



# USER MANUAL

Smart Pharmaceutical Warehouse System

May 2021

## PREPARED BY

Praveen Dhananjaya (E/16/081)

Shamra Marzook (E/16/232)

Rashmika De Silva (E/16/068)

Department of Computer Engineering  
University of Peradeniya



# CONTENT

<b>❑ Introduction</b>	<b>3</b>
<b>❑ Features</b>	<b>4</b>
<b>❑ Quick Start up</b>	<b>5</b>
<b>❑ Device Installation</b>	<b>6</b>
❑ AGV	6
❑ Robot Arm	8
❑ Local Communication	10
❑ AGV and ROBOT arm wifi setting	10
❑ Local Mqtt broker	10
❑ Communication test	11
<b>❑ Operator Control Application</b>	<b>12</b>
❑ Overview	12
❑ Database	12
❑ Controller Interface	13
<b>❑ Web Interface</b>	<b>16</b>
❑ Overview	16
❑ Admin	16
❑ Customer	18



# INTRODUCTION

Smart Pharmaceutical Warehousing is a fully automated pharmaceutical warehouse management system designed for medium to large scale pharmaceutical distributors. Carefully designed to overcome the downsides of conventional pharmaceutical warehousing methods, this system helps clients improve efficiency and profitability with minimal involvement of labor.

The system consists of three main components; an E-commerce website with inventory management system to place orders online and track inventory levels and orders, sales and deliveries, Automated Guided Vehicles (AGVs) and Automated Robotic Arms, engineered with cutting edge industrial automation techniques to handle the movements of goods inside the warehouse premises and an operating software monitors and controls the operation of these automated robots 24x7 and notifies warehouse management authorities about the progress of all operations.



# FEATURES

- Compact guided vehicle (AGV) and Robotic Arm designs
- Robust guidance system with optimized automated algorithms
- User-friendly controller software that monitors and controls all operations of the system
- Fully fledged E-commerce website
- An inventory management system to keep track of inventory levels and sales
- Emergency stopping mechanism for robots



# QUICK START UP

This section explains the quick start up guide to setup and test the main functionalities of the system.

## ● Controller Software

1. Install **Python3** and **pip3** in your system.
2. Clone the following repository:  
<https://github.com/cepdnaclk/e16-3yp-smart-pharmaceutical-warehousing>
3. Change the directory to /Operator\_Interface/Operator\_GUI/gui  
**cd /Operator\_Interface/Operator\_GUI/gui**
4. Open a terminal in the above directory and run the following command to install project dependencies.  
**pip3 install -r req.txt**
5. Run main.py.  
**Python3 main.py**

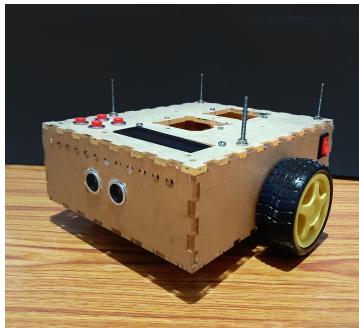
## ● Setting up robots

1. Power on AGVs and connect Robotic Arms to the power supply.
2. They will get connected to the local server automatically.
3. Place the AGVs properly on the marked paths in the warehouse arena.



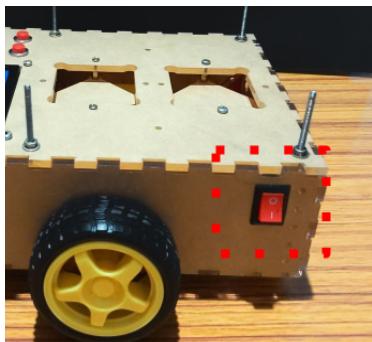
# DEVICE INSTALLATION

## AGV



Warring | don't open and don't touch internal electronics

This is an automated guided vehicle. Its tyres must touch the ground. And check whether there are no cracks or defects.



Power on button is placed In left side panel read end. Put the power switch to 1 poison to turn on. Then LCD display will turn and show "Hello AGV , ID:X" ,

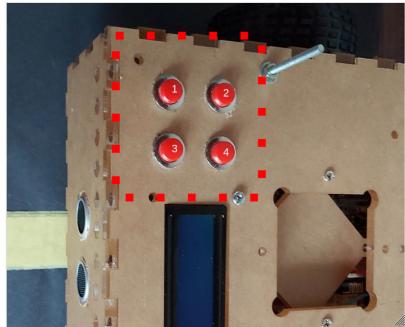
ID:X is the AGV is the identification number.



if there's any smoke turn off immediately and contact our assistance

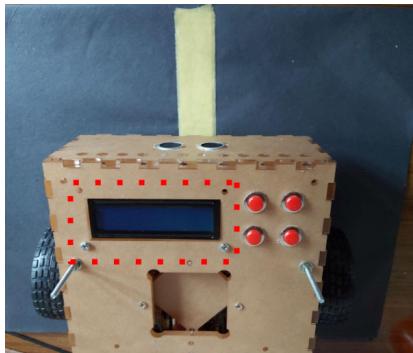


Please place AGV in the warehouse lines. Then , the AGV will automatically calibrate to the warehouse line system. During this process AGV will move back and forward and rotate clockwise and anticlockwise a few times. forward and rotate clockwise and anticlockwise a few times.



These are controller buttons.

1. OK / Select button
2. Back or Restart
  - a. Single click for back
  - b. Hold press will restart the system
3. Menu down
4. Menu up



This is the user LCD display. All AGV current status and error code will show. In addition to that sensor details and calibration report can be reviewed.



For charging purposes, the user should align the charging cable notch to charging port notch. The charger is an Industrial 5 pin connector . Charging port is located in the rear side of the AGV.

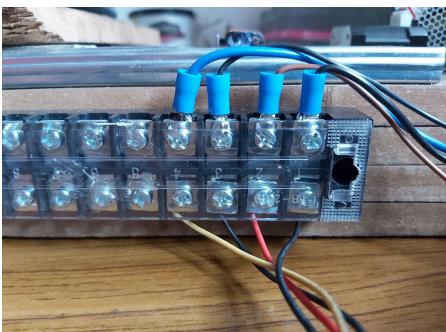
# Robot Arm



This is a pick and place robot arm. It must be firmly attached to the ground. Otherwise there will be noise and vibrations. And check whether there are no cracks or defects.



Warring | don't open and don't touch internal electronics



Power delivery system of the Robot arm. You should wire colour match as follows.

1. Black to Black - Ground wire
2. Brown to Red - 5v line
3. Yellow to Blue - 12V line

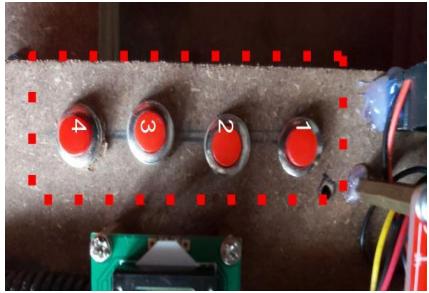
And power on the System, The Robotic arm starts to calibrate its sensors and actuators . It will take several seconds .



During place stay away from Robot ARM

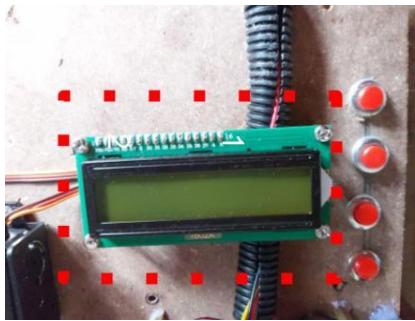


if there's any smoke turn off immediately and contact our assistance



These are controller buttons.

1. OK / Select button
2. Back or Restart
  - a. Single click for back
  - b. Hold press will restart the system
3. Menu down
4. Menu up



This is the user LCD display. All AGV current status and error code will show. In addition to that sensor details and calibration report can be reviewed.

# Local Communication

## AGV and ROBOT wifi setting

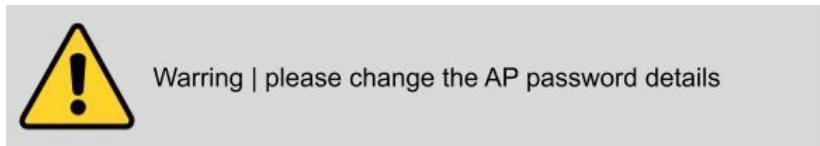
The screenshot shows the configuration interface for an ESP WiFi NAT Router. It includes sections for STA Settings (SSID: ssid, Password: password, Automesh: checkbox), AP Settings (SSID: MyAP, Password: none, Security: Open, Subnet: 192.168.4.1, Set button), Lock Config (Lock Device: checkbox, Lock button), and Device Management (Reset Device: Restart button). The URL in the address bar is 192.168.4.1/.

In the first boot , All AGV and ROBOT ARM IN AP mode operator can login to robot using

SSID : AGVX or ARMX

Password : Admin

Then the operator should add warehousing local wifi SSID and Password. In STA settings. Reboot the system using device management restart button.



## Local Mqtt broker

Ubuntu base instruction . The 1st operator should install the mqtt mosquitto.

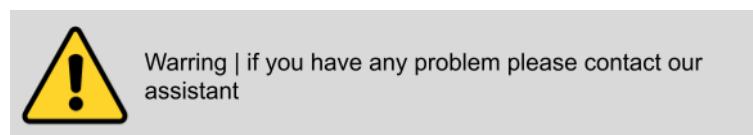
```
sudo apt-get update  
sudo apt-get install mosquitto
```

Install MQTT clients

```
sudo apt-get install mosquitto-clients
```

The screenshot shows the SLT-Fiber network configuration interface. It includes sections for IPv4 Method (Automatic (DHCP), Manual, Link-Local Only, Disable), Addresses (Address: 192.168.1.3, Netmask: 255.255.255.0, Gateway: 192.168.1.1, DNS: Automatic ON), Routes (Address: 192.168.1.3, Netmask: 255.255.255.0, Gateway: 192.168.1.1, Metric: ON), and a checkbox for "Use this connection only for resources on its network". There are tabs for Details, Identity, IPv4, IPv6, and Security, with an Apply button at the top right.

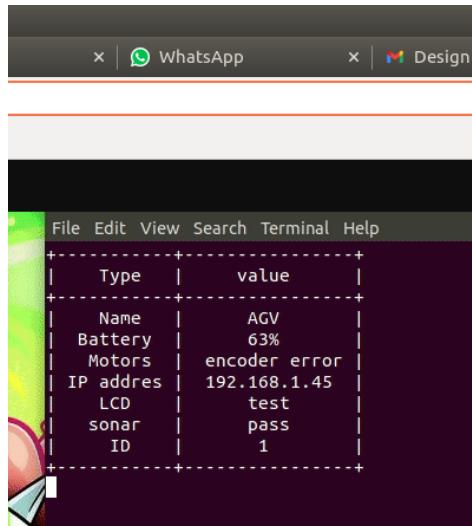
Operator pc Local wifi network setting change into static IP 192.168.1.3 ( AGV and ARM mqtt port )  
And pass the Apply button



## Communication test

For the AGV and ARM communication test . First operator should download the following files.

- AGV:-[https://github.com/cepdnaclk/e16-3yp-smart-pharmaceutical-warehousing/tree/main/Software/mqtt/mqtt\\_agv](https://github.com/cepdnaclk/e16-3yp-smart-pharmaceutical-warehousing/tree/main/Software/mqtt/mqtt_agv)
- ARM:-[https://github.com/cepdnaclk/e16-3yp-smart-pharmaceutical-warehousing/tree/main/Software/mqtt/mqtt\\_arm](https://github.com/cepdnaclk/e16-3yp-smart-pharmaceutical-warehousing/tree/main/Software/mqtt/mqtt_arm)

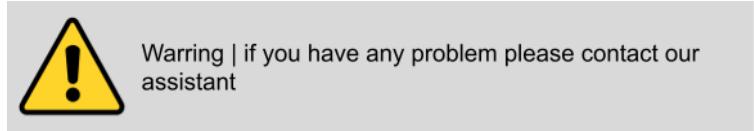


Type	value
Name	AGV
Battery	63%
Motors	encoder error
IP adres	192.168.1.45
LCD	test
sonar	pass
ID	1

To run the AGV and ARM test file . You should enter this command on the Local server computer.

```
python arm.py or  
python agv.py
```

Then automatically this program test robot prints details and diagnostic results .





# OPERATOR CONTROL APPLICATION

## Overview

The following guidelines are intended for operators who are going to manage the smart warehouse system. This contains extensive details of how to set up and use the operator control application.

Requirements:

- Smart Pharmaceutical Warehouse Management System Application (SPWMS)
- 'inventory\_system' database system

## Database System

The database system has the following tables included

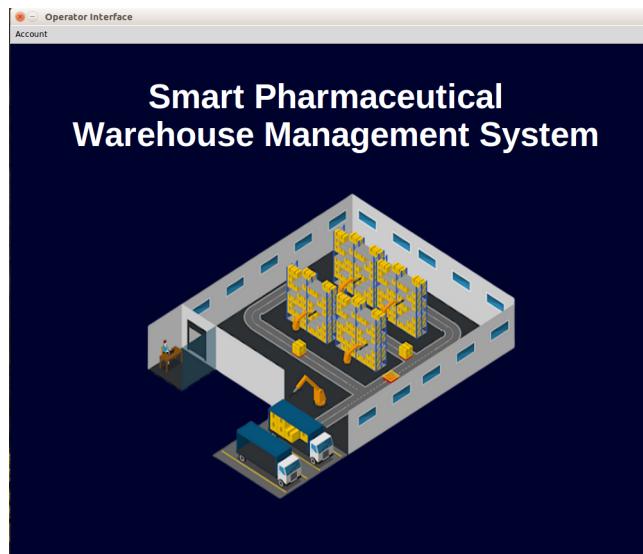
Name	Engine	Version	Row Format	Rows	Avg Row Length	Data Length	Max Data Length	Index Length	Data Free	Auto Increment	Create Time	Update Time	Check Time	Collation	Checksum	Comment
admin	InnoDB	10	Dynamic	2	8192	16.0 KiB	0.0 bytes	0.0 bytes	0.0 bytes	3	2021-01-31 16:45:59		latin1_swedish_ci			
inventory	InnoDB	10	Dynamic	28	585	16.0 KiB	0.0 bytes	0.0 bytes	0.0 bytes	31	2021-01-31 12:49:13		latin1_swedish_ci			
orders	InnoDB	10	Dynamic	5	3276	16.0 KiB	0.0 bytes	0.0 bytes	0.0 bytes	0	2021-03-09 20:07:50		latin1_swedish_ci			
robotAGV	InnoDB	10	Dynamic	11	1489	16.0 KiB	0.0 bytes	32.0 KiB	0.0 bytes	0	2021-03-09 18:41:37		latin1_swedish_ci			
robotArm	InnoDB	10	Dynamic	9	1820	16.0 KiB	0.0 bytes	16.0 KiB	0.0 bytes	0	2021-01-30 20:57:05		latin1_swedish_ci			

1. admin - contains the username and password of the operator
2. inventory - details of the stock available in the warehouse
3. orders - details of the orders placed by the customers
4. robotAGV - details of the AGVs the operate in the warehouse
5. robotArm - details of the robot arms that operate in the warehouse

The database system is managed by the SPWMS application.

# Controller Interface

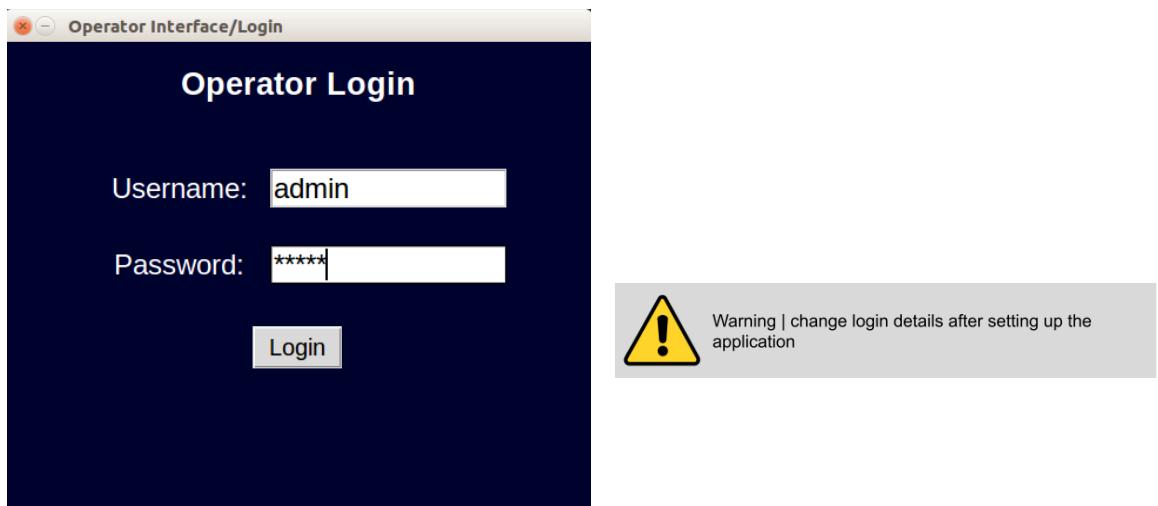
- The main tab of the operator interface is shown below



- To login into the system by clicking the 'Account/Login' in the main tab. You will be directed to this tab.

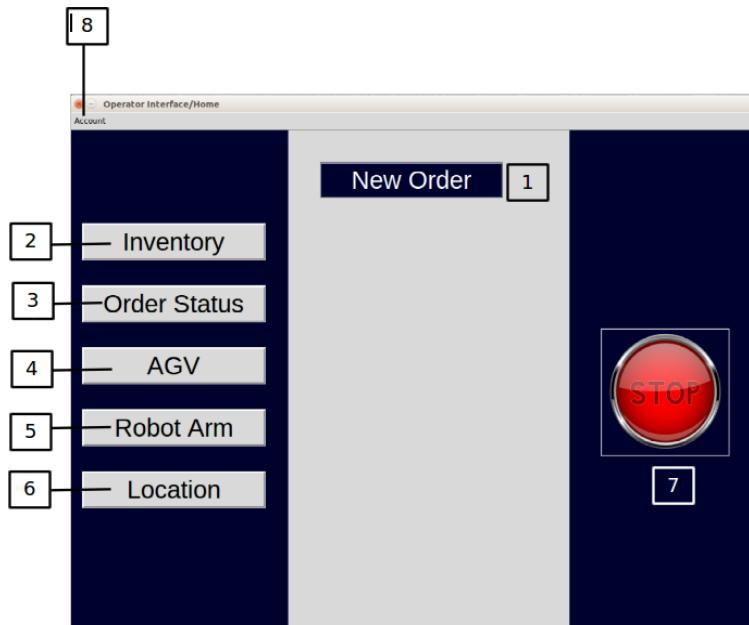
Enter the Username and Password and click the '**Login**' button.

- The first time you Login use 'admin' as both the username and the password



The image shows a screenshot of the "Operator Interface/Login" window. It features a dark blue header with the title "Operator Login". Below the header are two input fields: "Username: admin" and "Password: \*\*\*\*". A "Login" button is located at the bottom left. To the right of the input fields is a yellow warning icon with an exclamation mark and a message: "Warning | change login details after setting up the application".

- The users will be directed to this tab.



Here the functions and operations done by the application are displayed.

1. Display of the new order placed by customer - Click '**New Order**' button
2. Inventory management of the warehouse - Click '**Inventory**' button
3. Monitoring of the orders - Click '**Order Status**' button
  - a. View the list of orders placed by customers and their details
  - b. View stock details
  - c. Add new product
  - d. Update stock of product
4. Monitoring of the AGVs - Click '**AGV**' button
  - a. View the list of AGVs.
  - b. Enter the **AGV ID** to get the details such as
    - i. status
    - ii. order that being processed currently
    - iii. battery life
 of each of them.

5. Monitoring of Robot Arms - Click 'Robot Arm' button
  - a. View the list of robot arms.
  - b. Enter the **Arm ID** to get the details as
    - i. status
    - ii. order being processed
    - iii. battery lifeof each of them.
6. Locate position of AGVs in the warehouse - Click '**Location**' button
  - a. View the movement and path followed by the AGVs inorder to process the orders placed by the customer in the floor map.
7. To close the floor map tab, click '**Stop**' in the Home tab.
8. Click the **Account** menu in the Home tab and select 'Logout' to logout from the account and '**Exit**' to exit from the application.



# WEB APPLICATION

## Overview

The following guidelines are intended for the admin who will manage the web application and for the customers who will use the web to make purchases .

## Admin

- Enter the Username and Password and click the **SIGN IN** button.
  - The first time you sign in use 'admin' as both the username and the password

sign up first.' It features two input fields: 'Username\*' containing 'admin' and 'Password\*' containing '\*\*\*\*\*'. There is a 'Remember Me' checkbox, a 'FORGOT PASSWORD?' link, and a 'SIGN IN' button. Below the form is a dark blue footer bar with social media icons and the text '© 2020 Copyright: 3Yproject.com'. A light gray callout box at the bottom right contains a yellow exclamation mark icon and the text 'Warning | change login details after setting up the application'."/>

Medishop

Login Signup

### Sign In

If you have not created an account yet, then please [sign up](#) first.

Username\*

Password\*

Remember Me

[FORGOT PASSWORD?](#) [SIGN IN](#)

f t y G+ R D N

© 2020 Copyright: 3Yproject.com

Warning | change login details after setting up the application

- Once you sign in into the account you can
  - Manage the website
  - Add new items
  - Update them.

Social application tokens [+ Add](#)

Social applications [+ Add](#)

Change item

HISTORY [VIEW ON SITE](#)

Title: pfizer2

Price: 30.0

Discount price: 2.0

Category: Action medicine

Label: secondary

Slug: corona

Description: There are three aspects to the controversy over the "anti-COVID-19 potion" named "Dhammika Pariya" after its discoverer and practitioner Dhammika Bandara, a Shaman at the Sri Weera Budha Kali Devaleya in Herathmaluwa, Kegalle. Firstly, questions are being raised regarding the scientific basis of the potion as per Western standards of inquiry. Secondly, there are questions over the place of indigenous medicinal concepts and modes of preparing drugs in a globalised medical world which has a bias towards Western concepts. Thirdly, there is the issue of the potion's association with the toothless Kali, which, according to Dhammika Bandara, gives it a spiritual potency lacking in Western cures.

Image: Currentfile\_11554759\_gentengmeng-122654042.jpg  
Change [Choose File](#) [No file chosen]

Delete Save and add another Save and continue editing **SAVE**

# Customer

- When you access the website for the first time,
  - Sign up providing a username, email (optional) and a strong password
- Then Login into the website
  - Click the required medical item - details and prices are available

Medishop

x medicine

\$100.00 \$5.00

Description

Porphyria cutanea tarda (PCT) is a type of porphyria or blood disorder that affects the skin. PCT is one of the most common types of porphyria. It's sometimes referred to colloquially as vampire disease. That's because people with this condition often experience symptoms following exposure to sunlight.

ADD TO CART REMOVE FROM CART

- Then click **ADD TO CART**.
- Continue shopping by adding items into the cart
- When the items are complete checkout from the cart by clicking **PROCEED TO CHECKOUT**.
- In the checkout form enter the shipping details. You can see the total amount to be paid and entry to enter the promo codes (if available).
- Select payment option.
- Then click **CONTINUE TO CHECKOUT**.
- Click **SUBMIT PAYMENT** and complete the payment and place the order.

**END**