Techolution

Assignment

Problem Statement:

Battery Based Smart Swing Door with an access control of Face Recognition and FingerPrint.

Code Github Link: https://github.com/shriprad/SmartDoor/blob/master/smart_swing_door.py

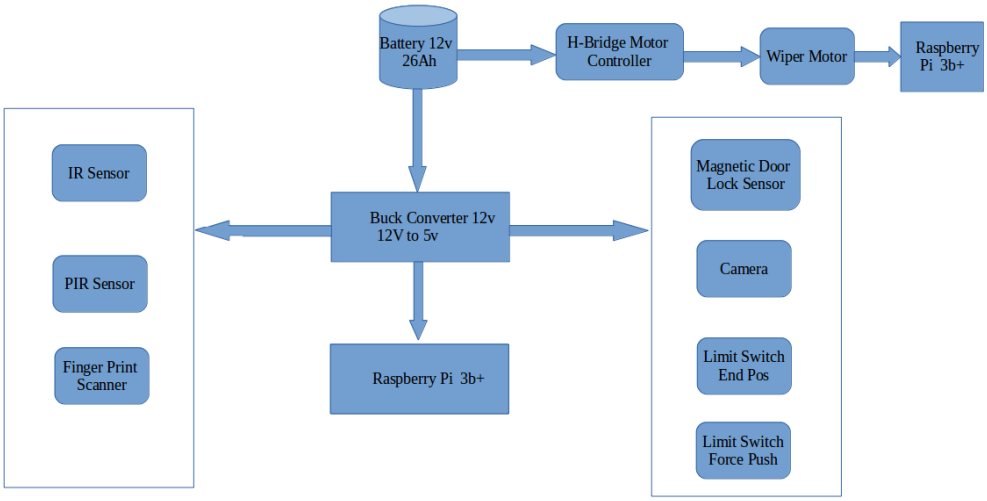
Test Cases:

1) Door should open automatically when a known user is recognized.
2) Door should not close until user passes by it.
3) Door should open if user is near the door while it's closing.
4) Door can be opened using push button if required.
5) Keep track of door's status whether it's in close state or open state.

Sensors ,Circuits and Processor:

1) Raspberry Pi (5V , 2A).
2) Wiper Motor for Swing Door Mechanism.(12v , upto 12A)
3) H-Bridge Circuit for motor.
4) 12 Volt, 25Ah battery.
5) 12v to 5v buck converter.
6) Camera Module for face detection.
7) Optical Finger Print Reader Sensor Module.
8) IR sensor 5v(Used as proximity sensor for face detection).
9) Door lock sensor magnet proximity switch reed sensor (5v).
10) PIR sensor (Used to detect to keep track of humans near the door).
11) Limit Switch (Attached to at the end of the door to track the end posistion of the door).
12) Limit Switch (Attached at the closing of the door. If force push is applied with a small push in the door limit switch gets triggered).

3) Integration Plan



Note: The Raspberry Pi connected to motor and other sensors is same.

Working

1) Camera , Finger Print and IR sensor is placed at the entrance of door.
2) PIR sensor is mounted on top of the door , so it can detect the users passing through the door.
3) Magnetic Sensor is mounted at the door closing where it will detect whether the door is in closed state or not.
4) 2 limit switches used One to detect the force push and one to detect whether the door is open.