RFID Based Smart Cycle Parking System

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Project Details

- TITLE : RFID Based Cycle Parking Stand With Authenticated Locking System
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Problem Statement

Lack of security for cycles parked in the cycle stand in the hostels and public places

Target Audience

- College Students and Students in Cities with Cycle

Tech Stack(Experience/Resources)

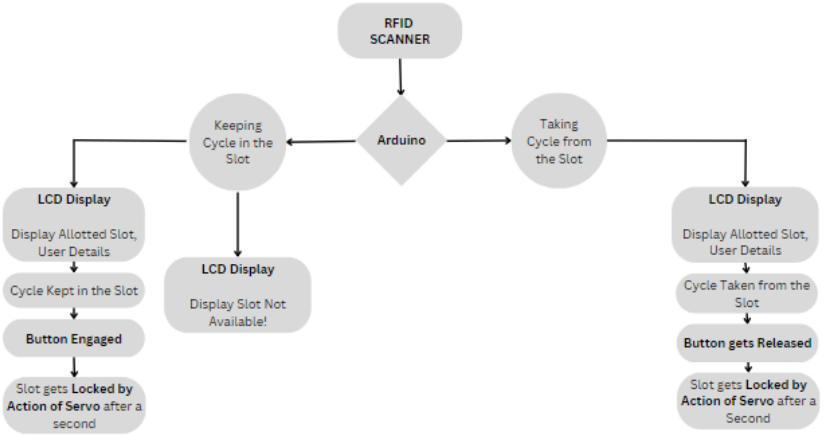
- RFID Reader and RFID Tags
- Bicycle Stand
- Servo & Hook
- Arduino
- NodeMCU ESP32
- I2C 16x2 LCD Display

Solution

Our Solution Include

- A person has to scan his RFID tag in the RFID reader present in the bicycle stand.
- An available slot gets allocated when the person keeps his cycle in the designated slot.
- The allocated slot in the bicycle stand automatically gets locked after a second, triggered by a switch activated by the bicycle wheel.
- To unlock the lock, the person needs to scan his RFID tag in the RFID reader again.
- The lock of the allocated slot gets released, and it automatically closes after a second once the cycle is taken from the stand.
- A dedicated app using MIT App Inventor is created.
- The app is linked to a Firebase database by Google, enabling monitoring of slot statuses via the app.

Work Flow


RFID SCANNER
Arduino
Keeping Cycle in the Slot
Taking Cycle from the Slot
LCD Display
Display Allotted Slot, User Details
Cycle Kept in the Slot
Button Engaged
Slot gets Locked by Action of Servo after a second
LCD Display
Display Slot Not Available!
LCD Display
Display Allotted Slot, User Details
Cycle Taken from the Slot
Button gets Released
Slot gets Locked by Action of Servo after a Second

Future Plan

- Making it efficient by using shift register IC / Multiplexer to increase the number of the input and output pins instead of using 2 microcontroller boards.
- Using mechanical lock instead of the servo and hook mechanism
- Using a Sql database as it involves large amount of data
- Interfacing SD Card with it so that the data gets retained even in case of power cut off
- Making the app more versatile and flexible to be able to update the database remotely through internet
- Making a portable compact version of the project which could be mounted in the cycle itself

Q&A Session


Thank you