

# Project

# Ahon

An agile tracking system using mobile embedded system for COVID-19 tracking

by

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**Project Ahon: An Agile Tracking System using  
Mobile Embedded Systems for COVID-19 Tracing**

User Manual

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## West Visayas State University PROJECT AHON CONTRACT TRACING SYSTEM USER MANUAL

### **Disclaimer**

This software project and its corresponding documentation entitled “Project Ahon: An Agile Tracking System using Mobile Embedded Systems for COVID-19 Tracing” is submitted to the College of Information and Communications Technology, West Visayas State University, in partial fulfillment of the requirements for the degree, Bachelor of Science in Computer Science. It is the product of our own work, except where indicated text.

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### **Getting Started**

#### **Introduction**

The COVID-19 virus was first started in China in late 2019 and started to spread around the world by the start of 2020, causing casualties worldwide and health systems to crash. Movement was then restricted in many countries, putting pressure on the populations' education, health, and economy.

To combat the risk of infections through COVID-19, researchers have experimented with the idea of a digital outbreak detection system as a method for identification and determination of possible contacts. Since manual contact tracing systems are very time consuming and require human intervention, which is avoided during pandemic outbreaks and also accompanied by human inefficiencies such as poor human recollection, results in a contact tracing system that will be incomplete and inefficient.

This User Manual contains all essential information for the user to make full use of the contract tracing system. Graphics and pictures are also provided for the step-by-step instructions.



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### System Requirements

#### Windows

##### Minimum system requirements

OS: Windows 10 64-bit: Home or Pro (build 19041 or later), Enterprise or Education (build 18363 or later). Windows 11 64-bit: Home, Pro, Enterprise, or Education version 21H2 or newer.

Processor: 64-bit processor with Second Level Address Translation (SLAT)

Memory: 4 GB RAM

BIOS-level hardware virtualization support must be enabled in the pc.

#### macOS

Minimum requirements: MacOs (Monterey, Big Sur, Catalina)

Memory: 4 GB RAM

Mac hardware must be a 2010 or a newer model, with Intel's hardware support for memory management unit (MMU) virtualization, including Extended Page Tables (EPT) and Unrestricted Mode

Important note: VirtualBox prior to version 4.3.30 must not be installed as it is not compatible with Docker Desktop.

#### Recommended specs:

Processor: Intel Core i5 quad-core or equivalent

Memory: 8GB RAM

Storage: 100 GB of storage (working with Docker will take up very much hard drive space)



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## Installation

Before using the device, check if you have the following:

List of softwares needed for deployment or testing:

- VSCODE or any IDE suitable or alternative
- DOCKER DESKTOP - For the purpose of testing servers incase of production testing
- DBeaver or any alternative for local database client

### ***Installing Node Js-for-backend:***

1: Download Node.js Installer

In a web browser, navigate to <https://nodejs.org/en/download/>. Click on the Windows Installer button to download the latest default version. At the time this article was written, version 10.16.0-x64 was the latest version. The Node.js installer includes the NPM package manager.

2: Install Node.js and NPM from Browser

1. Once the installer finishes downloading, launch it. Open the downloads link in your browser and click the file. Or, browse to the location of the saved file and double-click to launch.
2. The system will ask if you want to run the software – click Run.
3. You will be welcomed to the Node.js Setup Wizard – click Next.
4. On the next screen, review the license agreement. Click Next if you agree to the terms and install the software.



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5. The installer will prompt you for the installation location. Leave the default location, unless you have a specific need to install it somewhere else – then click Next.

6. The wizard will let you select components to include or remove from the installation. Again, unless you have a specific need, accept the defaults by clicking Next.

7. Finally, click the Install button to run the installer. When it finishes, click Finish.

#### 3: Verify Installation

Open a command prompt (or PowerShell), and enter the following:

```
node -v
```

The system should display the Node.js version installed on your system. You can do the same for NPM:

#### ***Installing Express Api:***

Assuming you've already installed Node.js, create a directory to hold your application, and make that your working directory using the commands:

```
$ mkdir myapp  
$ cd myapp
```

Use the npm init command to create a package.json file for your application. For more information on how package.json works, see Specifics of npm's package.json handling.

```
$ npm init
```

This command prompts you for a number of things, such as the name and version of your application. For now, you can simply hit RETURN to accept the defaults for most of them, with the following exception:

entry point: (index.js)





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Enter app.js, or whatever you want the name of the main file to be. If you want it to be index.js, hit RETURN to accept the suggested default file name.

Now install Express in the myapp directory and save it in the dependencies list. For example:

```
$ npm install express
```

To install Express temporarily and not add it to the dependencies list:

```
$ npm install express --no-save
```

Please refer to this link on more info about installing the express api

<https://expressjs.com/en/starter/installing.html>

### **Install Sequelize (ORM) :**

// Using NPM

```
$ npm install --save sequelize
```

Refer to this link about more info to the installation:

<https://sequelize.org/v4/manual/installation/getting-started>

### ***Install Nodemon:***

(nodemon is a tool for node.js based applications that automatically restart the node application when file changes in the directory are detected.)

1. Enter your command line or terminal
2. Go to folder where the npm or project is located - Cd thesis / Cd app
3. Enter npm install -g nodemon to install

Please refer to this link about more details on installing:

<https://nodemon.io/>



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### ***Installing or Using React-for-Frontend:***

#### **Prerequisites**

Install the latest version of Windows 10 (Version 1903+, Build 18362+) or Windows 11  
Install Windows Subsystem for Linux (WSL), including a Linux distribution (like Ubuntu) and make sure it is running in WSL 2 mode. You can check this by opening PowerShell and entering: `wsl -l -v`  
Install Node.js on WSL 2: These instructions use Node Version Manager (nvm) for installation, you will need a recent version of NodeJS to run create-react-app, as well as a recent version of Node Package Manager (npm).

“Run or enter on the terminal”

1. Open or go to the folder where the project is installed - `Cd IoTrace Webapp`
2. Update and install necessary dependencies - `Npm install`
3. Run the app using - `Npm start`

//Create your React app (optional) ( If you don't have any react file project)

To install the full React toolchain on WSL, we recommend using create-react-app:

Open a terminal(Windows Command Prompt or PowerShell).

Create a new project folder: `mkdir ReactProjects` and enter that directory: `cd ReactProjects`.

Install React using create-react-app, a tool that installs all of the dependencies to build and run a full React.js application:

When you're ready to deploy your web app for production, running `npm run build` will create a build of your app in the "build" folder. You can learn more in the Create React App User Guide.

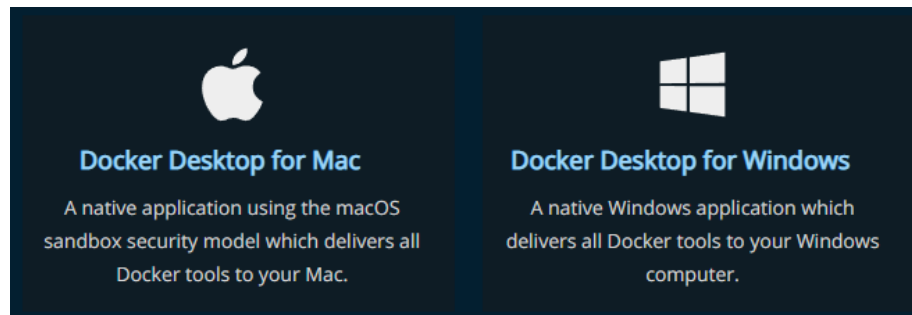


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### ***Installing Docker:***

Download and install Docker from <https://docs.docker.com/get-docker/>

Use the .exe if on Windows, and the .dmg file if on Mac or depending on what OS you're using



### **MYSQL server On Docker:**

" docker run -d --name=mysql5.6 -p 3306:3306 -e MYSQL\_ROOT\_PASSWORD=my-secret-pw --mount type=bind,src="C:\Users\Documents\db\mysql\mysql\_data",dst=/var/lib/mysql mysql:5.6 " = short code for installing the mysql image on docker

1.Run the MySQL image using the docker run command.

```
$docker run -p 3306:3306 -d --name mysql -e  
MYSQL_ROOT_PASSWORD=password mysql/mysql-server
```

This will install the latest version of the MySQL image in Docker Hub. As of this writing, it was 5.7.

If the image was not already available, this command will download the image and run it.



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2. Log into MySQL within the docker container using the docker exec command:

```
$docker exec -it mysql bash
```

```
bash-4.2# mysql -uroot -ppassword
```

```
mysql>
```

Remember, when we created and ran the MySQL container, we provided MYSQL\_ROOT\_PASSWORD=password.

Create a database and user, and grant privileges in MySQL (from within the container).

Log into MySQL if you haven't already. After login, the mysql> prompt shows up:

```
bash-4.2# mysql -uarun -ppassword
```

For further info about the installation please refer to this link:

<https://dzone.com/articles/docker-for-mac-mysql-setup>

*Connect existing db from Thesis folder which is the file name is db folder*

Refer to this link on how to connect using dbeaver client :

<https://www.techrepublic.com/article/how-to-connect-to-a-remote-mysql-database-with-dbeaver/>

RABBIT MQ server on Docker:

```
$ docker run -d --hostname my-rabbit --name some-rabbit rabbitmq:3
```

Assuming the Docker Desktop has been installed, we use the command docker pull rabbitmq:3-management to pull a RabbitMQ Docker image from DockerHub. After the Docker image is downloaded and saved locally, we can start a RabbitMQ container using the following command.



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```
docker run --rm -it --hostname my-rabbit -p 15672:15672 -p 5672:5672  
rabbitmq:3-management
```

In the command above, the port 5672 is used for the RabbitMQ client connections, and the port 15672 is for the RabbitMQ management website. This command may take a minute to execute. After that, we can open a browser window and use the URL <http://localhost:15672> to visit the RabbitMQ management website. The following screenshot shows the website login page.

Please refer to this link on how to install depending on the system you're using  
<https://codeburst.io/get-started-with-rabbitmq-on-docker-4428d7f6e46b>

*Check System Dependencies required before testing or running the whole process of the system:*

#### **Frontend:**

dependencies for frontend"

```
"@emotion/react": "^11.1.5",  
"@emotion/styled": "^11.1.5",  
"@hookform/resolvers": "^2.8.3",  
"@material-ui/core": "^5.0.0-alpha.28",  
"@material-ui/icons": "^5.0.0-alpha.28",  
"@material-ui/styles": "^4.10.0",  
"@mui/icons-material": "^5.1.1",  
"@mui/x-data-grid": "^5.0.1",  
"chart.js": "^2.9.4",  
"clsx": "^1.1.1",  
"formik": "^2.1.5",  
"history": "^5.0.0",  
"install": "^0.13.0",  
"lodash": "^4.17.19",  
"moment": "^2.29.1",  
"moment-timezone": "^0.5.34",
```



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```
"npm": "^7.7.4",  
"nprogress": "^0.2.0",  
"prettier": "^2.4.1",  
"prop-types": "^15.7.2",  
"react": "^17.0.2",  
"react-chartjs-2": "^2.10.0",  
"react-dom": "^17.0.2",  
"react-feather": "^2.0.8",  
"react-helmet": "^6.1.0",  
"react-hook-form": "^7.20.2",  
"react-moment": "^1.1.1",  
"react-perfect-scrollbar": "^1.5.8",  
"react-router": "^6.0.0-beta.0",  
"react-router-dom": "^6.0.0-beta.0",  
"react-scripts": "^4.0.0",  
"recoil": "^0.5.2",  
"uuid": "^8.3.0",  
"yup": "^0.29.3"
```

### **Backend:**

```
"amqplib": "^0.8.0",  
"axios": "^0.21.4",  
"bcryptjs": "^2.4.3",  
"cors": "^2.8.5",  
"express": "^4.17.1",  
"express-jwt": "^6.1.0",  
"jsonwebtoken": "^8.5.1",  
"mysql2": "^2.2.5",  
"nodemon": "^2.0.15",  
"require": "^2.4.20",  
"sequelize": "^6.3.4"
```



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Machine learning dependencies:

- pandas
- numpy
- sklearn

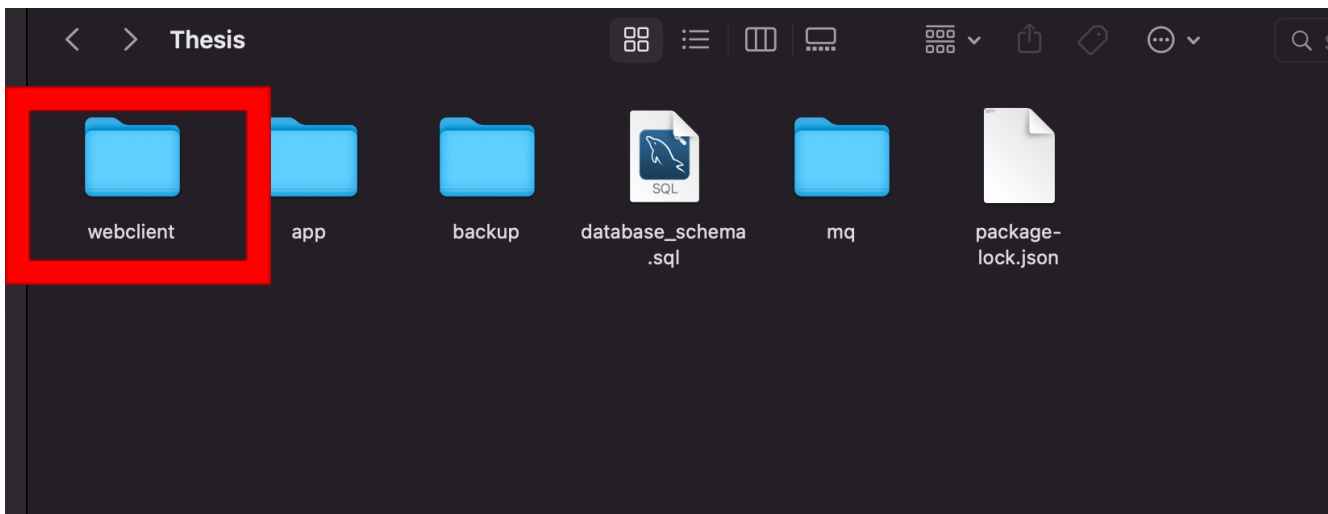
Raspberry pi dependencies:

```
"amqplib": "^0.8.0",  
"axios": "^0.24.0"
```

*After all the dependencies installed lets try a quick test on the whole system:*

### **RaspberryPi-Terminal machine for Rfid scanning:**

Step 1: Open and Copy the *webclient* folder located in the *thesis* folder to the raspberry pi desktop or folder



Step 2: Open an Ide then Open the *webclient* folder



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Step 3: Run the *scan.py* file to open the GUI and test the rfid scanner and temp scanner







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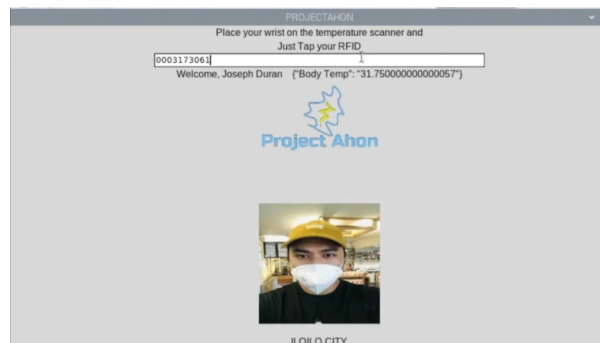
### Setup and Usage

#### ***Setting up terminal machine (raspberry pi) for rfid scanning***

1. Place the device to the designated place (entrance/exit gates)



2. Plug the power cord or use a fully charged power bank (20000mah)
3. Switch on the device
4. Connect the device to the internet either wifi or lan router
5. Click on any ide in the raspberry pi and run the file scan.py and will open the GUI for the rfid scanner :





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### ***Registering users for RFID scanning:***

1. Enter the required credentials for registration

A screenshot of a web-based registration form titled 'Create new account' with the subtitle 'Use your email to create new account'. The form contains several input fields: 'First name', 'Occupation' (a dropdown menu), 'Last name', 'Email Address', 'Age', 'Gender', 'Contact Number', another 'Occupation' field, and 'Password'. At the bottom, there is a checkbox labeled 'I have read the Terms and Conditions' and a blue button labeled 'SIGN UP NOW'.

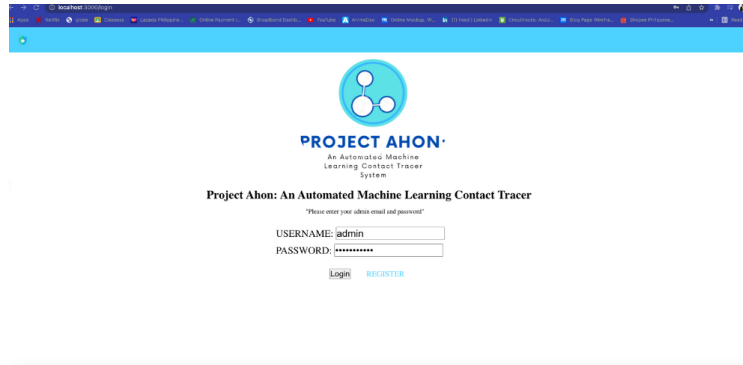
2. After being registered an email will sent about where,when and what time of the picking up or being sent about the rfid card



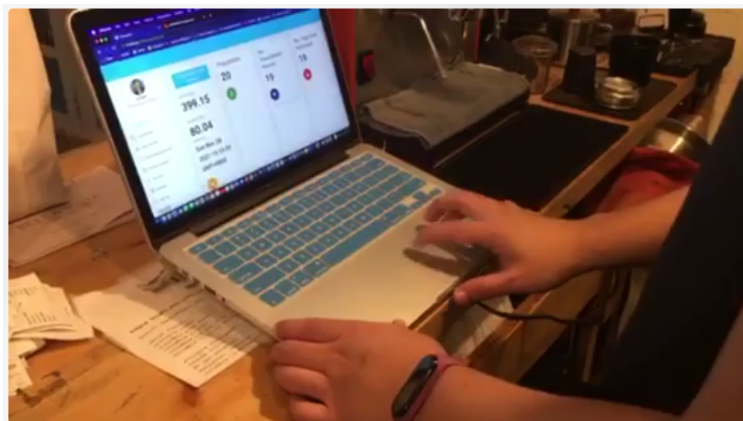
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### ***Setting up / using the web admin system***

1. Login user admin credentials (The IT admin will provide this after installation)



2. Dashboard is shown





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### ***Web Admin App and features:***

Step 1: Open localhost:3000/login.

Step 2: Input your credentials.

PROJECT AHON  
An Automated Machine Learning Contact Tracer System

Project Ahon: An Automated Machine Learning Contact Tracer

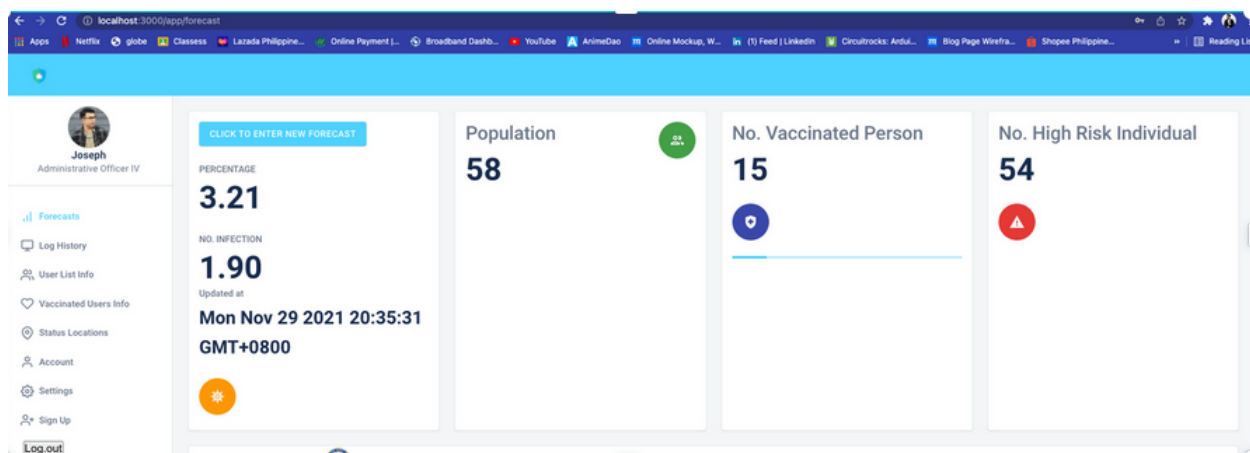
Please enter your admin email and password

USERNAME: admin

PASSWORD: \*\*\*\*\*

Login REGISTER

Step 3: You are now in the main interface of the application





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Step 4: Press the “Click to Enter new Forecast button” to process a new forecast.

The screenshot displays the user interface of the Project Ahon Contract Tracing System. On the left, a sidebar menu lists various functions: Forecasts, Log History, User List Info, Vaccinated Users Info, Status Locations, Account, Settings, and Sign Up. The main content area shows a dashboard for 'Joseph', an Administrative Officer IV. It features a prominent blue button labeled 'CLICK TO ENTER NEW FORECAST'. Below this, the 'PERCENTAGE' is displayed as '3.21' and the 'NO. INFECTION' as '1.90'. The last update timestamp is 'Mon Nov 29 2021 20:35:31 GMT+0800'. A gear icon is visible at the bottom of the main content area.



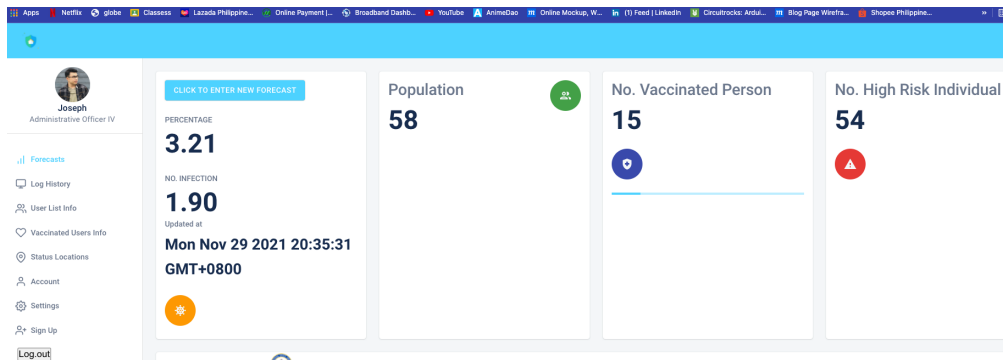
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### ***Checking the predicted Infection Rate***

1. Login into the admin dashboard

The screenshot shows the login interface for the Project Ahon system. At the top is a blue circular logo with a network diagram. Below it, the text reads "PROJECT AHON" and "An Automated Machine Learning Contact Tracer System". The main heading is "Project Ahon: An Automated Machine Learning Contact Tracer". A note says "Please enter your admin email and password". There are two input fields: "USERNAME: admin" and "PASSWORD: \*\*\*\*\*". At the bottom are "Login" and "REGISTER" buttons.

2. Check the prediction rate from the main dashboard





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### **Troubleshooting**

*Tapping into the device occasionally doesn't show up in the UI.*

- Check if the RFID scanner or card is clear and not covered with anything,

*Scanner not responding*

- Try turning it off and on again, if the problem persists, check if the USB cable is in working condition.



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### **FAQ (Frequently Asked Questions)**

What is the main use of the system?

- It is used as a contract tracing system, and a prediction model.

What is a contract tracing system?

- It is used to trace people around a set area.

Where can we use this system?

- It can be used anywhere where a stable internet connection and power is available.

How effective is the prediction model?

- The algorithm has a mean absolute error of  $\pm 0.9$ , meaning that it will usually be 0.9 units apart from the actual data.

How long does it take to deploy the system?

- The initial deployment of the system takes 3 minutes including software and hardware setup.

How do you register into the system?

- Registration is done using an RFID card and registering the details using the dashboard in the software provided.

How much does the full system cost?

- Around \$200 exclusive database hosting.





## West Visayas State University PROJECT AHON CONTRACT TRACING SYSTEM USER MANUAL

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# Project Ahon

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