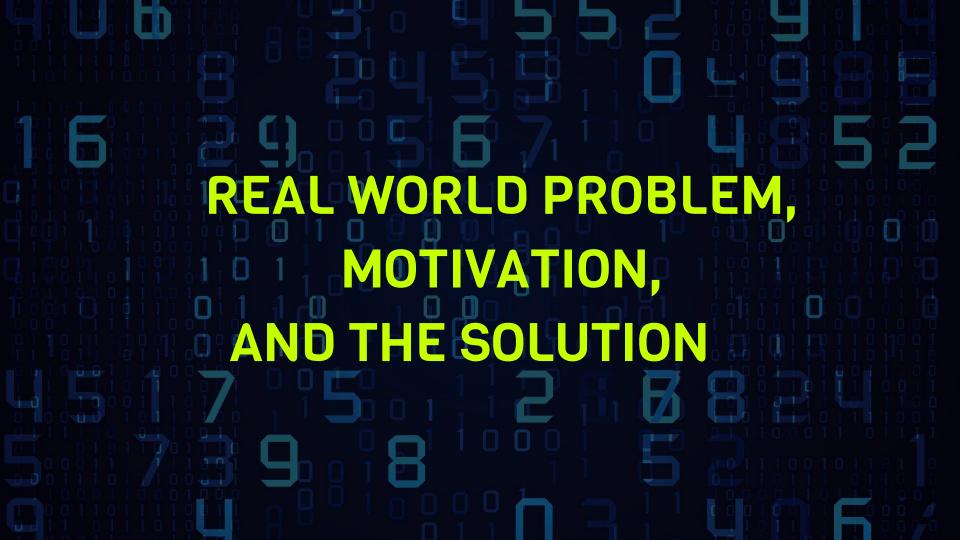# Remote Gatekeeping System

3rd Year Project

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# REAL WORLD PROBLEM, MOTIVATION, AND THE SOLUTION

# What we see today...

## The uprise of COVID-19 pandemic

Retail and Recreation trends have **declined b**y **17%** compared to baseline

Google COVID-19 Community Mobility Report

## Sudden surge of Online Deliveries

**1.5X** YoY growth of online buyers with a **2.5X** growth of Online Orders

E-Commerce Index : Powered by **daraz** January '19 – December '19

## The workforce of Sri Lanka

**19.1%** works in public sector. All of them are work in between **8am to 5pm, 5 days a week**

2020 Annual Report **Central Bank** of Sri Lanka

# Real World Problems and The Opportunity

➔ Safety of the deliveries **can not be guaranteed** and can be lost when the home owners are not home.

➔ When the parents are not home , it makes a **risky environment for children** if an outsider (visitors/delivery person) comes to the house.

➔ The ongoing **pandemic restricts** people to have **physical interactions** (with visitors, relations, etc.)

Our goal is to **introduce a system,** to **communicate remotely** with an outsider who is at our gate or to **undertaking deliveries,** without making **physical interactions.**

# Solution : Remote Gatekeeping System

Smart Mailbox

Remote Gate unlocking system

Control unit with intercom

Mobile controlling interface

Web interface

Solution Architecture and the components of the system

# High-level System Organization
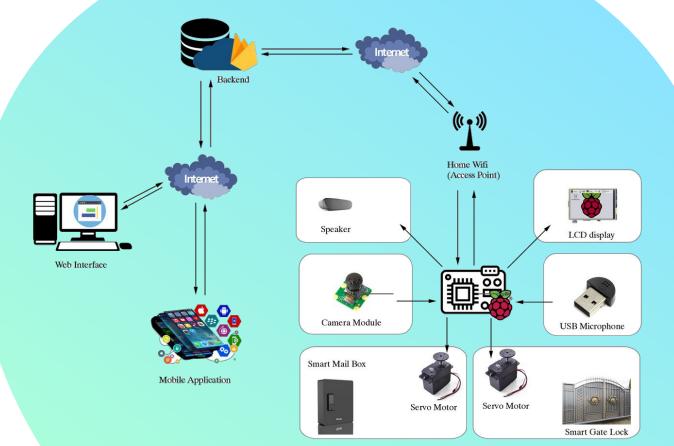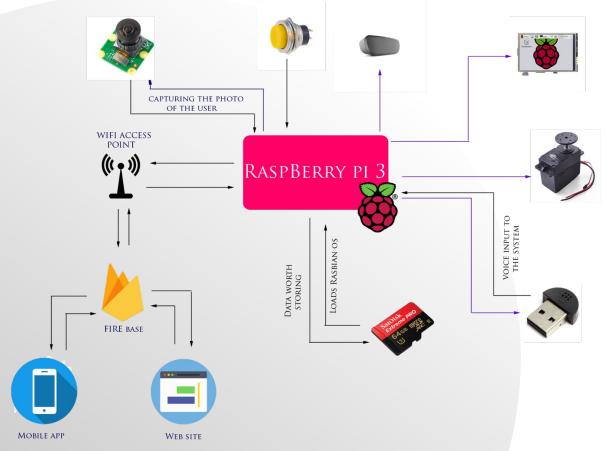
# Data and Control Flow of the Desian



CAPTURING THE PHOTO OF THE USER

WIFI ACCESS POINT

RASPBERRY PI 3

FIRE BASE

MOBILE APP

WEB SITE

DATA WORTH STORING

LOADS RASBIAN OS

VOICE INPUT TO THE SYSTEM

# Users - Who's going to interact with the system

**Inside-User:**
**The owner of the house**

Mainly interact with the Mobile Application.

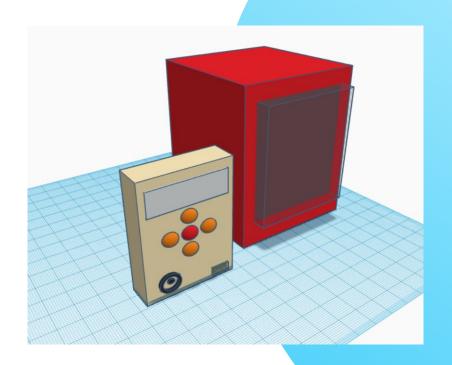**Outside-User:**
**Person who wants to communicate with insiders**

Mainly interacts with the IoT device

# Components of system

## Control Unit

Controlling the smart mailbox and smart gate lock.

Capture the photo of the outsider.

Outsider can enter their contact information and also request for the inside user contact information.

Outsider can intercom with the insider user using voice message.

## Smart Mailbox

Used to safely **receive** and **store** the delivery packages.

Can be locked and unlocked as the request of the delivery person.

## Gate lock/unlocking system

Used to lock and unlock the gate **remotely**.

Can be locked and unlocked as the request of the outsider.

Controlled by the inside user using the mobile application.

Unlocking and Locking is achieved by the turning the servo motor clockwise and anticlockwise.

# Software level and hardware level Technologies of the System

## Mobile Application

**The Insider can response to the various requests of the outsider.**

**Informing through real time notification.**

Intercom

Accessing the Smart Mailbox/

Smart Gate lock

Capture a photo of the

outsider

## Web Application

**Initializing the system.**

Registering the user to the system.

Establishing the connection between

the user account and the IoT device.

Download the mobile application.

# Technologies to be used...

**Raspberry pi 3**      **Python 3**      **Firebase**      **ReactJS**      **React Native**

**IoT Platform**      **Programming Language**      **Backend Services**      **Web App Development**      **Mobile App Development**

# Why we chose them?

**We considered about the following aspects . . .**

- Features and performance
- Cost
- Documentation
- Community Support
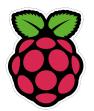- Cross-platform Support
- ...

# Technologies, explained...

## Raspberry Pi 3 Model B

1.2GHz 64-bit CPU –
1GB RAM –
40-pin extended GPIO –
Inbuilt network module –

## React

Both mobile and web app –
development   .
Free and open source –
Multi platform support –

## Python 3

– Vast community support
– Web frameworks (Django, Flask)
– Fast programing and wide array
   of libraries

## Firebase

– Authentication, Web
hosting
– NoSQL database
– Free tier
– Good for Real-time Apps

# Security and Privacy Concerns

## Privacy of the user data
## (audio files, images, personal information, etc.)

➔  User authentication (User identification)

➔  Cannot be accessed by the admins
while transmitting or at the storage

➔  The outsiders can take the informations
only at Inside-End user's will

## Data should not be accessible to the attackers

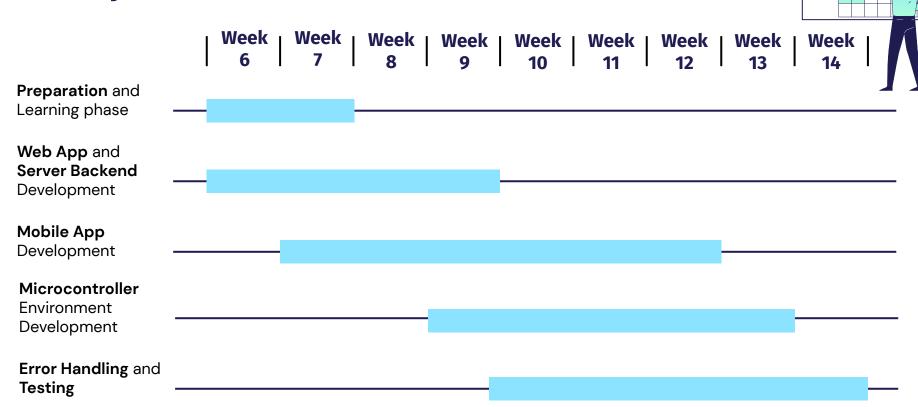➔  All the technologies we use are highly
secure and well maintained

# Demonstration Plan

**A full demonstration virtually or in real time, including;**

➔ Completed User Interfaces

➔ User Registration

➔ A complete interaction between the two end users

➔ Completed hardware module (by the end of Short Semester)

# Project Timeline

| | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | Week 11 | Week 12 | Week 13 | Week 14 |
|---|---|---|---|---|---|---|---|---|---|

**Preparation** and Learning phase

**Web App** and **Server Backend** Development

**Mobile App** Development

**Microcontroller** Environment Development

**Error Handling** and **Testing**

# Proposed Budget

| Description | Price – LKR |
|---|---:|
| Raspberry Pi 3 (Model B) | 8000 |
| Raspberry Pi Camera Module | 3800 |
| Raspberry Pi LCD | 2500 |
| Speaker Module | 2000 |
| USB Microphone Module | 1000 |
| Micro SD card | 850 |
| Servo Motor × 2 | 1000 |
| Power Adapter | 800 |
| Other Expenses (Push Buttons, Cables, etc.) | 1000 |
| **Total** | **20950** |

# Thank You!

Questions ?

# Q&A