 1 and 4: IoT Sensor, Network, and Door Lock System



Main flowchart (left in red frame) and subprocess flowcharts (right in blue frames) for Activities 1 and 4.

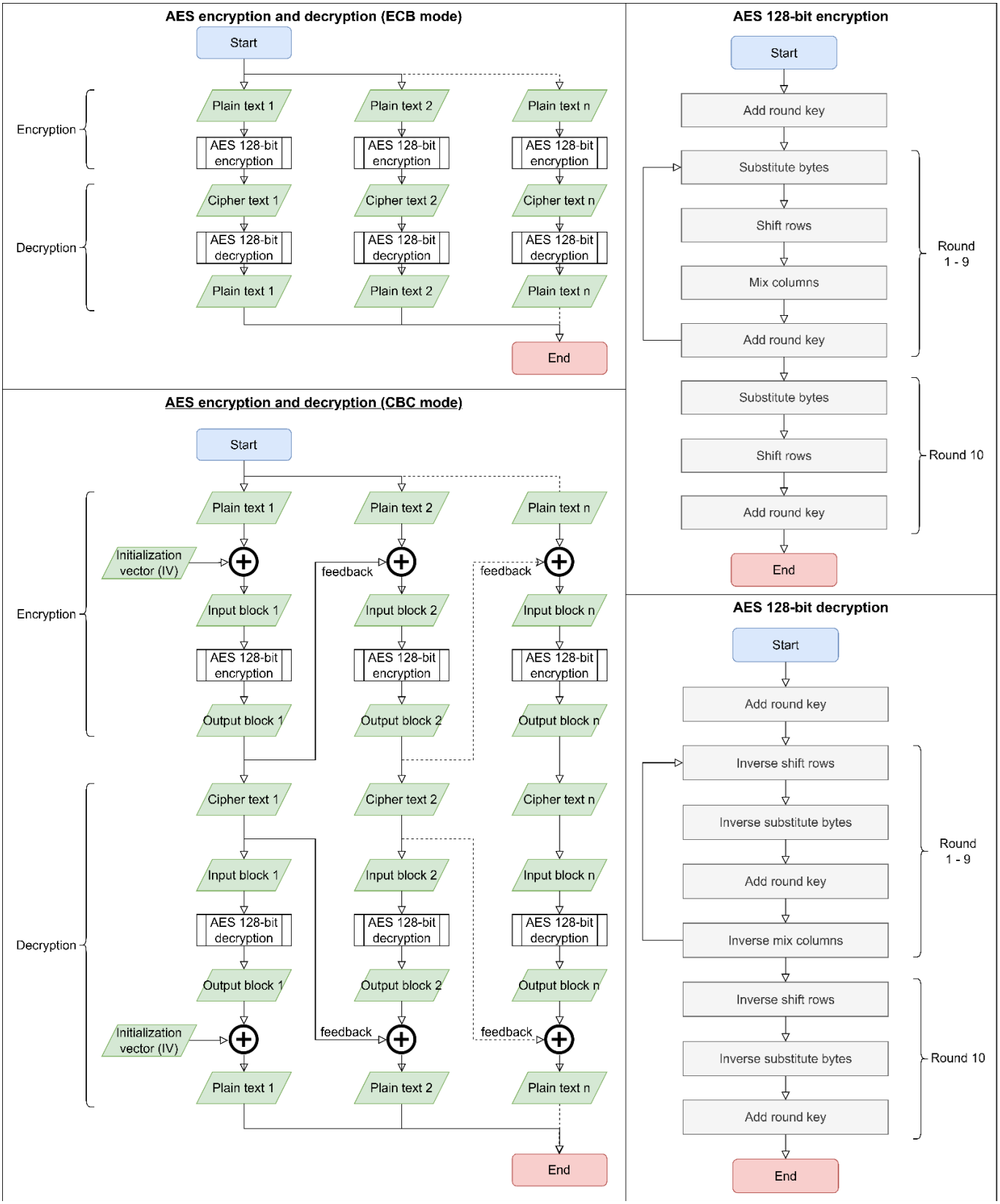
Features 2 and 3: Machine Learning System and Temperature and Humidity



Left in red frames: the 4 main Python files for Activities 2 and 3. Preliminary work: (a), (b), and (c). System

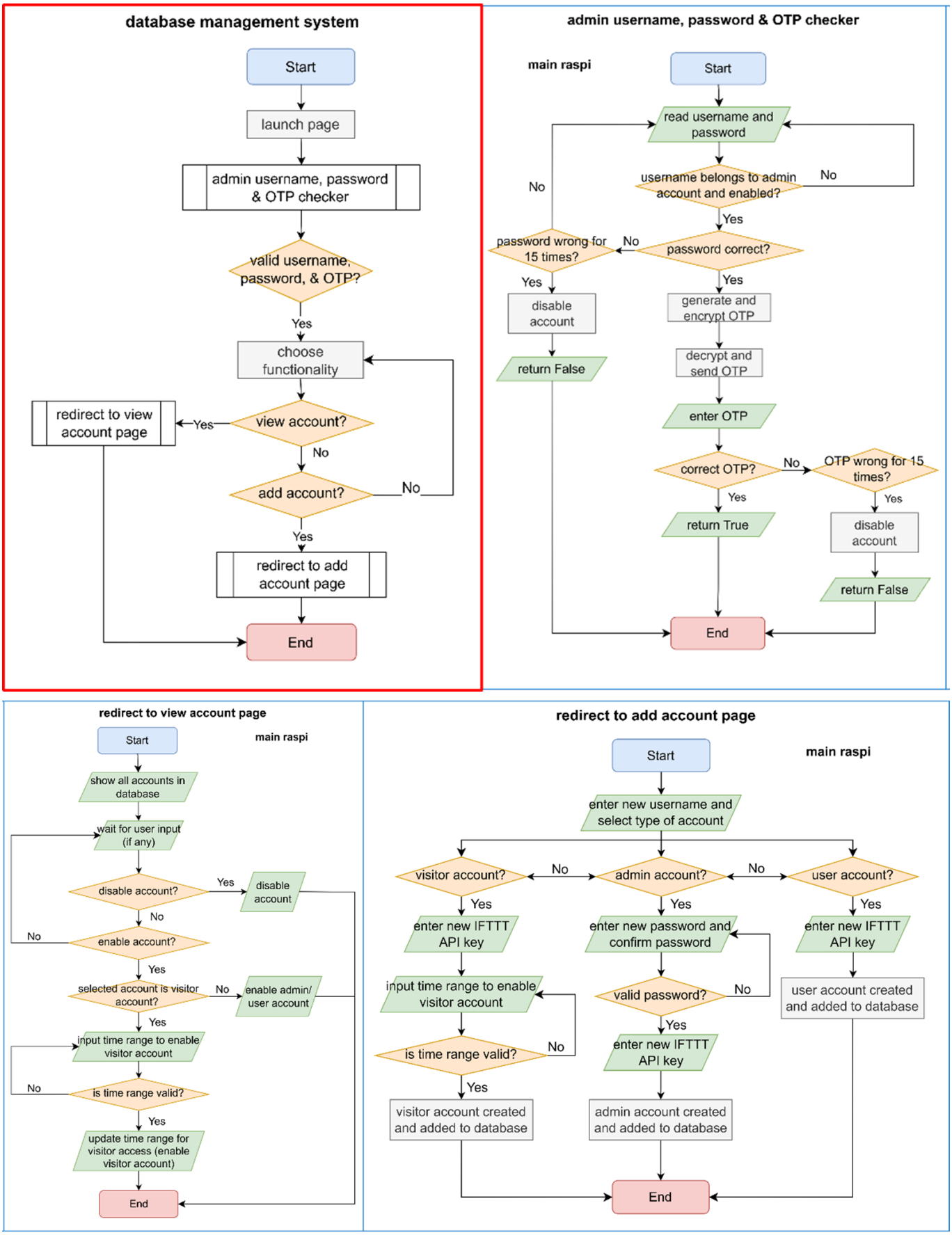
execution file: (d). Right in black frames: Subprocesses or functions associated.

Feature 5: Security – Encryption and Decryption



Main processes (left) and subprocesses (right) for Activity 5.

Feature 6: Database management and door access system



Main flowchart (top left in red frame) and subprocess flowcharts (in blue frame) for Activity 6.