

# **PREVACTIVE MAX**

**MAJOR PROJECT  
DOCUMENTATION**

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**VNSGU**

VEER NARMAD  
SOUTH GUJARAT  
UNIVERSITY, SURAT

Project Report On

## **“Prevactive Max”**

Submitted for Partial Fulfilment towards the Degree Of

**BACHELOR OF COMPUTER APPLICATION [BCA] Year:  
2022 – 2023**

Submitted To:

**M. K. INSTITUTE OF COMPUTER STUDIES  
BHARUCH**



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(Project) under my supervision, for consideration in Partial  
Fulfillment for the VI<sup>th</sup> Semester of Bachelor of Computer Application,  
Veer Narmad South Gujarat University, Surat (VNSGU), during the  
academic year 2022-23.

The project is carried out using React, PHP, Python tools.

Date: 19/04/2023

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## ACKNOWLEDGEMENT

WE WOULD LIKE TO EXPRESS OUR HEARTFELT GRATITUDE TO ALL THOSE WHO HAVE CONTRIBUTED TO THE COMPLETION OF THIS PROJECT.

FIRSTLY WE WOULD LIKE TO THANK OUR COLLEGE M.K INSTITUTE OF COMPUTER STUDIES TO PROVIDE US A PLATFORM, AND ENVIRONMENT TO COMPLETE THIS PROJECT. AS WELL AS PROVIDING US WITH A WONDERFUL MENTOR MR.PARESH PRAJAPATI.

WE ARE ALSO GRATEFUL OF THE TEACHERS AND STAFF AT M.K INSTITUTE OF COMPUTER STUDIES WHO HELPED AND SAILED US THROUGH EVERY STEP OF OUR PROJECT.

NEXT I WOULD LIKE TO THANK "TOTO INDIA LTD." FOR PROVIDING THE HANDS ON EXPERIENCE OF AN EXISTING WORK ORDER MANAGEMENT SYSTEM. THIS HELPED US IN BUILDING A WONDERFUL SYSTEM BY STUDYING AND UNDERSTANDING THE EXISTING ONE.

WE ALSO THANK OUR MENTOR MR.PARESH PRAJAPATI FOR GUIDING US THROUGH THIS PROJECT, PROVIDING US WITH ALL NECESSITIES AND INFORMATIONS, TIMELY SUGGESTING US IDEAS AND PROVIDING APPROPRIATE DIRECTION WHEN EVER WE NEEDED. WE APPRICIATE HIS CONSTANT ENCOURAGEMENT AND SUPPORT THROUGH THE DURATION OF OUR PROJECT.

LASTLY WE THANK OUR PEERS, FRIENDS AND TEAMMATES FOR THEIR RELIABLE SUPPORT AND HELP IN FINISHING THIS PROJECT.

Regards,

Shah Ravi Anilbhai

Sindha Krupalsinh Manojkumar

Poladiya Rahil Tilak

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# PROJECT DESCRIPTION

## 1.1 PROJECT PROFILE

PROJECT NAME	PREVACTIVE MAX : The Total Maintenance Solution
DEVELOPERS	RAVI ANILBHAI SHAH KRUPALSINH MANOJKUMAR SINDHA RAHIL TILAK POLADIYA
GUIDE	PARESH PRAJAPATI
COLLEGE	M.K INSTITUTE OF COMPUTER STUDIES
CODING LANGUAGE	REACT JS AND PHP
CODE LENGTH	7549 lines
DEVELOPMENT MODEL	ITERATIVE MODEL
DATABASE NORMALIZATION	3NF( Third Normal Form)

## 1.2 PROJECT INTRODUCTION

### What is Preventive and Reactive Maintenance?

Preventive maintenance and reactive maintenance are two approaches to equipment maintenance. Preventive maintenance involves regular inspections, servicing, and repairs to prevent equipment breakdowns or failures. It is a proactive approach that aims to identify potential problems and address them before they become serious issues that require extensive repairs or replacements. Preventive maintenance is scheduled in advance and performed at regular intervals, regardless of whether the equipment is showing any signs of wear or damage. Reactive maintenance, on the other hand, is a response to a problem or failure that has already occurred. It is a reactive approach that aims to repair the equipment after it has broken down or failed. Reactive maintenance is often performed on an emergency basis, with little or no warning, and can be costly and time-consuming. While preventive maintenance can help to reduce downtime and extend the lifespan of equipment, reactive maintenance is necessary when an unexpected problem arises.

### What is Preventive Maintenance System?

A preventive maintenance system is a computerized program that helps organizations manage their maintenance activities in a more efficient and streamlined manner. The software automates the process of scheduling, tracking, and completing preventive maintenance tasks, making it easier to manage maintenance activities for a large number of equipment, machinery, or facilities. A preventive maintenance software can help organizations reduce downtime, increase equipment lifespan, improve safety, and increase productivity. By automating maintenance processes, the software can also reduce the administrative burden of managing maintenance activities, freeing up time and resources for other tasks.

### Why is there a need of preventive maintenance system?

There are several reasons why organizations need preventive maintenance system software:

- 1) Automation: Preventive maintenance software automates the scheduling, tracking, and completion of maintenance tasks, reducing administrative burden, minimizing errors, and saving time.
- 2) Centralization: Preventive maintenance software provides a centralized location to manage maintenance activities for all equipment, machinery, or facilities, making it easier to track maintenance history and status.
- 3) Data-driven decisions: Preventive maintenance software provides data on equipment performance, maintenance history, and other metrics, enabling organizations to make informed decisions about maintenance activities, equipment replacements, and upgrades.
- 4) Increased efficiency: Preventive maintenance software streamlines maintenance activities, reducing downtime, increasing equipment reliability, and improving productivity.
- 5) Cost savings: Preventive maintenance software can help organizations save money by reducing the need for expensive repairs or replacements, extending equipment lifespan, and optimizing maintenance activities.
- 6) Regulatory compliance: Preventive maintenance software can help organizations comply with regulatory requirements for equipment maintenance by providing a record of maintenance activities and ensuring that equipment is properly maintained.

## 1.3 PROJECT DEFINITION

### What is Prevactive Max?

Prevactive a combination of words “Preventive” + “Reactive”, is a Web application created in React Js and PHP to provide an efficient approach to streamline the process of both preventive and reactive maintenances. Prevactive Max helps to generate work orders, keep track of equipments, their warranty information, technicians as well as provide facilities to manage work orders throughout their life cycle. In Addition to such features we have also provided a facilities to store all necessary documents related to the equipments such as warranty certificates, user manuals, maintenance checklist, equipment analysis reports, etc. these enables a paperless ecosystem which reduces the needs of physical copies of documents, and on premise file libraries , by storing all necessary documents within a system. The System also has a simple and minute AI implementation using flask and python sklearn/NTLK libraries that process natural language work order tasks to determine necessary type of technician. Currently only giving an optimum technician as a suggestion this system could be future enhanced to automate work order generation and handling processes and reducing administrative efforts. The Prevactive Max also provides various statistics to users to provide overviews of their usage. Technicians are provided with Statistics about their works such as Total hours worked etc. to keep track of their performances. Admins have several report generation facilities one key such facility is ‘Custom Reports’ where users can create reports against their custom selection queries and plot interactive graphs for the same. The system also allows to download all the available documents and generated reports as pdfs and save graphs as png images.

### Where does our project stand between the existing counterparts in market?

There are several available preventive maintenance software in the market such as Fiix, Upkeep, Hippo CMMS, Dude Solutions, Asset Panda that have been existing in market since a while and have strong roots and fundamentals supporting them. All of them are Efficient Solutions and provide facilities such as preventive maintenance scheduling, work order management, asset management/tracking, inventory management, and reporting. In comparison to them our project might be in quite an early stage where although we might not have enough polished system but we do have some key differentiators and USPs:

- We have an in-system database management studio “Executor” where Master users can perform any kind of Insert, Update, Delete, Select queries as per requirements.
- “Custom Reports” engine is a key feature of our software that give an upper hand over others. Apart from providing system designed static reports we also provide custom report creation against any kind of query as well as plot highly customizable Bar, Scatter or Pie chart out of the query results.
- “AI Max” our AI tool max is in an early development phase and is only capable to detect type of technician required but this can further be enhanced with future updates that can make this AI smart enough to automate work order generation process. By creating and assigning the work order to most optimum technician and handle it.
- Apart from them our Algorithm combined with AI to suggest name of the most suitable technician is a powerful tool to help Administrators to decide what technician would be favourable to assign to the requested work order.

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# PROJECT PLANNING

## 2.1 SCOPE

The scope of a project refers to the specific boundaries and objectives of the project. When documenting the scope of a project, it is important to provide a clear and concise description of what the project will entail and what it will not entail. Our project "Prevactive Max" has the following notable scope:

**Objective:** "The Primary Objective of our project is to provide an ecosystem to Schedule, Manage, and streamline the process of Preventive and Reactive Maintenance, Generate work orders timelessly and also provide a paperless infrastructure to store all necessary documents remotely on server."

### End Users Scopes and Responsibilities:

There are four key End Users of this system with their predefined roles and responsibilities. These End Users are:

- 1) Users
- 2) Technicians
- 3) Admins
- 4) Master

### Scope for Users:

- Login/Logout
- View Profile
- Update Profile
- Reset Password
- Create Work Orders ( Reactive )
- View Work Orders ( Made By Them )
- Search
- View Department-Area-Equipment mapping
- A small AI interaction facility to test our AI Max.

### Scope for Technicians:

- Login/Logout
- View Profile
- Update Profile
- Reset Password
- View Work Orders ( Assigned to Them )
- Search
- View Department-Area-Equipment mapping
- A small AI interaction facility to test our AI Max.
- Upload Work Quotation for work orders
- Accept/Reject work
- View Equipments and Download their Checklists

#### Scope for Admins:

- Login/Logout
- View Profile
- Update Profile
- Reset Password
- View Work Orders ( Assigned to Them )
- Search
- View Department-Area-Equipment mapping
- A small AI interaction facility to test our AI Max.
- Create Work Orders (Both Preventive and Reactive)
- Approve/Reject work order requests
- Assign Technicians to work orders
- Add New Users, Equipments, Inventory, or Preventive Maintenance Schedules etc.
- Update Users, Equipments, Inventory, or Preventive Maintenance Schedules etc.
- Block/Unblock Users, Equipments, Inventory, or Preventive Maintenance Schedules etc.
- Generate Static Reports and Plotted Graphs
- Generate Custom Reports and Plot Customizable Graphs
- Manage Work Orders
- Link/Unlink Checklist, Upload Missing Equipment Documents
- Etc.

#### Scope for Masters:

- Login/Logout
- View Profile
- Update Profile
- Reset Password
- View Work Orders ( Assigned to Them )
- Search
- View Department-Area-Equipment mapping
- A small AI interaction facility to test our AI Max.
- Add New Areas, Departments, Users, Equipments, Inventory, or Preventive Maintenance Schedules etc.
- Update Areas, Departments, Users, Equipments, Inventory, or Preventive Maintenance Schedules etc.
- Block/Unblock Areas, Departments, Users, Equipments, Inventory, or Preventive Maintenance Schedules etc.
- Link/Unlink Checklist, Upload Missing Equipment Documents , Link Inventory Items to Equipments
- Use Executor Engine to execute boundless insert, update, delete and select queries ( but with ensured safety against harmful sql-injections )
- Create Backup for database Etc.

## 2.2 GOALS

The "Fundamental Goal" of our system Prevactive Max is to provide an easy to use platform for Scheduling, Managing and Streamlining the process of Preventive and Reactive Maintenances. Along with that we also plan to provide a paperless infrastructure to store, view, or download all necessary documents at a remote servers instead of making an on-premise physical file library that requires hours to locate files. In Addition to that we are also wishing to improve our AI system to automate the process make it describe-less work order generation system which can generate and assign work orders with least possible given description, accurately and reduce human interactions and Administrator efforts.

## 2.3 CONSTRAINS

Constrains of a project are limitations or restrictions that affect a project's scope. As Humans mistakes, miscalculations, flaws, limitations etc. might occur in any project and as a good developer it is a fundamental duty to address any such constrains in the project so that they can be improved in future.

Our Project Prevactive Max may not be the most perfect system available and has various flaws, limitations and constrains that might be undiscovered, unforeseen, unintended or neglected out of lack of knowledge . Few such limitations are enlisted below.

- 1) The project has several missing minute detailing that's required to polish it perfect, this might be tackled in future enhancements. The Project is also a lot manual and several automations need to be introduced.
- 2) The project also might have an undiscovered algorithmic limitation when the data would become massive such as search suggestions might run slower, or other such things that might affect the performance when on a gigantic scale.
- 3) The project also has a restriction that it might require sufficiently modern device to host and all software requirements must be met in order to effectively deploy it. It might also need a good internet connection to be able to access this since it is a web application.
- 4) Another known limitation is that although project has a functional backup facility, but it is only limited to backing up the database due to which although there facility to store files and documents remotely but the system doesn't have a counter measure to back up the files or documents that are uploaded to server.
- 5) One another Restriction is that although project has been best developed to be used on both desktop as well as mobile devices but there still might be some unpredicted design flaws that might occur on mobile platforms.
- 6) Since this project was developed particularly for a "Company Specific" use, this doesn't facilitate allowance to create accounts on their own or also might not support global deployment to handle multiple Companies at one place, i.e Global scaling is a Restriction although each company can have their own configured individual Prevactive Max installation.

We would ensure to resolve the any such flaws in future enhancements of the system.

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# **Environment Description**

### 3.1 HARDWARE SPECIFICATION

The Project's hardware necessities must be clearly mentioned to ensure effective and efficient usage of the system and make use of 100% of the potential of Project. Since hardware specifications highly depend on various factors such as amounts of data that is to be hosted or amounts of traffic that is supposed to be served, etc. Our Project is a Web Application made in React Js , PHP, Python Flask with a small machine learning code, and Mysql database might require the following hardware specification to serve a minimal ticket size of 100-1000 employees effectively:

Parameter	Value	Description
Processor	Quad Core Intel i5 or AMD Ryzen 5	A Good Processor shall be required to handle the React , PHP and Python Machine Learing + Flask Code
RAM	8 to 16 GiB	It is preferable to meet minimal RAM requirements to handle the application smoothly
Storage	Atleast 500GiB to 1TB	This might be required to store all the large amounts of documents and data. A Solid State Drive(SSD) is recommended for faster run.
Network	-	It would require a good internet connection to access or operate the web application.
Operating System	Linux, Windows or Mac etc.	Any OS with all sufficient software requirements met can be used.
Graphic Card	-	Currently although it works without graphics card but a minimal 2-4 GiB graphics card might boost the performance when the machine learning dataset would eventually become larger.
Database	-	A server with at least 8GB of RAM and a quad-core processor should be sufficient for a database serving 100-1000 employees.
Server	-	A dedicated server or cloud server with at least 8GB of RAM and a quad-core processor is recommended to Host the application

## 3.2 TECHNOLOGY USED

The Project "Prevactive Max" has been built using the following technologies:

### 1) HTML / CSS:

HTML is used within JSX of REACT JS to design the base of the Webpages of the Web App. Inline CSS is used to style several elements of the Web App to provide a mediocre User Interface.

### 2) REACT JS:

React Js version(^18.2.0) is used to Create a fluent Front end and split entire web application into smaller components and modules to make the entire application more modular , efficient and easy on memory due to less renders of original DOM. React Js is the base of the entire Application.

### 3) BOOTSTRAP and REACT-BOOTSTRAP:

React-Bootstrap is another extension library module of React Js that enables Bootstrap functionality into react to make designing easy. Various Components like Navbars, Buttons, Forms, Form-Controls Etc are developed using this. Version (^2.7.2) of react-bootstrap is used for this project.

### 4) NODE JS:

Node Js is used to create various minimal javascript modules as such for Encryption, and Decryption utilities etc. version ( 18.12.1 ) of node js and version( 9.6.0 ) of npm is used during development of this project.

### 5) JQUERY:

Jquery is used for making api calls to backend server side php scripts using \$.ajax() function of the jquery library. It has been used to send or retrieve data to and from the php script running at server. Other JQuery functions have also been used as per requirements in the project to make development easier. The version of jQuery used is ^3.6.3.

### 6) JAVASCRIPT:

Javascript is used to perform all necessary client side scripts such as storing necessary data into sessionStorage , Validation of Form Inputs, Perform Calculations, display or hide elements accordingly and various other minimal DOM manipulations.

### 7) PLOTLY.JS and REACT-PLOTLY-JS:

Plotly.js library of javascript is used to visualize required data in form of graphs as well as create custom graphs by user. The Version used for plotly.js is ^2.20.0 and react-plotly.js is ^2.6.0

### 8) PHP:

PHP is used to handle entire server side application tasks such as putting data into database, pre-checking of data before uploading , uploading files to server , creating database dump backups , executing custom sql queries sent by user , deleting useless files of deleted records , Downloading files from server into user device etc. the version used for PHP is 5.5.12

### 9) MYSQL DATABASE:

MySQL database is used to store the data sent by user into respective table securely. Version used: 5.6.17

10) PYTHON:

Python is used to create another backer service that hosts the machine learning algorithm. The version of python used is 3.11.0.

11) FLASK and FLASK-CORS:

Python Flask has been used to Host the backend service made in python to be accessible to react application. The version of flask is 2.2.3, Flask-Cors is used to bypass the CORS policy. Version of it is 3.0.10

12) SCIKIT-LEARN:

Python Library Scikit-learn(sklearn) is used for machine learning algorithm based in python. The version of it is: 1.2.2

13) NLTK:

NLTK library is used to pre-process, i.e lemmatize words, remove stop words, and process the natural language to make an accurate Machine Learning Algorithm. Version used is: 3.8.1.

14) JSPDF and JSPDF-AUTOTABLE

These modules of npm is used to convert the tabular data into pdf files in order to enable us to download generated reports as pdfs. Version used: jsPDF(^2.5.1) and jsPDF-autotable(^3.5.28).

15) REACT-ORGANIZATIONAL-CHARTS:

This module of react js is used to create an organization hierarchy in of departments-areas-equipments. Version used: ^2.2.0

16) SWEET ALERTS:

Sweet alerts are used to alert the user where ever necessary. Sweet alert version used here is : ^2.1.2

17) EMAIL-JS:

EmailJs is an email sending library that is used in this project to send OTP emails and Credentials Emails to users. The version used is: ^3.2.0

18) BOOTSTRAP-ICONS:

This module is used for various icons in the project. The version used is: ^1.10.3

19) WAMP SERVER:

WAMP Server is user to Host PHP scripts and database. Version used: 2.5

20) Notepad++:

Notepad++ is used as the text editor to write all the required code.

Other many such small modules and libraries have been used in the project. The above list only mentions a few important ones.

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# System Description

## 4.1 FEASIBILITY STUDY

A feasibility study is a comprehensive analysis of a proposed project's viability, including its technical, economic, operational, legal, and scheduling feasibility. It is conducted to determine whether the project is feasible and viable in terms of the resources, time, and money required for successful completion. The purpose of the feasibility study is to identify any potential challenges or obstacles that may affect the success of the project and to assess whether it is feasible to proceed with the project based on its objectives, goals, and expected outcomes.

The feasibility study of our project "Prevactive Max" concludes the following outcomes:

- 1) Technical Feasibility: The Technical Feasibility of Prevactive Max states that the project needs various technical requirements such as ReactJS, NodeJS, PHP, MYSQL, WAMP, PYTHON, Dataset for machine learning, and several other minor modules and libraries that make it possible to develop and run. The Minimum hardware requirements to deploy or run the project can be easily full filled since they are basically available in most devices these days. In Conclusion Prevactive Max is technically Feasible for all the devices which have installed software requirements and have minimum support hardware.
- 2) Operational Feasibility: Prevactive Max's operational feasibility concludes that the project is almost operationally feasible for everyone with basic knowledge about how to use it. It is easier to understand and interactive interface makes it very simple for those who don't have complex knowledge about it. Technician Suggestion AI tool helps Administrators with less or No knowledge to assign work orders to technicians. The Complex Features such as "Executor" and "Custom Reports" although need an expertise in the SQL language in order to bring out full potential of the system's powers.
- 3) Legal Feasibility: Prevactive Max is legally feasible since it has sufficient security and privacy. Since it is not a globally deployable tool and rather a Company Specific one it is reliable with enough privacy and restricts data within one's company itself. Sensitive Data such as passwords are well taken care of, and are never brought out of database unless authorized Master or Admins have requested for it.
- 4) Financial Feasibility: Prevactive Max has not yet been tested for financial feasibility, predictively the only revenue stream possible is one-time installation fee, but on other hand the Project might save several costs such as cost of on-premise physical file storage room, and apart from that even be cost effective by reducing breakdown costs of a machine by timely preventive maintenances and give enough statistics and reports to Authorities to manage Costs on inventory and maintenances.
- 5) Schedule Feasibility: Prevactive Max is feasible with schedule and was developed within the time constrain provided.

## 4.2 REQUIREMENT ANALYSIS AND DATA GATHERING

Requirement analysis is an important stage of software development and includes several methods such as interviews, questionnaires, observation, record view, surveys, task analysis, brainstorming, prototyping etc.

For Our Project the type(s) of Requirement Gathering techniques that we used are:

- 1) Observation: For this Requirement Gathering method the actual working of the existing installed systems is observed by the development team. They observe the workflow at client's end and how execution problems are dealt. The team itself draws some conclusions, which aid to form requirements expected from the software.

For our project we observed the existing system designed for a company "Toto". We Ran the System, Tested it accordingly, and spent enough time playing through the system to identify the various work flows data flows, and necessary data to make a basic system.

This Method was preferred because:

- It gives us reliable data. As we know the system is already working and in use for the company, we can get basic idea about how it works with true and reliable data.
- This method also gave us rough idea above improving or removing different parts of the system. As we already understand the basic working of the existing system, we can create a base model out of it but we can also improve its functionality as we did and also remove features from existing System that felt unnecessary.
- This method provides work measurement since we already know how much work is supposed to be done and how many changes/improvements are needed.
- This method gives us practical experience of how the project should work at first place. We don't have to derive conclusions from theoretical data, instead we can have a hands on experience of how things work.

Apart from this we gathered all the necessary data from internet. Online dictionaries and sources we used to create a dataset for machine learning. Some data in the dataset was hand written as well.

## 4.3 SYSTEM DEVELOPMENT PROCESS MODEL

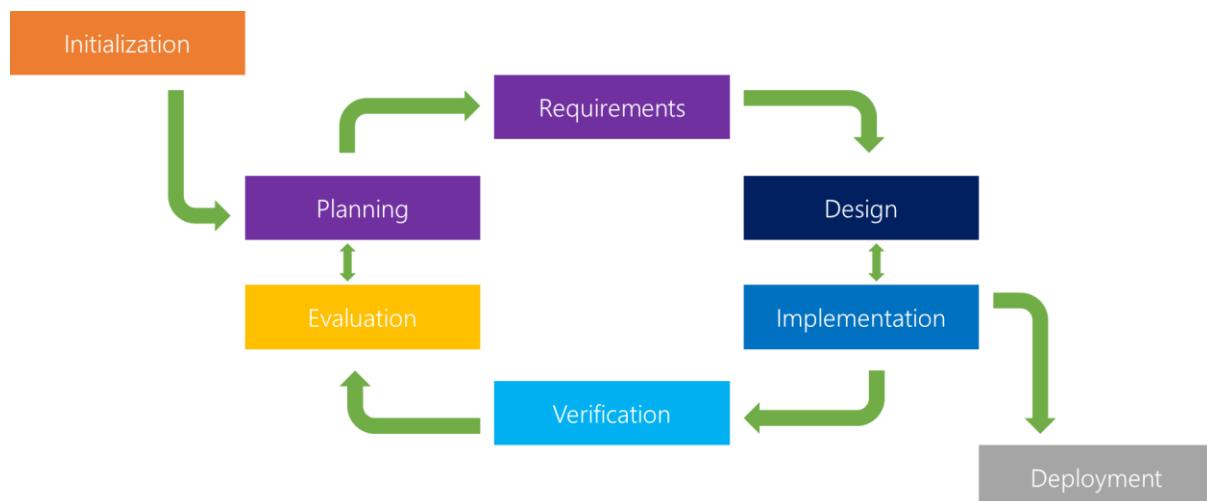
The System Development Process model used for this project is "Iterative Model".

The iterative model is a software development methodology that involves breaking down the software development process into smaller, more manageable parts, which are then developed and tested in short cycles. The process involves repeating a series of steps, each of which involves design, development, and testing. The goal of this approach is to produce software that is both functional and efficient.

The iterative model typically involves the following steps:

- 1) Requirements gathering: This involves gathering information about the requirements of the software.
- 2) Design: This step involves designing the software based on the requirements gathered in the first step.
- 3) Implementation: This step involves implementing the design using a programming language.
- 4) Testing: This step involves testing the software to ensure that it meets the requirements and is free from errors.
- 5) Evaluation: This step involves evaluating the software to determine whether it meets the requirements and is suitable for release.

After the evaluation step, the process starts again, with any necessary adjustments being made to the requirements, design, implementation, or testing as needed.



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# Advantages of System

## 5.1 ADVANTAGES OF THE SYSTEM

Our Project Prevactive Max has more or less all the usual features like other systems existing in the market. Apart from that The Advantages of our system are:

- 1) Creative Design Interface: we did all possible creativity that could be implemented in the design. One such feature is long-press for the actions. Where data in table can be press and hold for sufficient moments to make actions such as view detail, update, or delete features available. Drag Drops for plotting graphs etc are other featured creative designs. We have tried to make the system simple, easy and fun to use.
- 2) We have an in-system database management studio “Executor” where Master users can perform any kind of Insert, Update, Delete, Select queries as per requirements.
- 3) “Custom Reports” engine is a key feature of our software that give an upper hand over others. Apart from providing system designed static reports we also provide custom report creation against any kind of query as well as plot highly customizable Bar, Scatter or Pie chart out of the query results.
- 4) “AI Max” our AI tool max is in an early development phase and is only capable to detect type of technician required but this can further be enhanced with future updates that can make this AI smart enough to automate work order generation process. By creating and assigning the work order to most optimum technician and handle it.
- 5) Apart from them our Algorithm combined with AI to suggest name of the most suitable technician is a powerful tool to help Administrators to decide what technician would be favourable to assign to the requested work order.
- 6) Paperless Ecosystem allows to make every necessary document remotely available. There is no need to have an on-premise physical room to store documents and files. Documents and Files such as warranty documents, equipment manuals, checklists, or analysis reports can be stored on the system and can be viewed, or downloaded any time anywhere.

## 5.2 SECURITY ISSUES AND PRECAUTIONS

There are several possible security issues that might occur in the system, while many of them are already address a few of them still might need enhancement in future.

- 1) Security Issue: “Allowing custom querying into database”  
Precaution: “to suppress harmful SQL injection attacks such as adding semicolon and a drop or delete query after it or Running commands such as Drop, Alter, Delete from table where 1=1 etc; we have taken steps such as Not allowing any other queries except INSERT, UPDATE, DELETE and SELECT, along with that we have made sure that all the string written after a semicolon is truncated. In Delete query we also have prevented running of where 1=1 like conditions. “
- 2) Security Issue: “ Unsafe Password ”  
Precaution: We have prevented passwords from being transacted during any interaction. i.e. No select query brings in data such as Password for regular usage. Although Admins and Masters are given rights to run custom queries where they might be able to access password information. This Security might get resolved sooner using a encryption and decryption algorithm in future enhancements.

# 6

# System Design

## 6.1 DATA DICTIONARY

Sr.No	Field Name	Datatype	Datastore	Description
1	areald	Int(11)	areamaster, equipmentmaster, workordermaster	Primary key to uniquely identify Areas also used as foreign key in equipmentmaster, workordermaster.
2	areaName	text	areamaster	Name of the area.
3	status	Int(11)	areamaster, checklistformatmaster, deptmaster, equipmentmaster, usermaster	To determine active or inactive status.
4	ceNo	Int(11)	checkequipmapping	Primary key to uniquely identify equipment mapping.
5	chld	Int(11)	checklistformatmaster, checkequipmapping	Primary key to uniquely identify checklist also used as foreign key in checkequipmapping.
6	chName	Text	checklistformatmaster	Name of checklist.
7	chDoc	Text	checklistformatmaster	Path of checklist document.
8	uploadDate	datetime	checklistformatmaster	Date of the upload of checklist document.
9	deptId	Int(11)	deptmaster, areamaster, usermaster, workordermaster	Primary key to uniquely identify department also used as foreign key in areamaster, usermaster, workordermaster.
10	deptName	Text	Deptmaster	Name of the department.
11	equipld	Int(11)	equipmentmaster, checkequipmapping, workordermaster, inveqpmapping, pmschedule	Primary key to uniquely identify equipment also used as foreign key in checkequipmapping, workordermaster, inveqpmapping, pmschedule
12	equipName	Text	equipmentmaster	Name of the equipment.
13	description	Text	equipmentmaster	Description of the equipment.
14	warrantyStart	Date	equipmentmaster	Equipment warranty start date.
15	warrantySpan	Int(11)	equipmentmaster	Total duration of warranty in months.
16	warrantyEnd	Date	equipmentmaster	Equipment warranty end date.
17	warrantyDoc	Text	equipmentmaster	Path of equipment warranty document.

18	equipDoc	Text	equipmentmaster	Path of equipment document.
19	invId	Int(11)	Inventorymaster, Inventorylog, inveqpmapping	Primary key to uniquely identify inventory also used as foreign key in Inventorylog, inveqpmapping.
20	invName	Text	Inventorymaster	Name of inventory.
21	invDesc	Text	Inventorymaster	Inventory description.
22	invCost	Int(11)	Inventorymaster	Inventory cost.
23	stockQty	Int(11)	inventorymaster	Total no of stock of inventory.
24	userNo	Int(11)	Usermaster, Workordermaster, technicianmaster	Primary key to uniquely identify user also used as foreign key in Workordermaster, technicianmaster.
25	employeeName	Text	usermaster	Name of the employee.
26	employeeId	Text	usermaster	Id of the employee.
27	Email	Text	usermaster	Employee email id.
28	phoneNo	Text	usermaster	Employee phone no.
29	Password	Text	usermaster	Password for login into system.
30	access	Text	usermaster	Type of allowance to user.
31	woid	Int(11)	workordermaster, workqoutationreqs, inventorylog, workorderstatus	Primary key to uniquely identify work order also used as foreign key in workqoutationreqs, inventorylog, workorderstatus.
32	woTitle	Text	workordermaster	Work order Task
33	woDesc	Text	workordermaster	Work order description
34	woType	Text	workordermaster	Work order type
35	severity	Text	workordermaster	Severity of the work order
36	deadline	Date	workordermaster	Until when the work order should be finish
37	wqid	Int(11)	workqoutationreqs	Primary key to uniquely identify work Quotation.
38	wqTitle	Text	workqoutationreqs	Work Quotation title.
39	wqDesc	Text	workqoutationreqs	Work Quotation description.
40	analysisRepDoc	Text	workqoutationreqs	Work Quotation analysis report.
41	estimatedCost	Int(11)	workqoutationreqs	Estimated cost of work Quotation.
42	stcode	Int(11)	workstatusmaster	Primary key to uniquely identify work status.
43	stat	text	workstatusmaster	Status description of the work order.

44	entNo	Int(11)	inventorylog	Primary key to uniquely identify inventory item.
45	qtyUsed	Int(11)	inventorylog	Used qty of inventory item.
46	dateofuse	date	inventorylog	the date on which inventory item was used.
47	ieNo	Int(11)	inveqpmapping	Primary key to uniquely identify inventory-equipment mapping entry.
48	pmsId	Int(11)	pmschedule	Primary key to uniquely identify preventive maintenance schedule.
49	pmsdate	date	pmschedule	Schedule date for preventive maintenance.
50	tid	Int(11)	Technicianmaster, workorderstatus	Primary key to uniquely identify technician also used as foreign key in workorderstatus.
51	typeid	Int(11)	typemaster, technicianmaster	Primary key to uniquely identify type of technician also used as foreign key in technicianmaster.
52	type	text	typemaster	Type of technician.
53	wslId	Int(11)	workorderstatus	Primary key to uniquely identify work order status.
54	assignDate	Date	workorderstatus	Work order assign date.
55	completionDate	Date	workorderstatus	Work order completed date.
56	CurrStatus	Int(11)	workorderstatus	Status of work order.

## 6.2 DATABASE AND TABLE DESIGN

Table Name: areamaster

Column	Type	Null	Default	Constraint
arealId	int(11)	No	Auto Increment	Primary key
areaName	text	No		
deptId	int(11)	No		Foreign key
status	int(11)	No	1	

Table Name: checkequipmapping

Column	Type	Null	Default	Constraint
ceNo	int(11)	No	Auto Increment	Primary Key
chId	int(11)	No		Foreign key
equipld	int(11)	No		Foreign key

Table Name: checklistformatmaster

Column	Type	Null	Default	Constraint
chId	int(11)	No	Auto Increment	Primary Key
chName	text	No		
chDoc	text	No		
uploadDate	datetime	No	CURRENT_TIMESTAMP	
status	int(11)	No	1	

**Table Name: deptmaster**

Column	Type	Null	Default	Constraint
deptId	int(11)	No	Auto Increment	Primary Key
deptName	text	No		
status	int(11)	No	1	

**Table Name: equipmentmaster**

Column	Type	Null	Default	Constraint
equipId	int(11)	No	Auto Increment	Primary Key
equipName	text	No		
description	text	No		
areaid	int(11)	No		Foreign Key
warantyStart	date	No		
warantySpan	int(11)	No	1	
warantyEnd	date	Yes	NULL	
warantyDoc	text	No		
equipDoc	text	No		
status	int(11)	No	1	

**Table Name: inventorylog**

Column	Type	Null	Default	Constraint
entNo	int(11)	No	Auto Increment	Primary Key
invld	int(11)	No		Foreign Key
wold	int(11)	No		Foreign Key
qtyUsed	int(11)	No		
dateofuse	datetime	No	CURRENT_TIMESTAMP	

**Table Name: inventorymaster**

Column	Type	Null	Default	Constraint
invId	int(11)	No	Auto Increment	Primary key
invName	text	No		
invDesc	text	No		
invCost	int(11)	No	0	
stockQty	int(11)	No	0	

**Table Name: ineqpmapping**

Column	Type	Null	Default	Constraint
ieNo	int(11)	No	Auto Increment	Primary Key
invId	int(11)	No		Foreign Key
eqpId	int(11)	No		Foreign Key

**Table Name: pmschedule**

Column	Type	Null	Default	Constraint
pmsId	int(11)	No	Auto Increment	Primary Key
eqid	int(11)	No		Foreign Key
pmsdate	date	No		

**Table Name: technicianmaster**

Column	Type	Null	Default	Constraint
tid	int(11)	No	Auto Increment	Primary Key
uid	int(11)	No		Foreign Key
typeid	int(11)	No		Foreign Key

**Table Name: typemaster**

Column	Type	Null	Default	Constraint
typeid	int(11)	No	Auto Increment	Primary Key
type	text	No		

**Table Name: workstatusmaster**

Column	Type	Null	Default	Constraint
stcode	int(11)	No	Auto Increment	Primary Key
stat	text	No		

**Table Name: usermaster**

Column	Type	Null	Default	Constraint
userNo	int(11)	No	Auto Increment	Primary Key
employeeName	text	No		
employeeld	text	No		
email	text	No		
phoneNo	text	No		
password	text	No		
deptId	int(11)	Yes	NULL	Foreign Key
access	text	No		
status	int(11)	No	1	

Table Name: workordermaster

Column	Type	Null	Default	Constraint
woid	int(11)	No	Auto Increment	Primary Key
woTitle	text	No		
woDesc	text	No		
woType	text	No		
severity	text	Yes	NULL	
deadline	date	No		
reqUid	int(11)	No		Foreign Key
deptId	int(11)	No		Foreign Key
areald	int(11)	No		Foreign Key
eqpid	int(11)	No		Foreign key

Table Name: workorderstatus

Column	Type	Null	Default	Constraint
wsld	int(11)	No	Auto Increment	Primary Key
wold	int(11)	No		Foreign Key
techId	int(11)	Yes	NULL	Foreign Key
assignDate	date	Yes	NULL	
completionDate	date	Yes	NULL	
CurrStatus	int(11)	No		

Table Name: workqoutationreqs

Column	Type	Null	Default	Constraint
wqid	int(11)	No	Auto Increment	Primary Key
wqTitle	text	No		
wqDesc	text	No		
analysisRepDoc	text	No		
wold	int(11)	No		Foreign Key
estimatedCost	int(11)	No		

DATABASE TRIGGER:

Trigger trig1:

Parameters	Values
Trigger Name	trig1
Table	inventorylog
Time	After
Event	INSERT
Definition	<pre>BEGIN     UPDATE inventorymaster SET stockQty = stockQty - NEW.qtyUsed WHERE     invId = NEW.invId; END</pre>

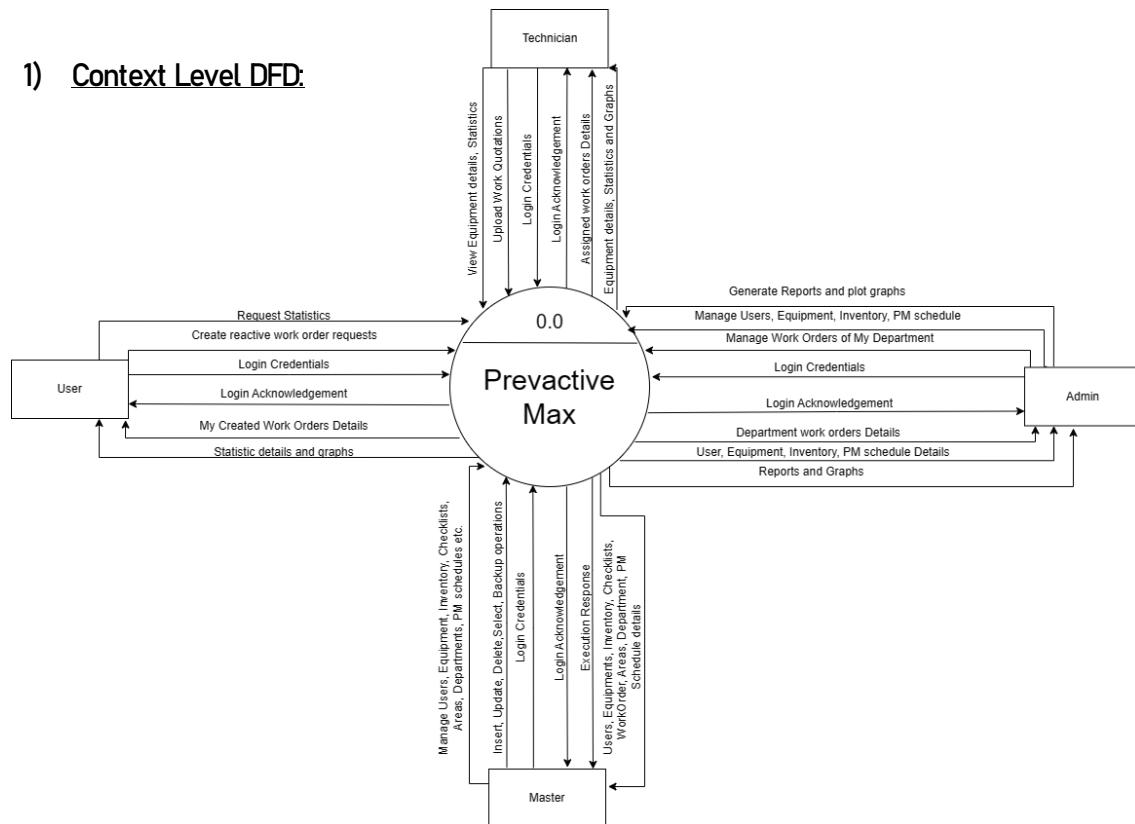
## 6.3 DATAFLOW DIAGRAM [DFD]

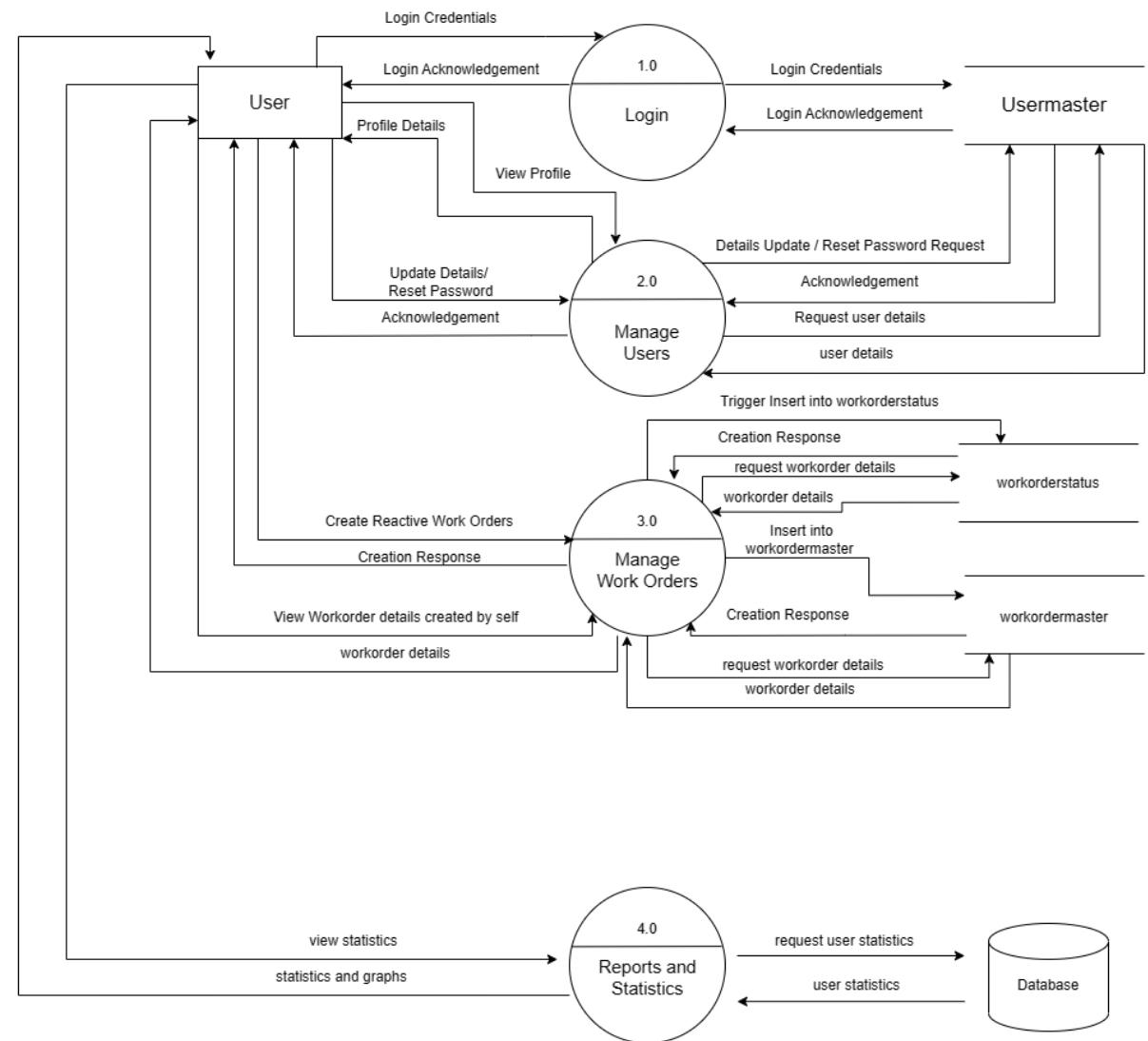
DFD is the abbreviation for Data Flow Diagram. The flow of data of a system or a process is represented by DFD. It also gives insight into the inputs and outputs of each entity and the process itself. DFD does not have control flow and no loops or decision rules are present. Specific operations depending on the type of data can be explained by a flowchart.

It is a graphical tool, useful for communicating with users, managers and other personnel. It is useful for analysing existing as well as proposed system.

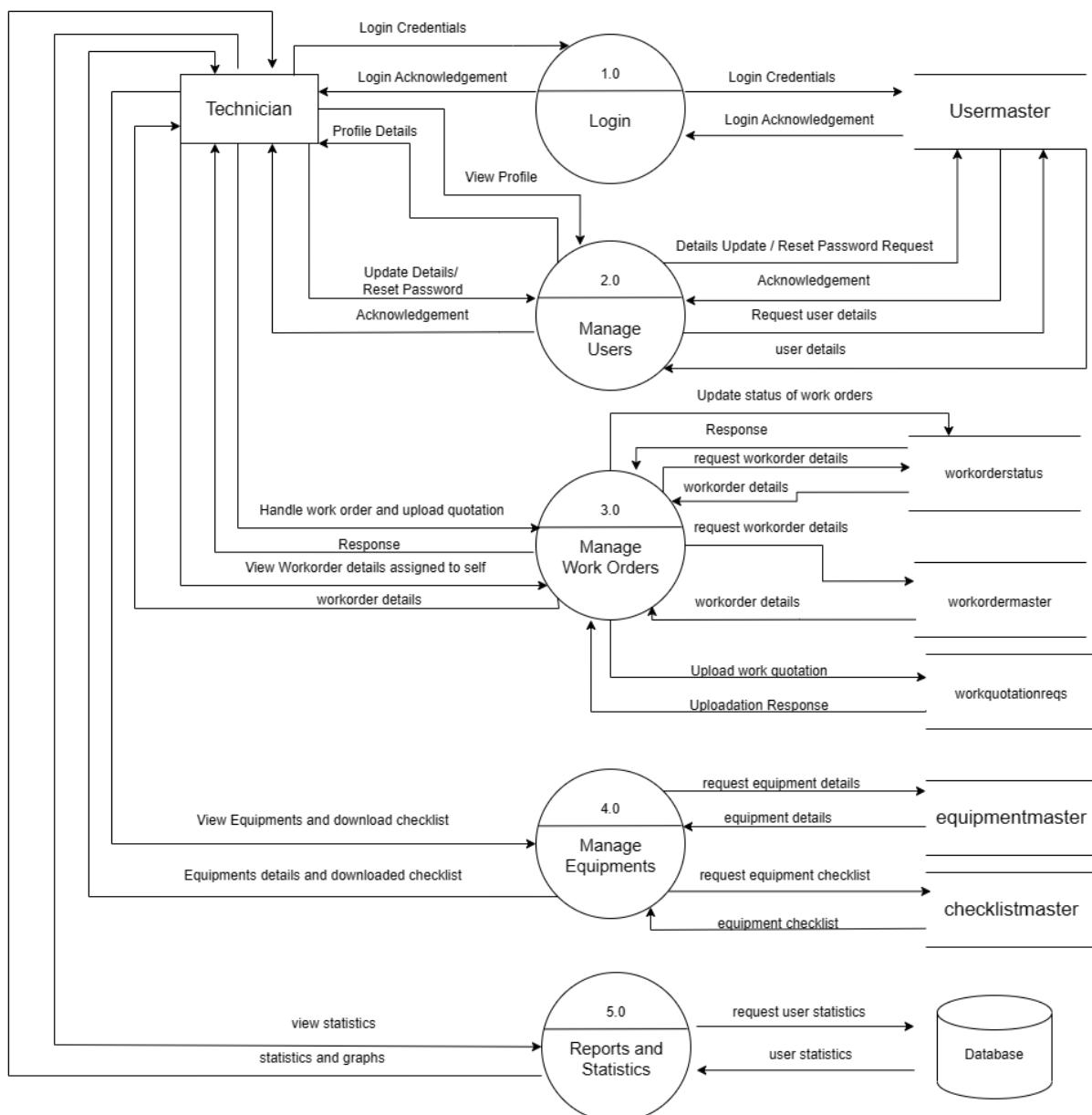
Symbol	Meaning
	Process
	Entity
	Data flow
	Datastore

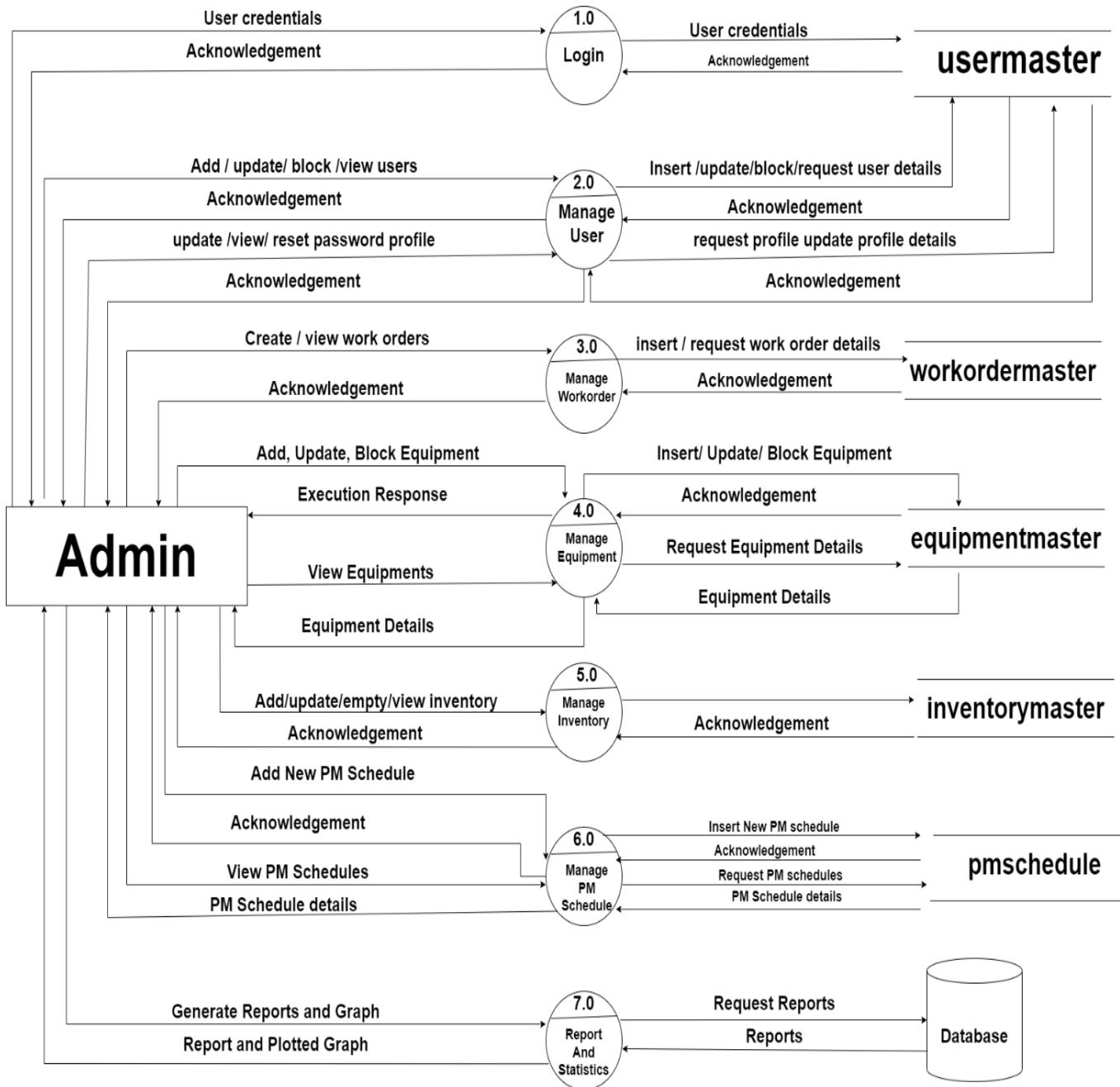
### 1) Context Level DFD:



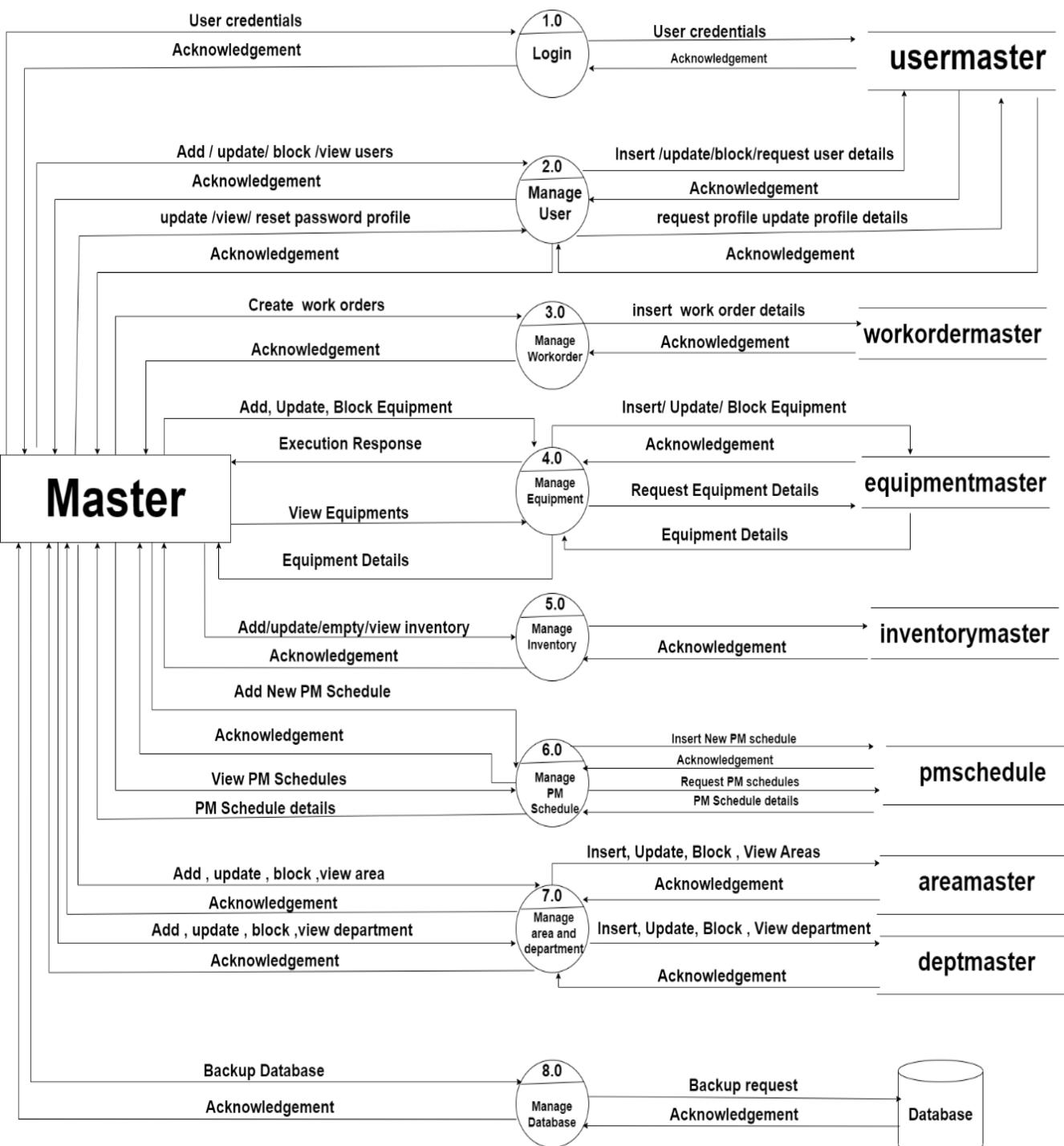
2) 1<sup>st</sup> Level DFD:User Based:

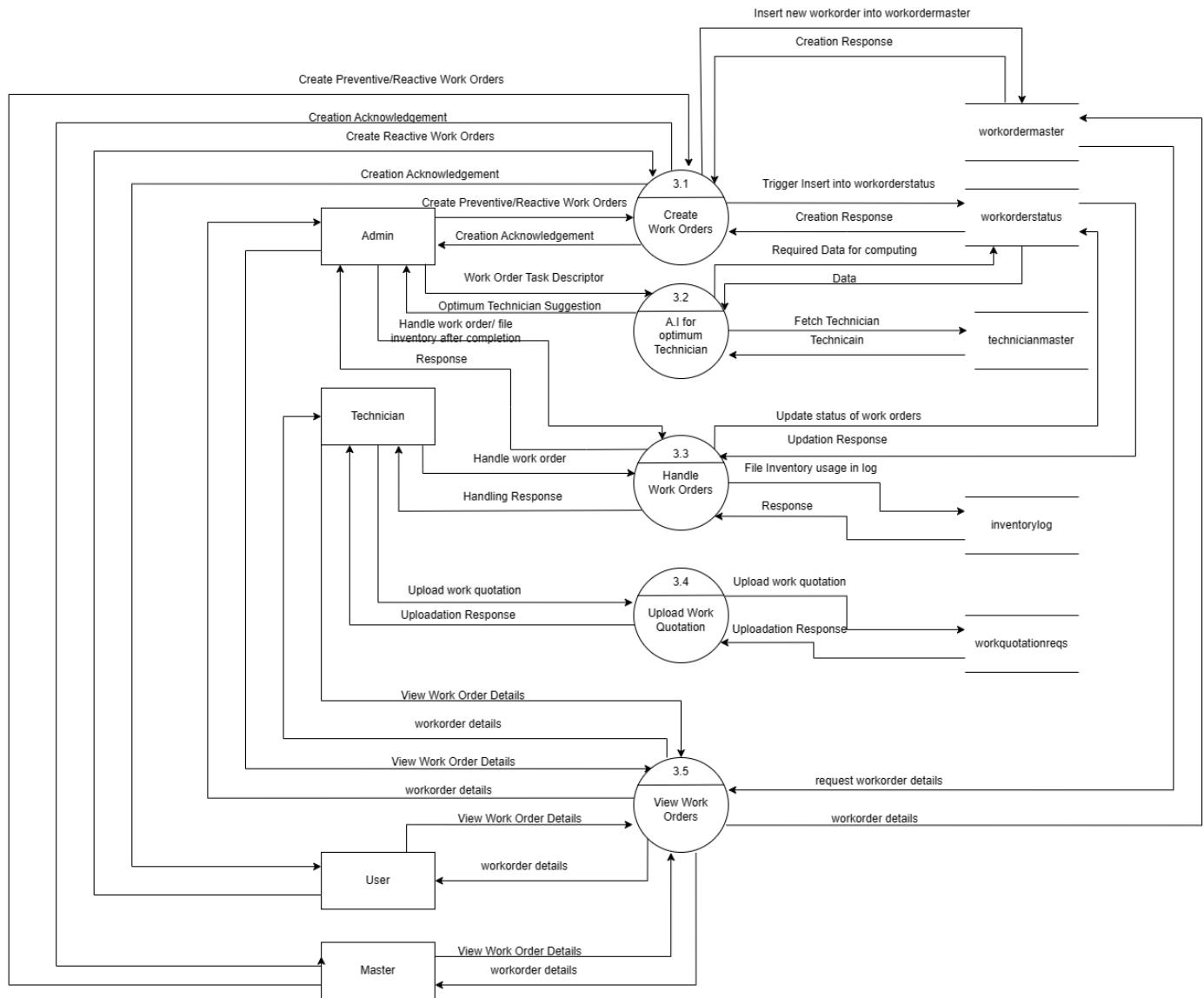
Technician Based:

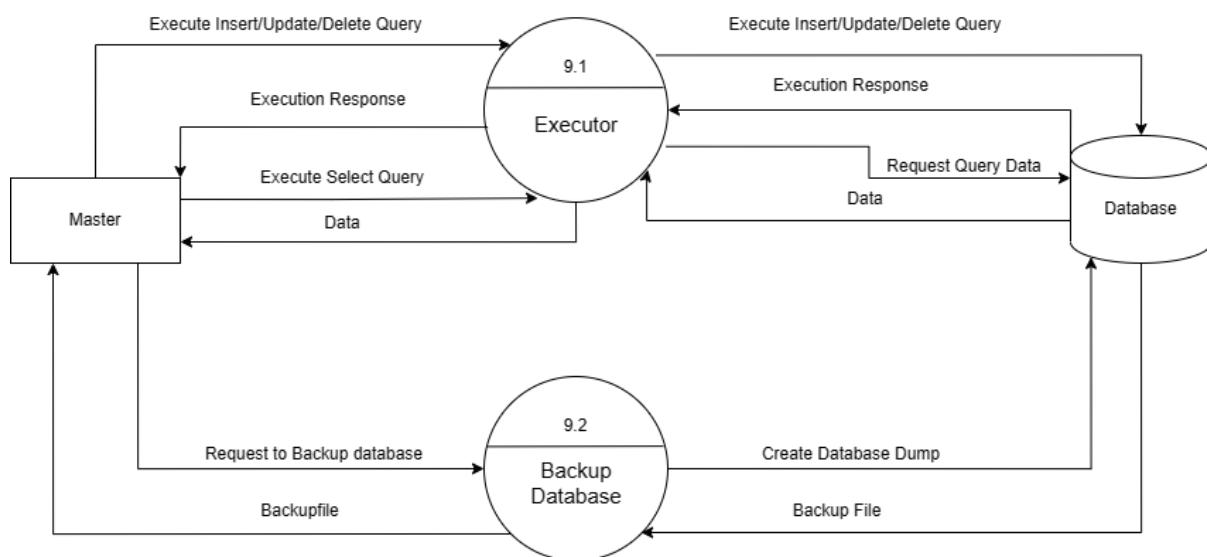


Admin Based:

Master Based:



3) 2<sup>st</sup> Level DFD:**3.0 MANAGE WORK ORDER :**

**9.0 MANAGE DATABASE :**

## 6.4 ENTITY RELATION DIAGRAM [ ERD ]

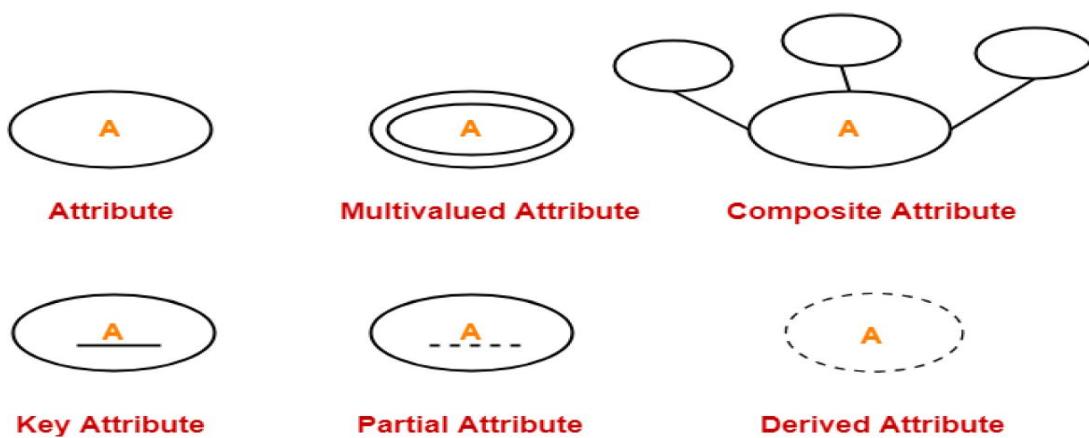
An Entity-Relationship (ER) diagram is a visual representation of the relationships between entities (objects or concepts) in a database system. It uses symbols and lines to illustrate how entities are related to each other and how they interact with each other in a database.

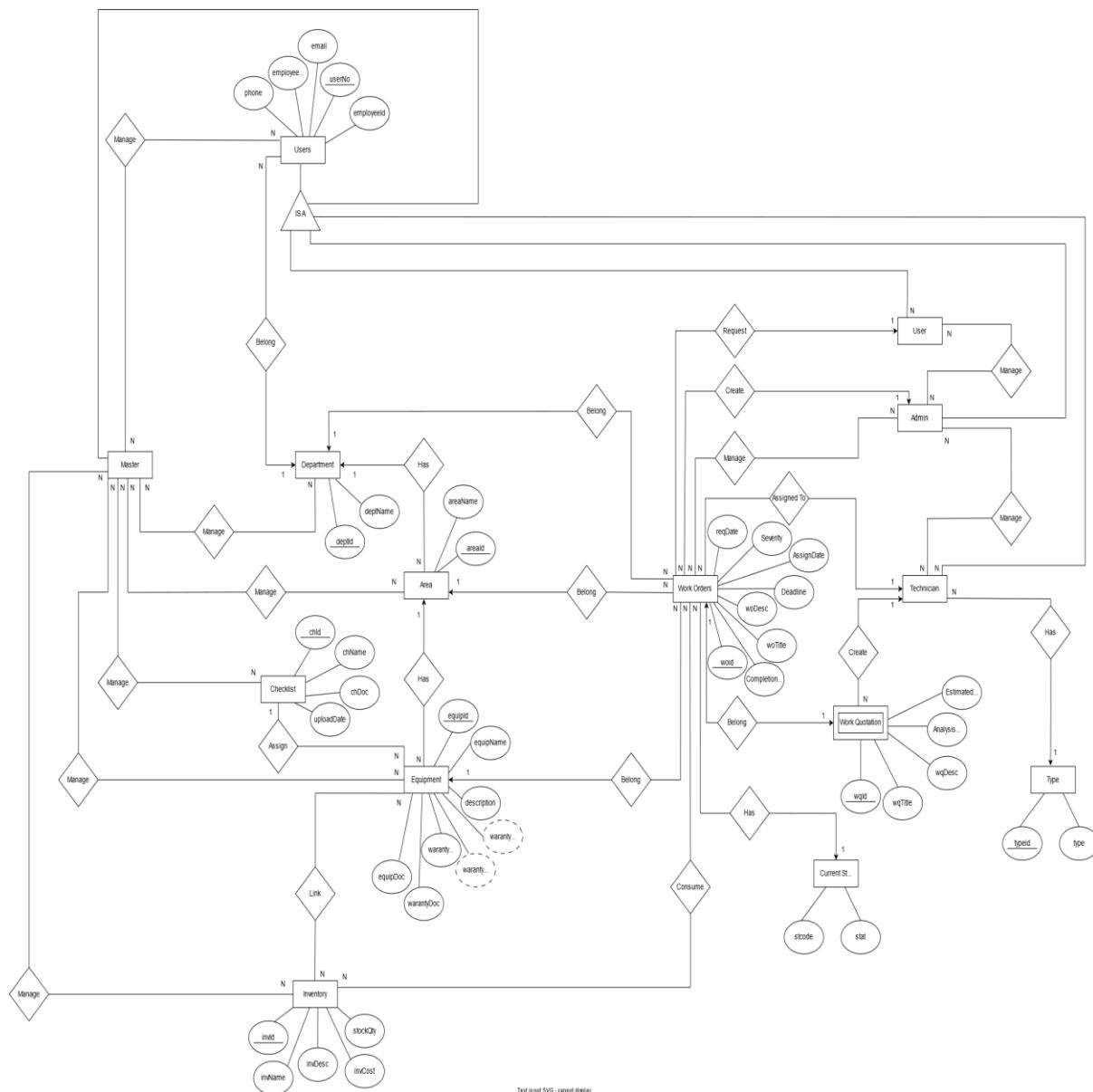
ER diagrams are commonly used in database design to model and plan the structure of a database system. They are particularly useful in depicting the relationships between entities, such as one-to-one, one-to-many, and many-to-many relationships, and the attributes associated with each entity. ER diagrams provide a visual representation of the logical structure of a database, making it easier to understand the relationships and dependencies between entities.

ER diagrams are helpful in various stages of database development, including conceptual design, logical design, and physical design. They are used by database developers, analysts, and designers to communicate the database structure to stakeholders, including end-users, programmers, and other members of the development team. ER diagrams also serve as a blueprint for creating the actual database schema and defining the relationships between tables.

Symbol Used-

	A <b>single rectangle</b> is used for representing a strong entity set.
	A <b>diamond symbol</b> is used for representing the relationship that exists between two strong entity sets.
	A double rectangle is used for representing a weak entity set.
	A single line is used for representing the connection of the strong entity set with the relationship set.
	A double line is used for representing the total participation of an entity set with the relationship set.





Text is not SVG - cannot display

7

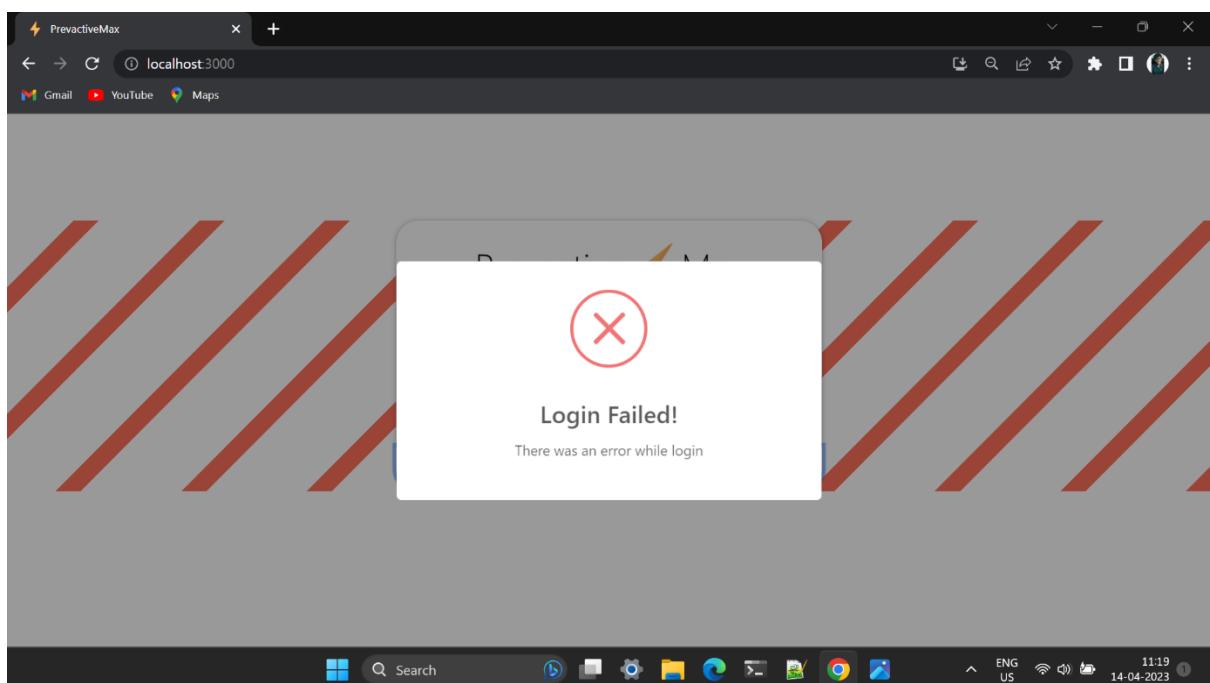
# SYSTEM MODULES

## 7.1 SCREEN LAYOUTS

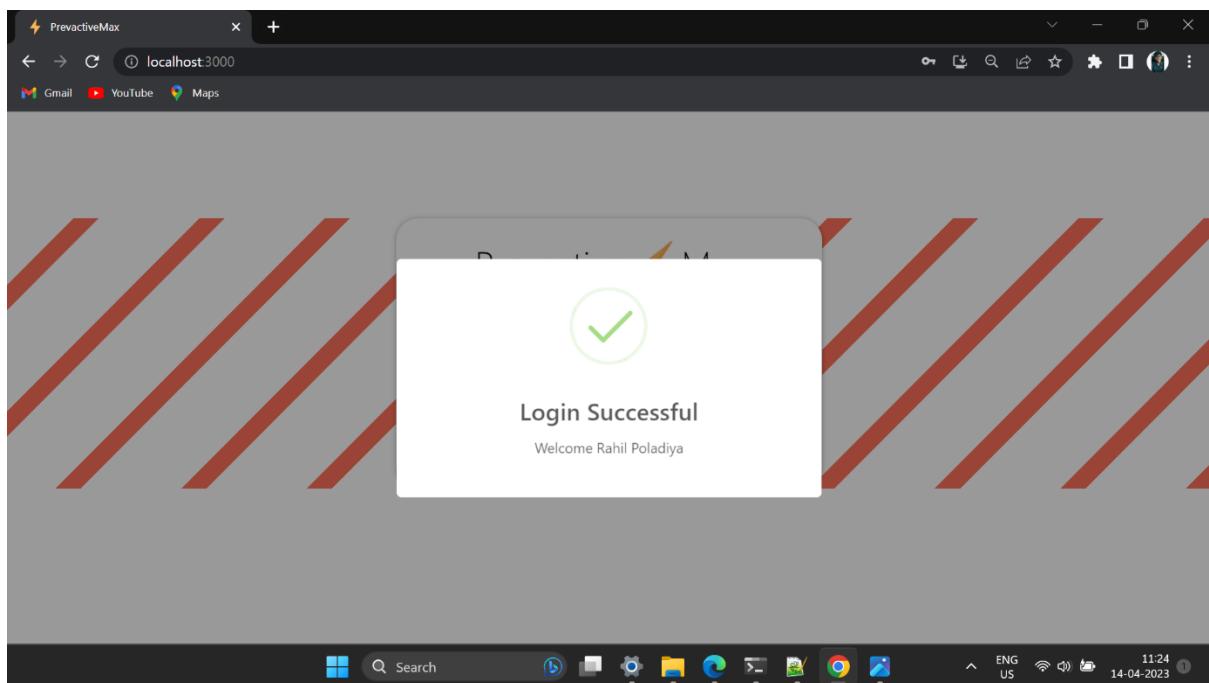
### 1. Login Module



#### 1.1 Login Page



#### 1.2 Login Fail



### 1.3 Login Successful

# Home Modules

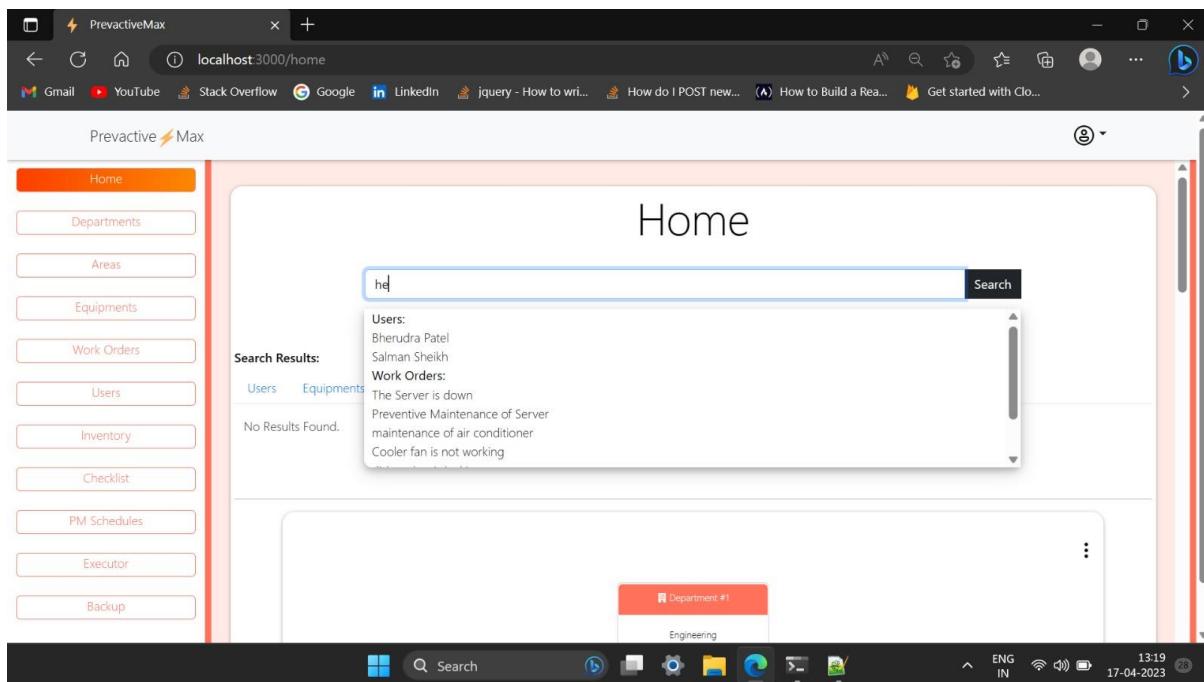
The screenshot displays the 'Home' module of the PrevactiveMax application. On the left, a sidebar lists various modules: Home, Departments, Areas, Equipments, Work Orders, Users, Inventory, Checklist, PM Schedules, Executor, and Backup. The 'Home' button is highlighted. The main area shows a hierarchical tree diagram. At the top level is a red box labeled 'IT'. Below it are two purple boxes: 'Area #3' (containing 'Server Room') and 'Area #4' (containing 'Room 1'). The 'Server Room' node has three black boxes below it: 'Equipment #1', 'Equipment #2', and 'Equipment #3'. The 'Room 1' node has two black boxes below it: 'Equipment #10' and 'Equipment #11'. Below these equipment nodes are their specific details: 'Server V1', 'Server V8', 'Air Conditioner 1', 'PC 1', and 'PC 2'. A dropdown menu in the top right corner also shows 'IT'.

## 2.1 Department-Area-Equipment

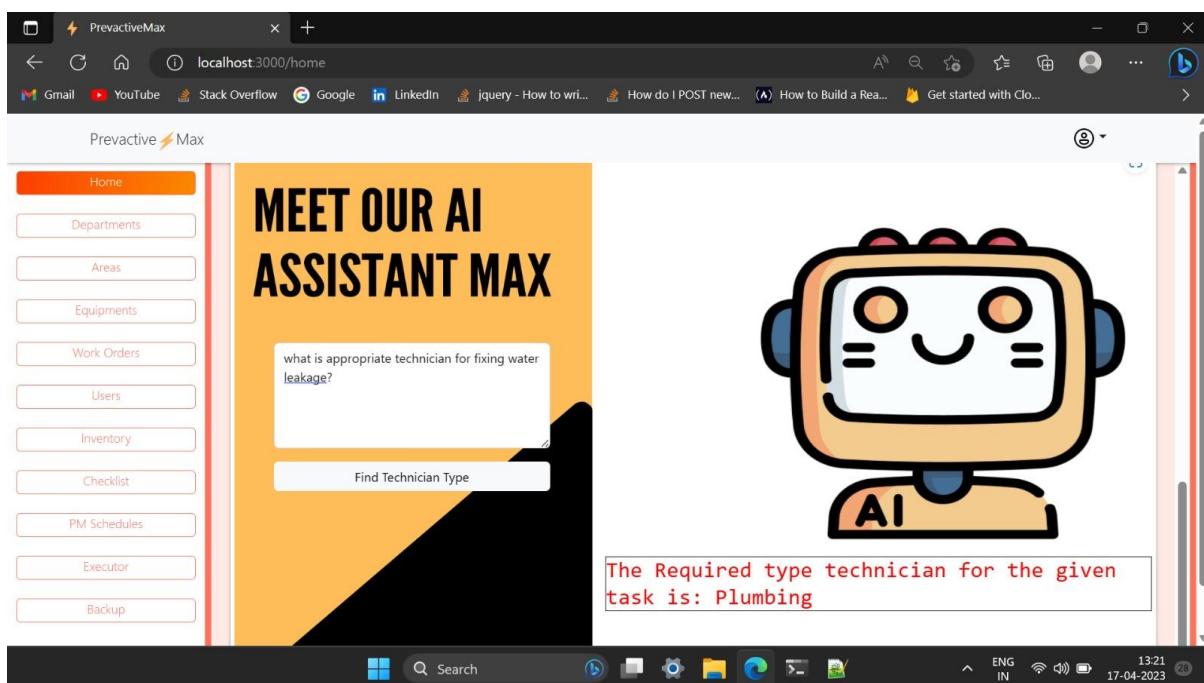
The screenshot shows the search results page within the PrevactiveMax application. The sidebar on the left remains the same. The main area features a search bar with the text 'he' entered. Below the search bar is a table titled 'Search Results:'. The table includes tabs for 'Users', 'Equipments', 'Work Orders', 'Areas', 'Departments', and 'Inventory'. The 'Users' tab is selected. The table has columns: UserNo., Employee, Employee Id, Email, Phone, Type, and Department. There are two rows of data:

UserNo.	Employee	Employee Id	Email	Phone	Type	Department
9	Bherudra Patel	E200503	bmpatel@gmail.com	8042228321	Technician	Utilities
11	Salman Sheikh	E120012	sallubhai@gmail.com	9194939295	User	Firing

## 2.2 Search Result



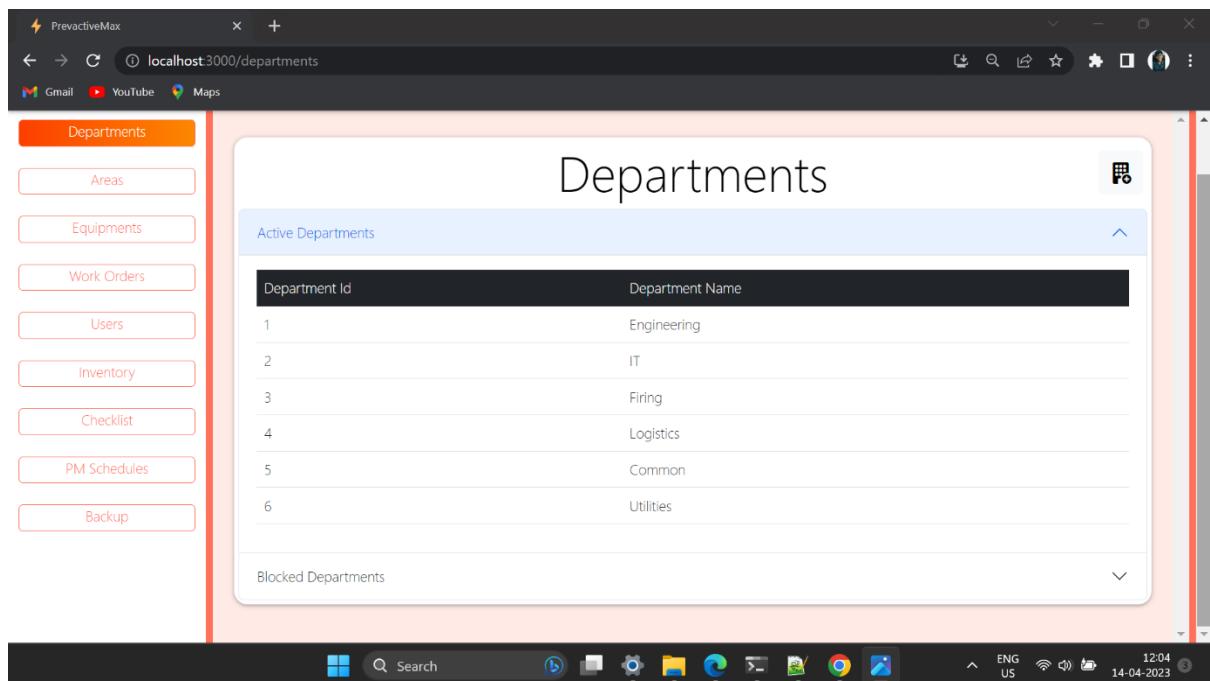
### 2.3 Search Suggestion



### 2.4 Meet Our AI Max

# Master Modules

## 3. Departments

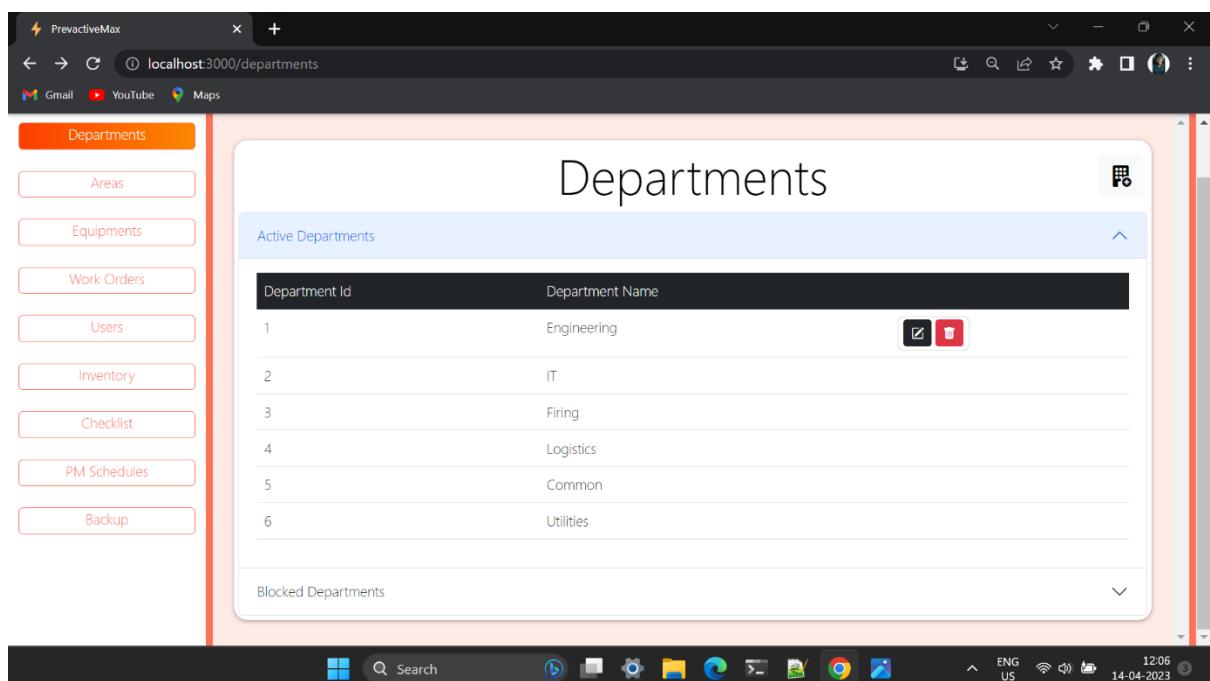


The screenshot shows a web browser window for 'localhost:3000/departments'. The left sidebar has a 'Departments' button highlighted in orange, while others like 'Areas', 'Equipments', etc., are in light red boxes. The main content area is titled 'Departments' and shows a table for 'Active Departments' with the following data:

Department Id	Department Name
1	Engineering
2	IT
3	Firing
4	Logistics
5	Common
6	Utilities

Below this is a section for 'Blocked Departments' which is currently empty.

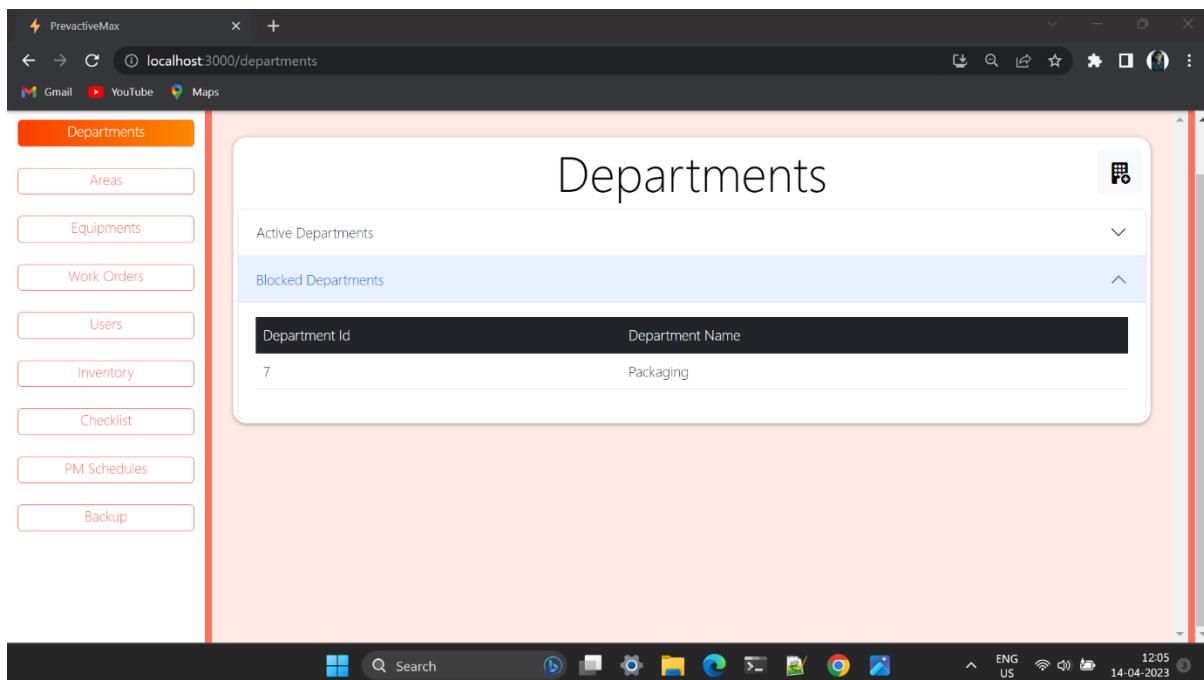
### 3.1 Active Department



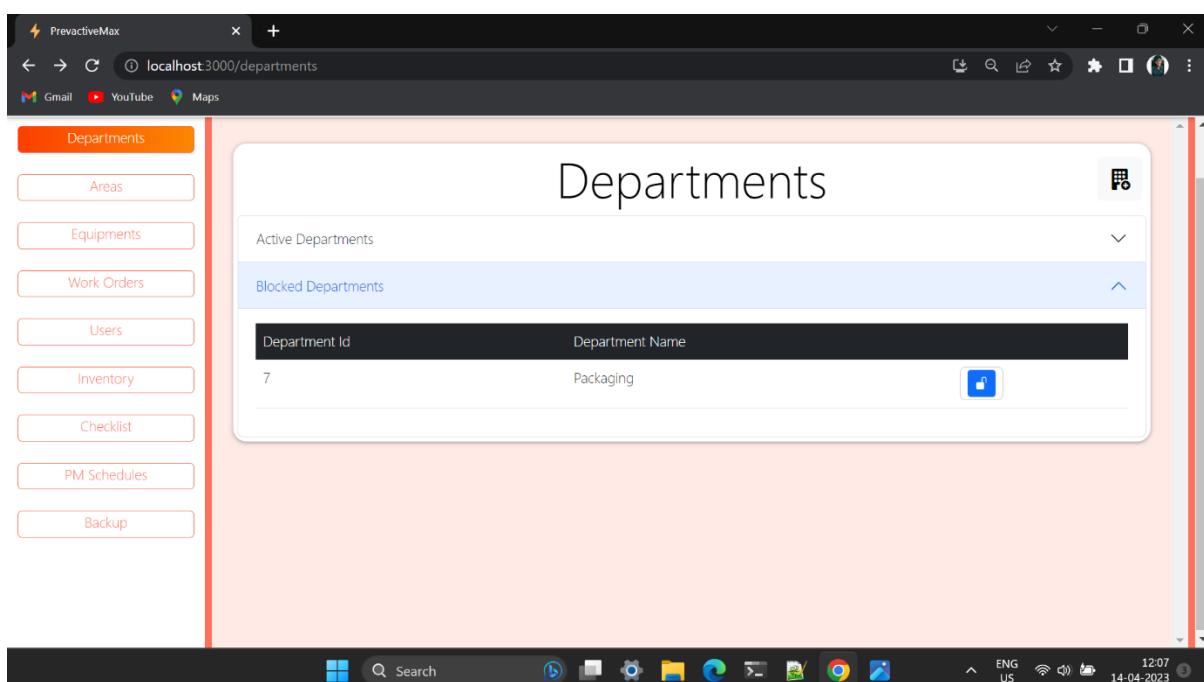
This screenshot is similar to the previous one but shows small edit icons (a pencil and a delete symbol) next to each department name in the 'Active Departments' table.

Department Id	Department Name
1	Engineering
2	IT
3	Firing
4	Logistics
5	Common
6	Utilities

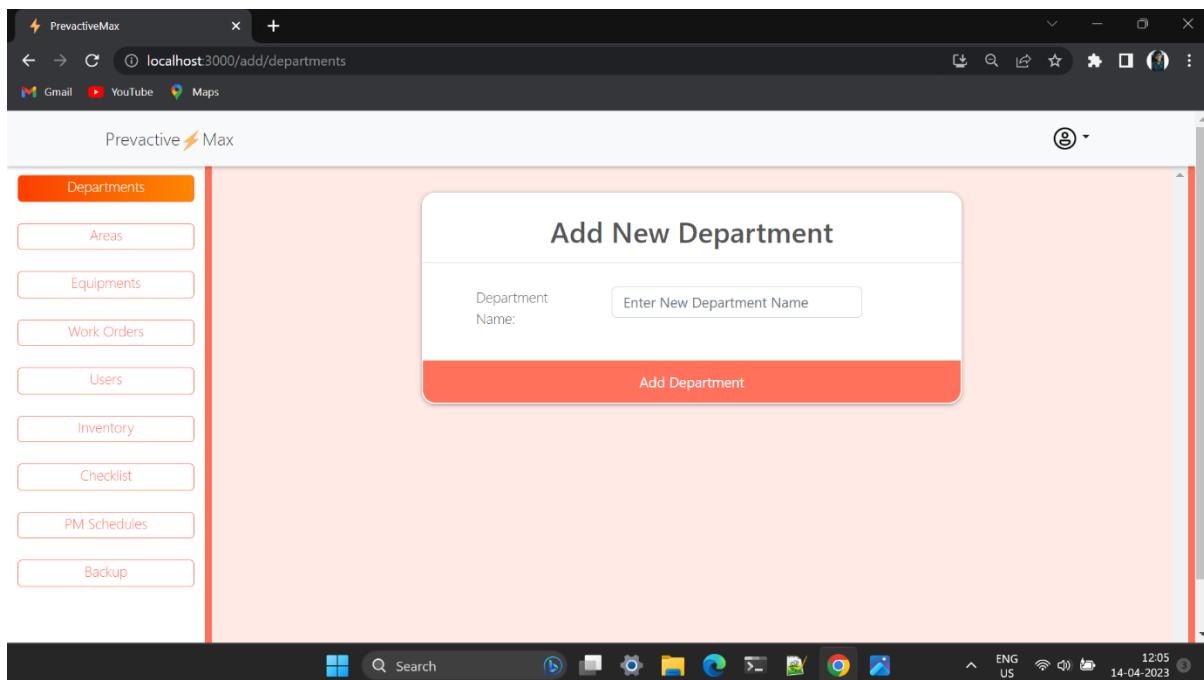
### 3.2 Press and Hold for Actions



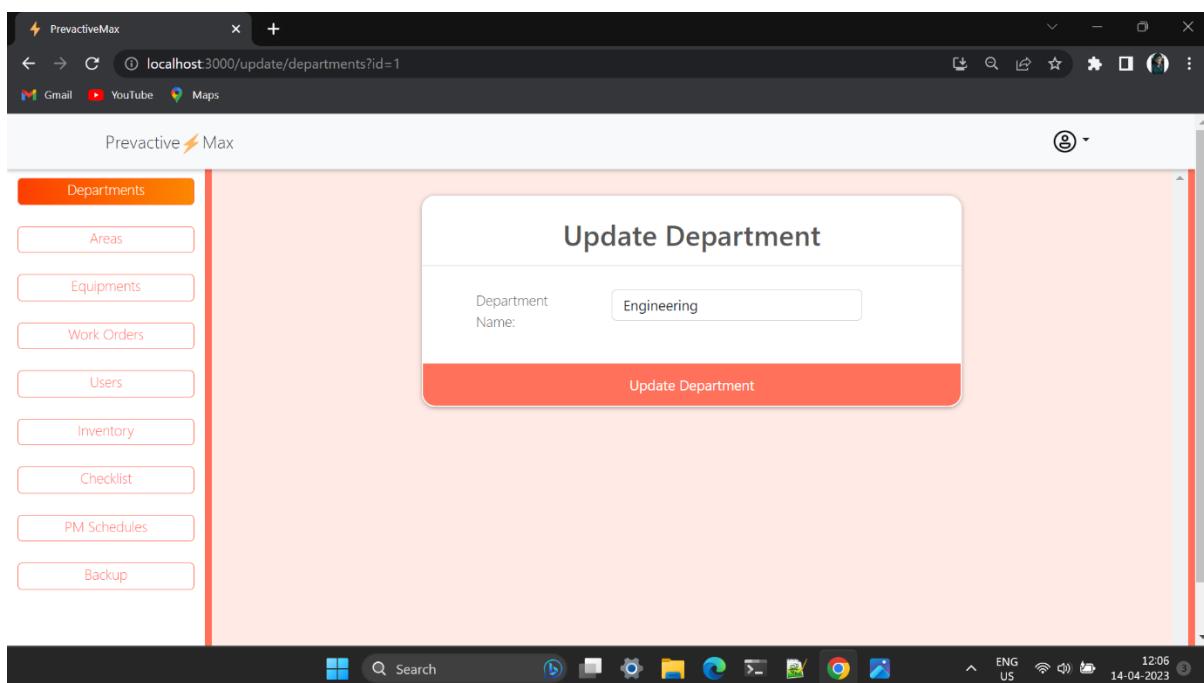
### 3.3 Blocked Department



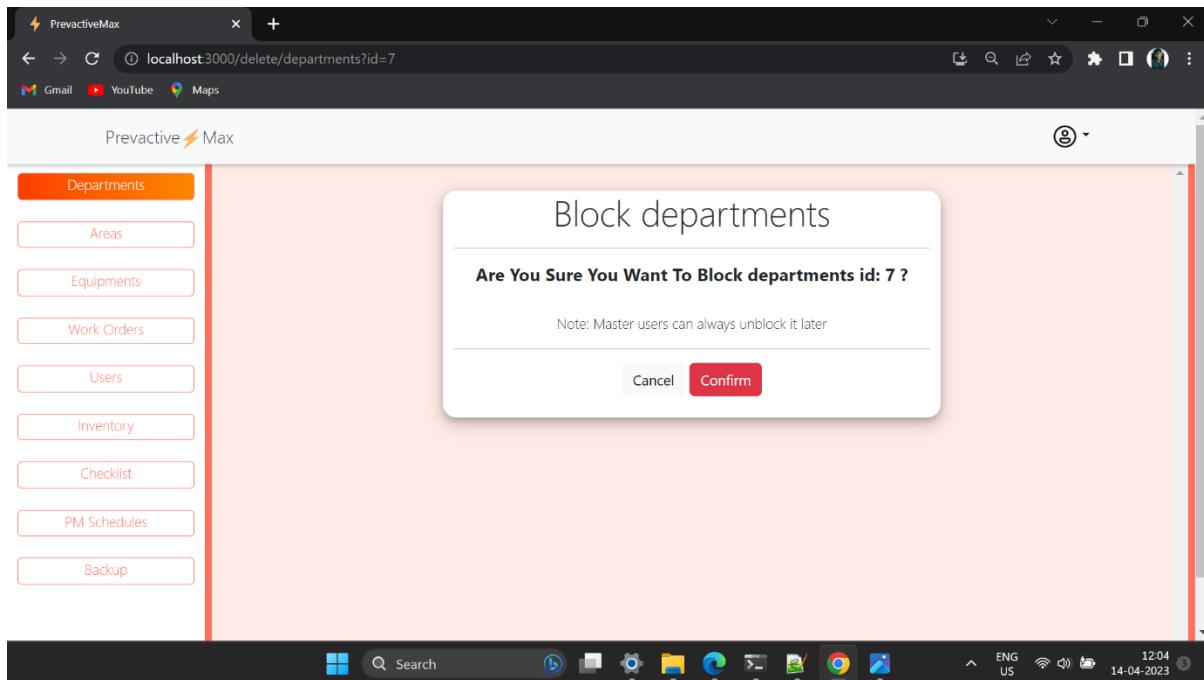
### 3.4 Press and Hold for Actions



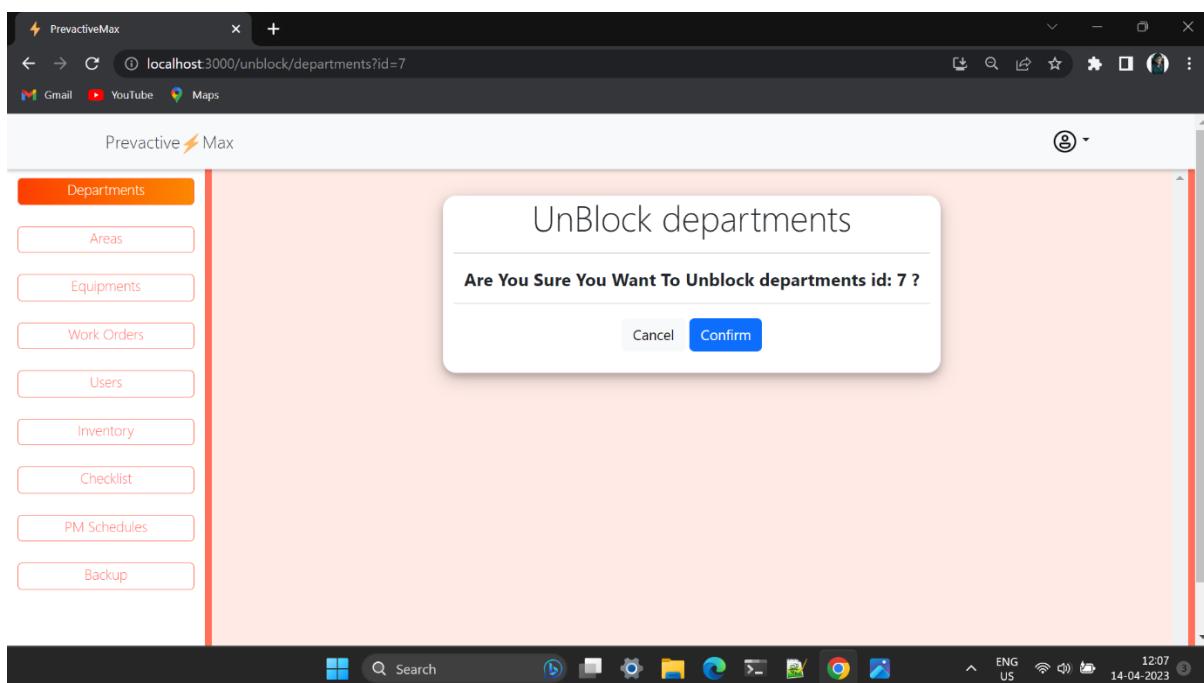
### 3.5 Add New Department



### 3.6 Update Department



### 3.7 Block Department



### 3.8 Unblock Department

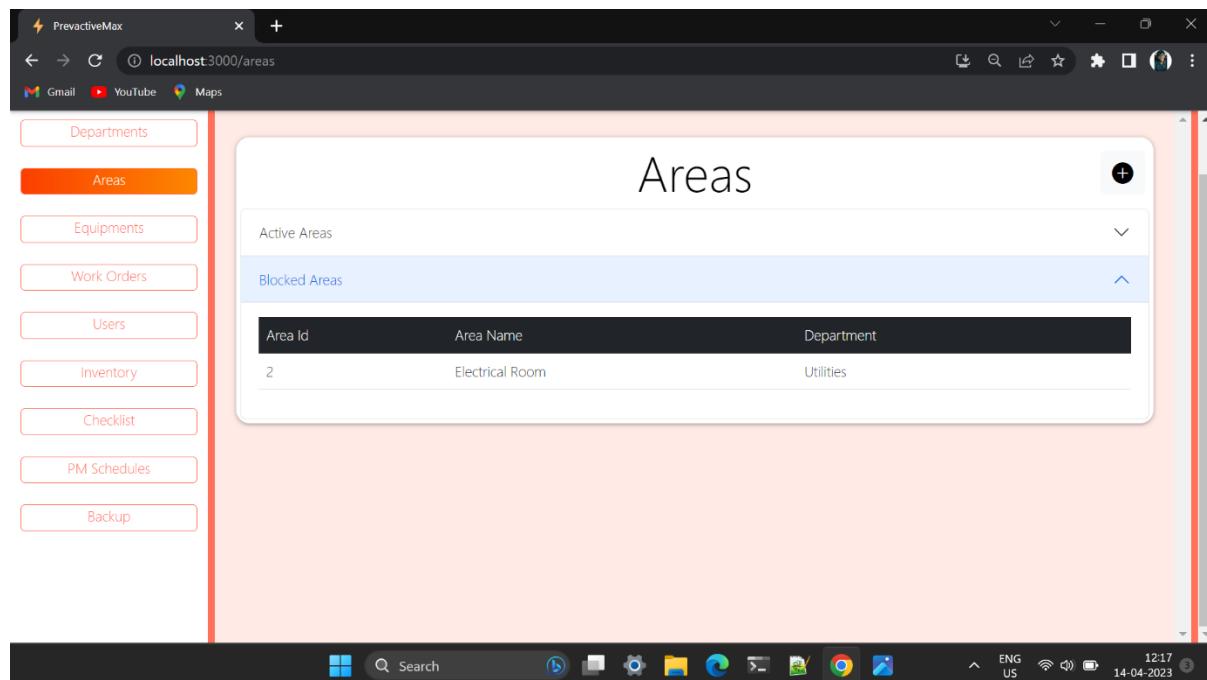
## 4. Area

Area Id	Area Name	Department
5	Loby	Engineering
7	Machine Room	Engineering
3	Server Room	IT
4	Room 1	IT
6	Cabin 2	IT
8	Canteen	Common
9	Washroom	Common
11	Sidewalk	Common
1	Generator Room	Utilities

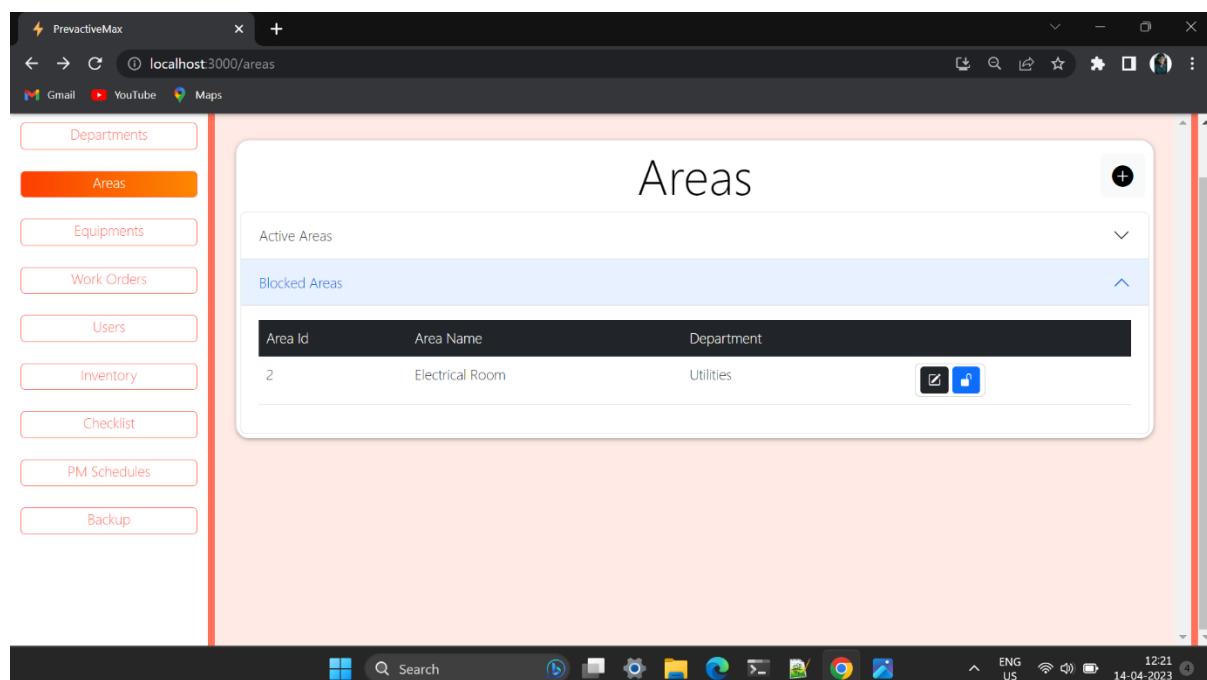
### 4.1 Active Area

Area Id	Area Name	Department
5	Loby	Engineering
7	Machine Room	Engineering
3	Server Room	IT
4	Room 1	IT
6	Cabin 2	IT
8	Canteen	Common
9	Washroom	Common
11	Sidewalk	Common
1	Generator Room	Utilities

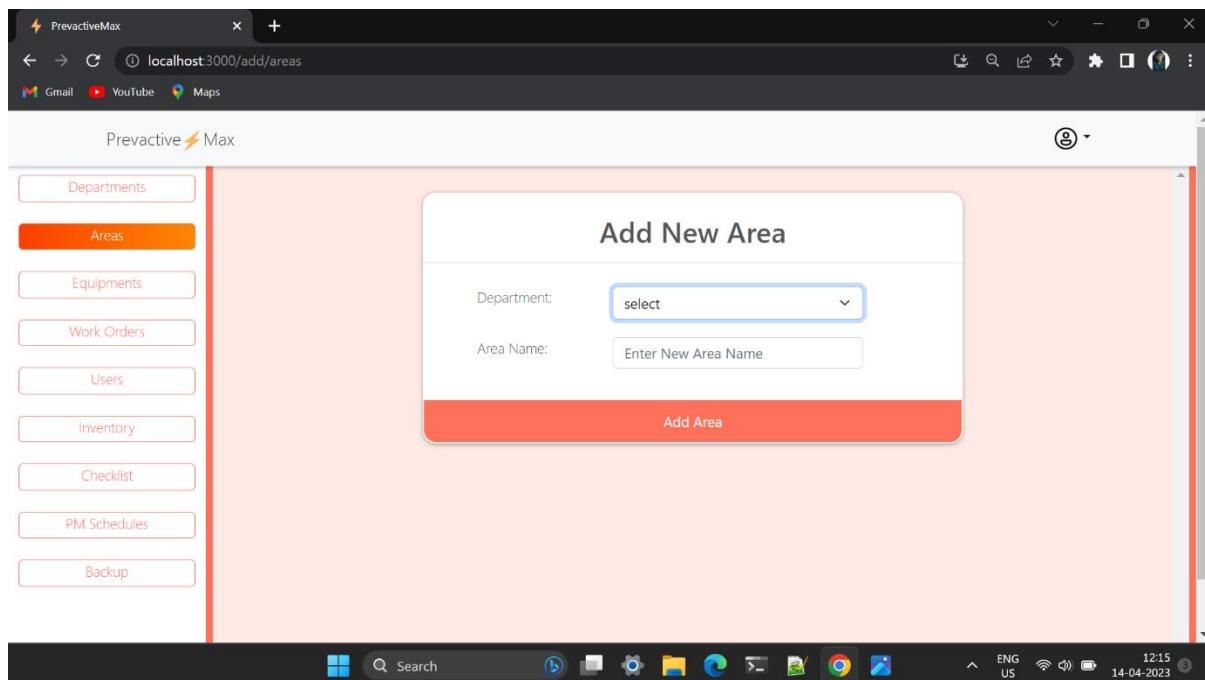
### 4.2 Press and Hold for Actions



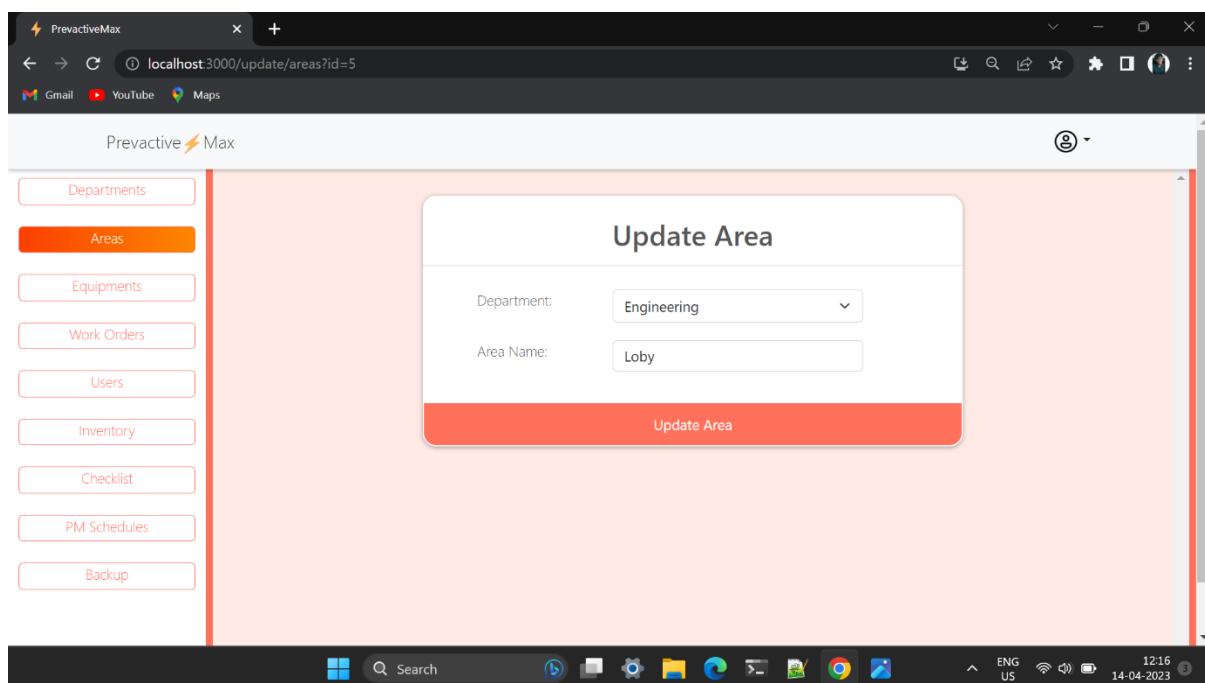
### 4.3 Blocked Area



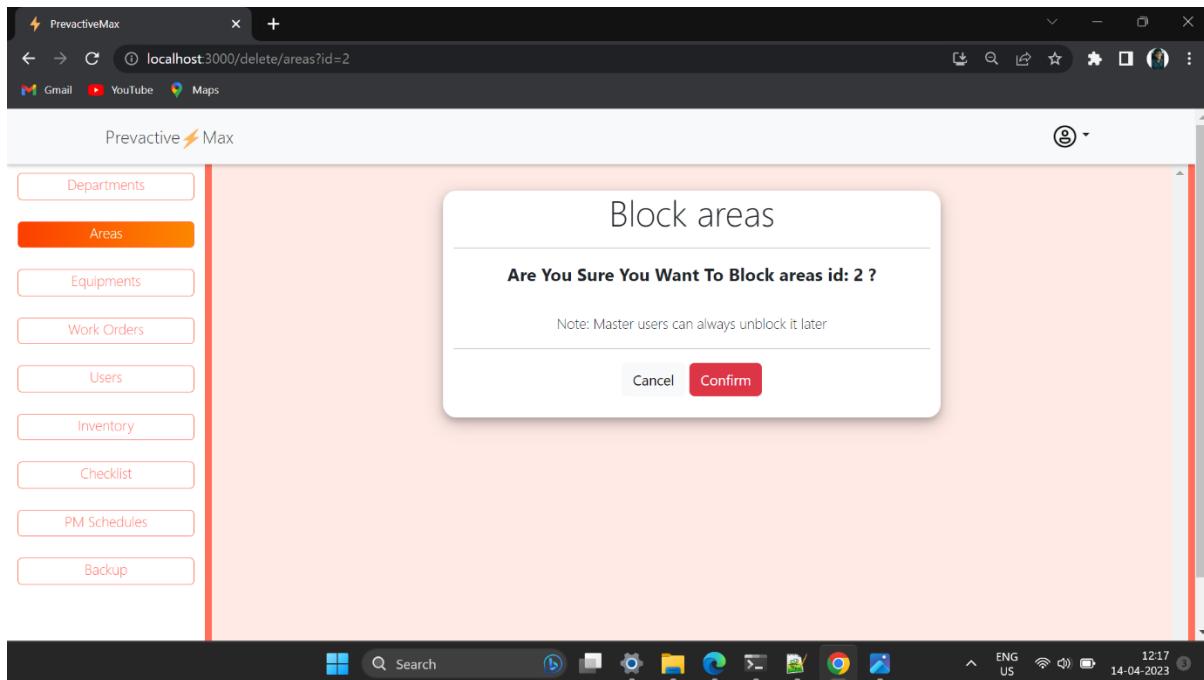
### 4.4 Press and Hold for Actions



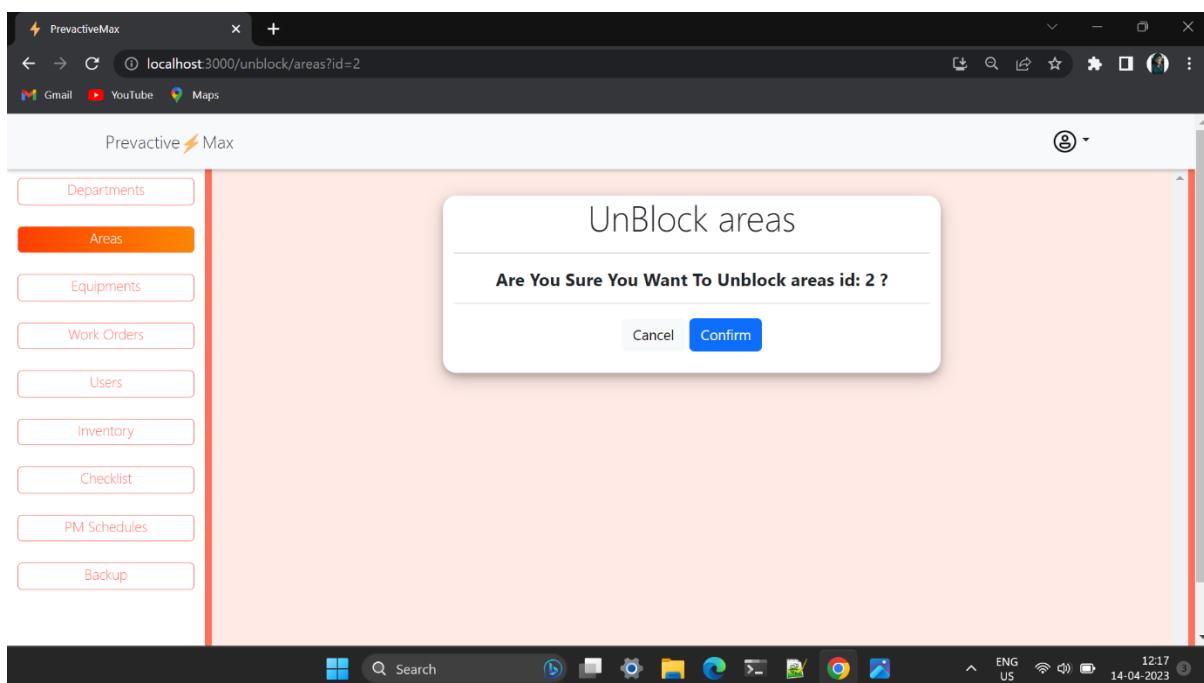
#### 4.5 Add Area



#### 4.6 Update Area



## 4.7 Block Area



## 4.8 Unblock Area

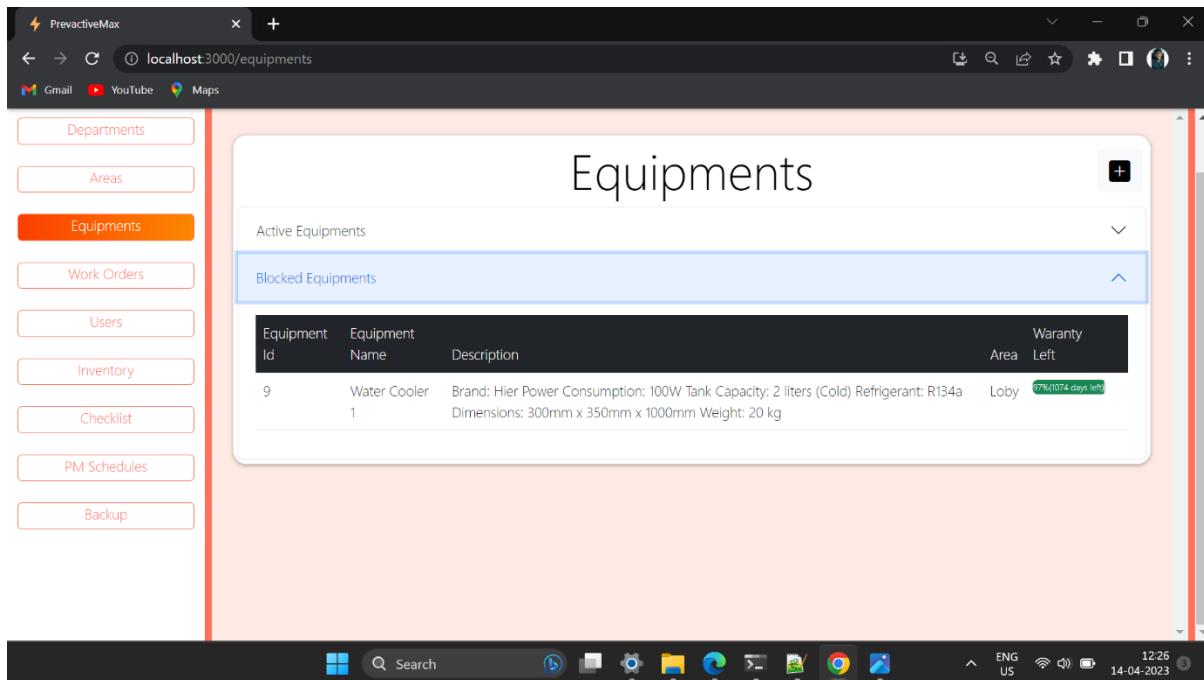
# 5.Equipments

Equipment Id	Equipment Name	Description	Area	Warranty Left
1	Server V1	DELL EMC Server - 500 TB capacity, Windows NT TigerLake , Intel i9 10H005	Server Room	90% (31 days left)
2	Server V8	Oracle Server - 800 TB capacity, Windows NT 2000, AMD U5 3G005	Server Room	85% (31)
3	Air Conditioner 1	Mitsubishi 2 ton Air Conditioner 2kW power consumption	Server Room	80% (31)
4	Elevator 1	Otis Elevator, Speed: 1000 feet per minute, Capacity: 580 Kgs, floors: 3, power-consumption: 7.5 kW	Elevator Loby	75% (31 days left)
5	Elevator 2	Otis Elevator, Speed: 1000 feet per minute, Capacity: 580 Kgs, floors: 3, power-consumption: 7.5 kW	Elevator	70% (31 days left)

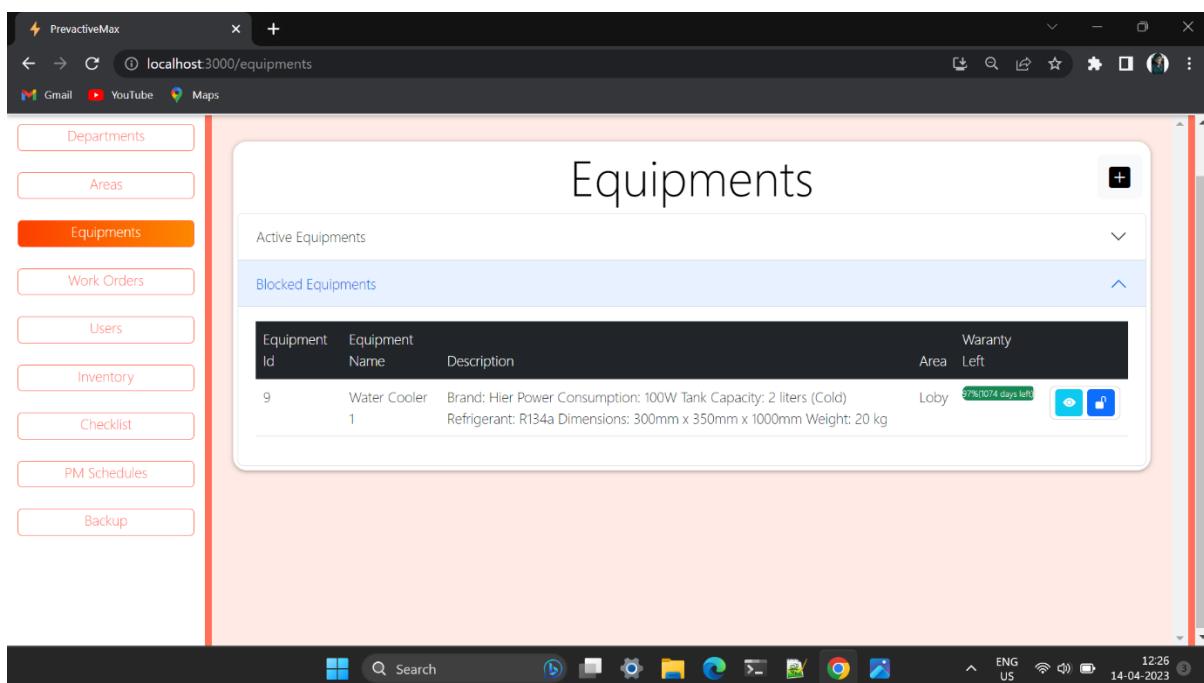
## 5.1 Active Equipment

Equipment Id	Equipment Name	Description	Area	Warranty Left
1	Server V1	DELL EMC Server - 500 TB capacity, Windows NT TigerLake , Intel i9 10H005	Server Room	90% (31 days left)
2	Server V8	Oracle Server - 800 TB capacity, Windows NT 2000, AMD U5 3G005	Server Room	85% (31)
3	Air Conditioner 1	Mitsubishi 2 ton Air Conditioner 2kW power consumption	Server Room	80% (31)
4	Elevator 1	Otis Elevator, Speed: 1000 feet per minute, Capacity: 580 Kgs, floors: 3, power-consumption: 7.5 kW	Elevator Loby	75% (31 days left)
5	Elevator 2	Otis Elevator, Speed: 1000 feet per minute, Capacity: 580 Kgs, floors: 3, power-consumption: 7.5 kW	Elevator	70% (31 days left)
6	Generator 1	KOHLER diesel generator Power with 1000 kW output, V12 Engine,	Generator	65% (736 days left)

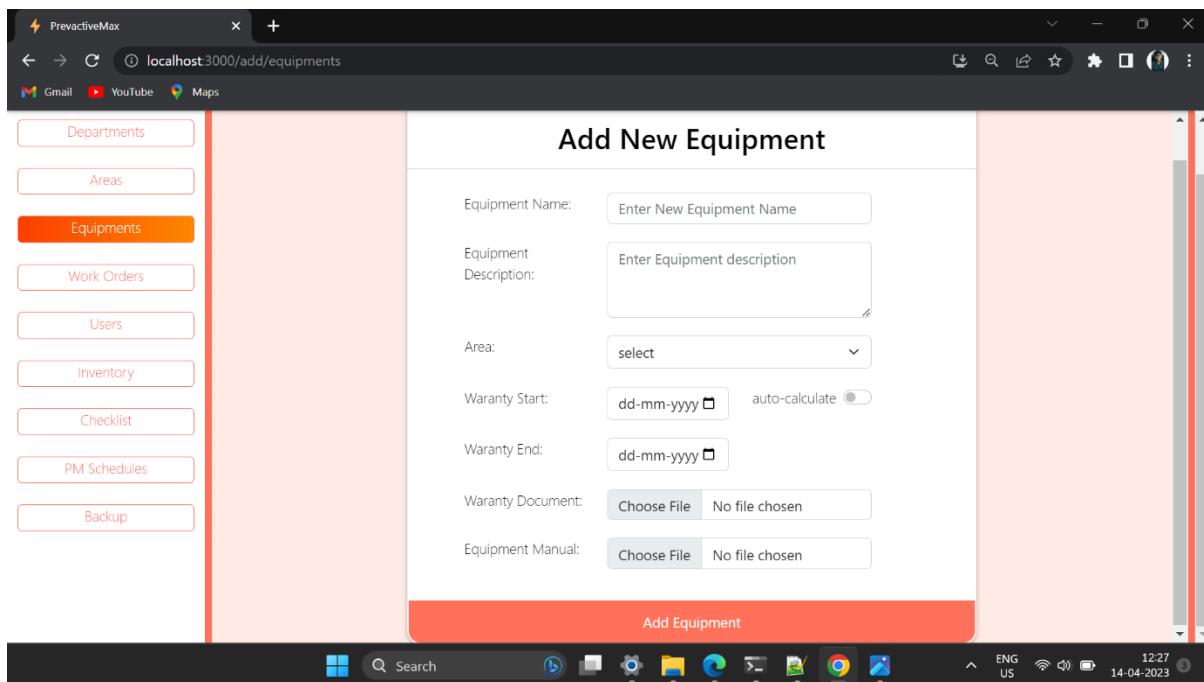
## 5.2 Press And Hold for Actions



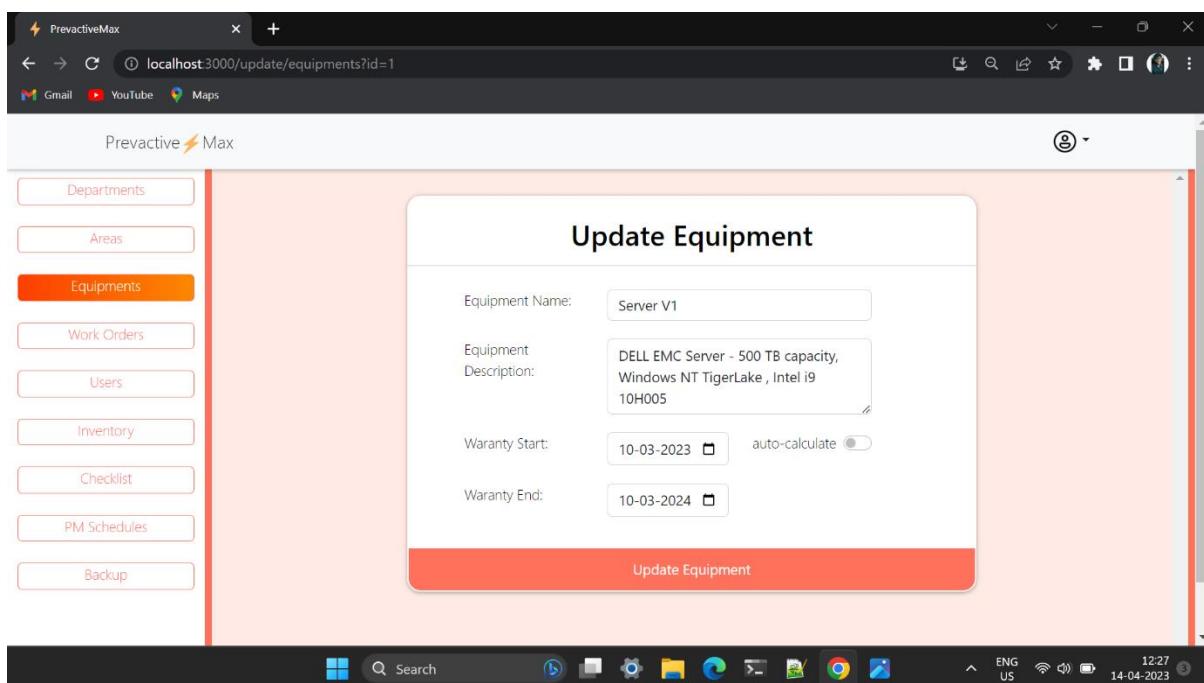
### 5.3 Blocked Equipment



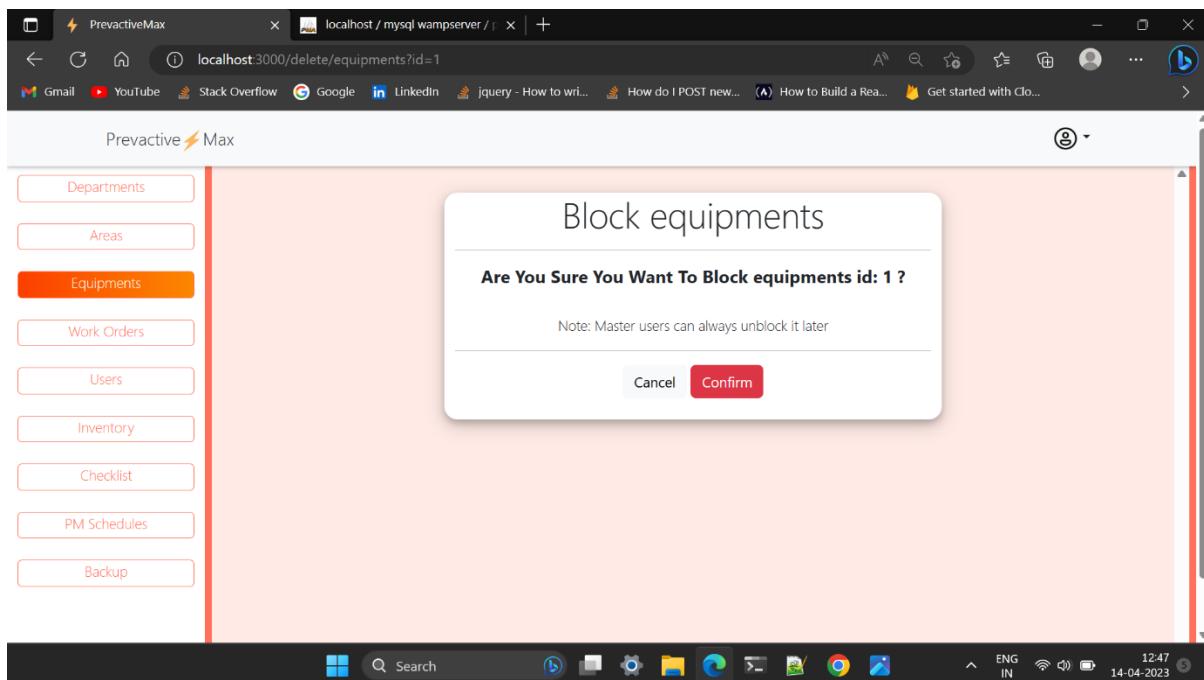
### 5.4 Press And Hold for Actions



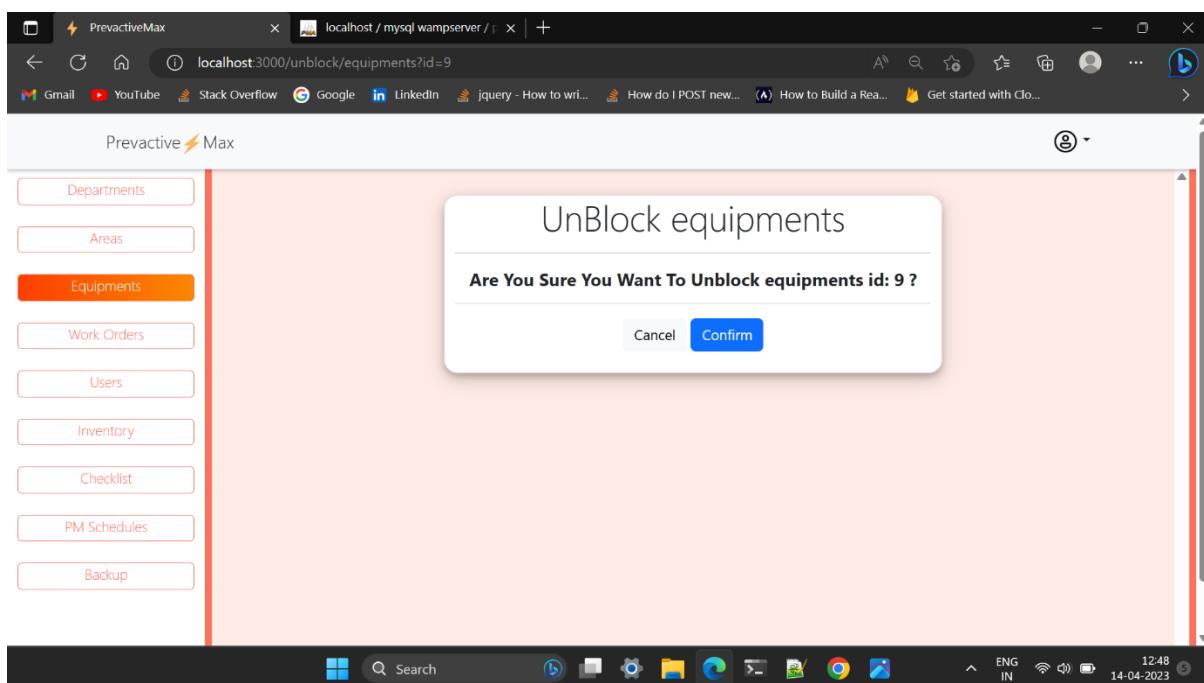
## 5.5 Add New Equipment



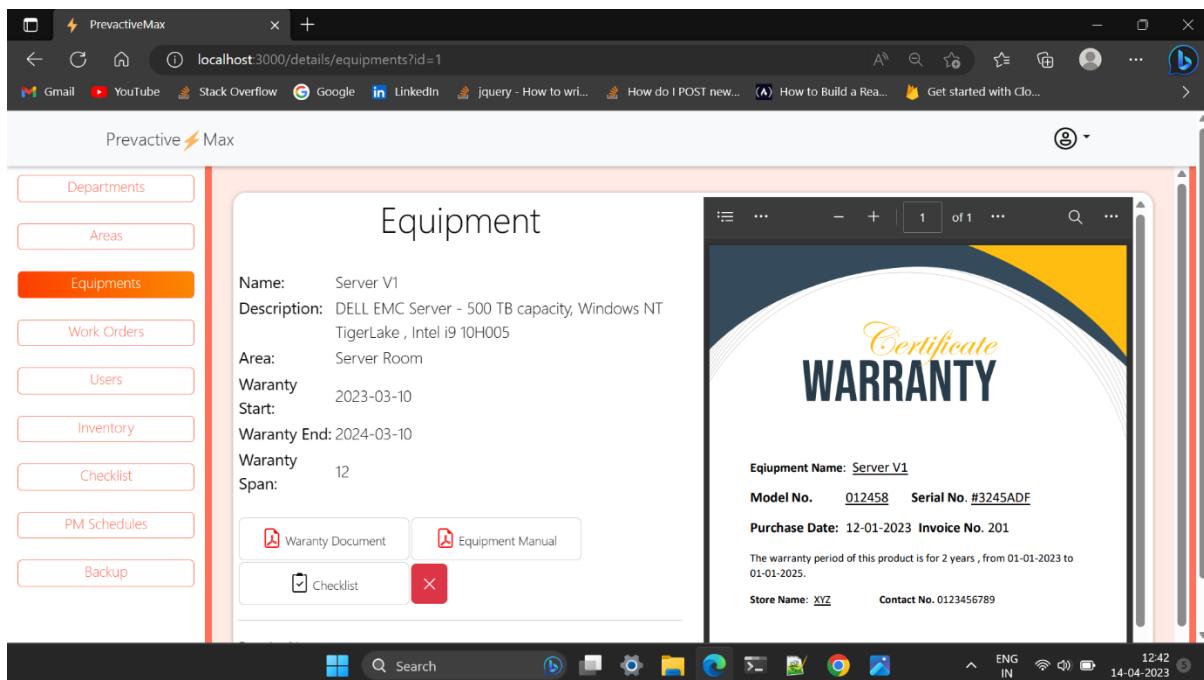
## 5.6 Update Equipment



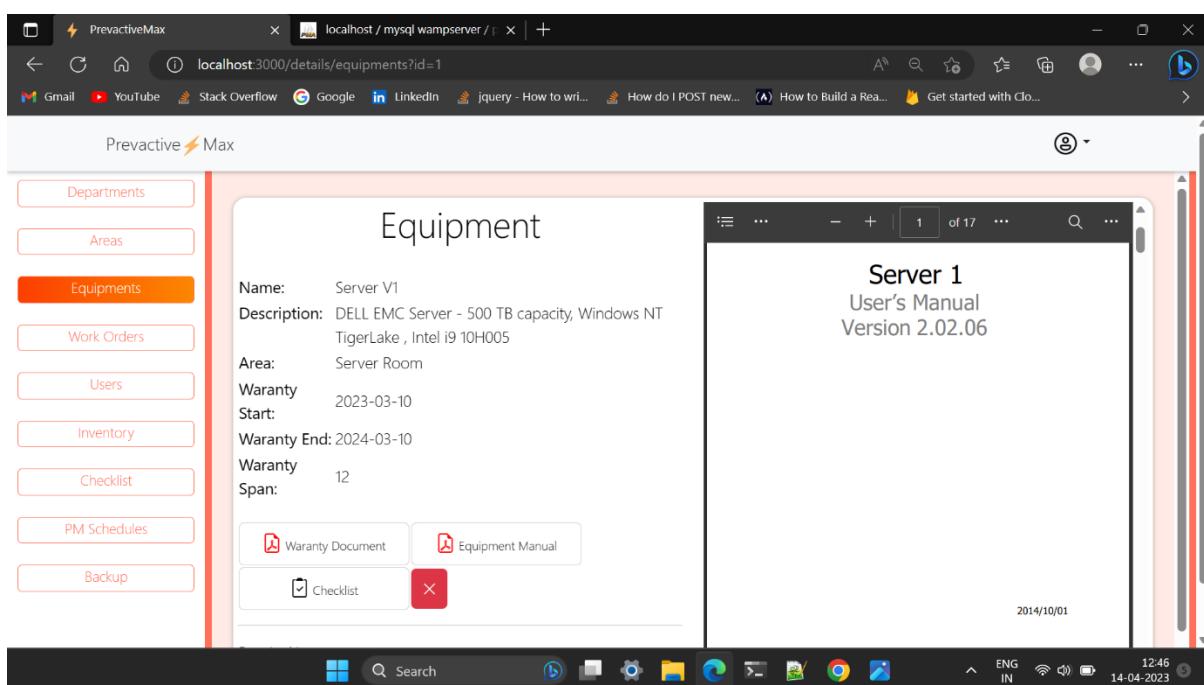
### 5.7 Block Equipment



### 5.8 Unblock Equipment



## 5.9 View Equipment Warranty Certificate



## 5.10 View Equipment User Manual

The screenshot shows the Prevactive Max application running in a browser. On the left, a sidebar menu lists various modules: Departments, Areas, Equipments (highlighted in orange), Work Orders, Users, Inventory, Checklist, PM Schedules, and Backup. The main content area displays details for an equipment item named 'Server V1'. The description states it is a DELL EMC Server - 500 TB capacity, Windows NT TigerLake, Intel i9 10H005, located in the Server Room, with a warranty starting on 2023-03-10 and ending on 2024-03-10. A 'Span' field is set to 12. Below the details are three buttons: 'Warranty Document', 'Equipment Manual', and 'Checklist' (which is checked). A note below says 'Required Inventory: [ Cooling Fans ]'. To the right, a 'Downloads' window is open, listing several files: '26323144013TOTOIndia.Utilitysoftwarebasicdata (3).xlsx', 'server1.pdf' (removed), 'equip1.pdf' (removed), 'mandala (1).png', and 'mandala.png'. A 'See more' link is also visible. The system status bar at the bottom shows the date as 14-04-2023 and the time as 12:47.

## 5.11 Download Checklist

# 6. Work Orders

The screenshot shows the 'Work Orders' module in the Prevactive Max application. The sidebar menu is identical to the previous screenshot, with 'Work Orders' selected. The main content area is titled 'Work Orders' and contains a section for 'Work Order Requests'. This section includes a table header with columns: Work Id, Task, Type, Severity, Made By, For Equipment, and Status. Below the table, two expandable sections are shown: 'Approved Work Orders' and 'Rejected Work Orders'. The system status bar at the bottom shows the date as 14-04-2023 and the time as 12:51.

## 6.1 Work orders

The screenshot shows a web browser window titled "localhost / mysql wampserver /" with the URL "localhost:3000/workorders". The main content area is titled "Work Orders" and displays a table of "Approved Work Orders". The table has columns: Work Id, Task, Type, Severity, Made By, For Equipment, and Status. The data is as follows:

Work Id	Task	Type	Severity	Made By	For Equipment	Status
2	The Server is down	Reactive	Emergency	Rahil Poladiya	Server V1	<span>Assigned</span>
3	Preventive Maintenance of Server	Preventive	Low	Krupal Sindhia	Server V1	<span>Assigned</span>
4	maintenance of air conditioner	Preventive	Low	Krupal Sindhia	Air Conditioner 1	<span>Assigned</span>
5	Computer is not turning on	Reactive	Emergency	Krupal Sindhia	PC 1	<span>Completed</span>
6	Computer needs repairing	Reactive	Medium	Krupal Sindhia	PC 3	<span>In Progress</span>
7	Cooler fan is not working	Reactive	Medium	Kruti Jadav	Cooler Fan 1	<span>Pending Approval</span>
1	Change Elevator door interlocks	Preventive	Medium	Krupal Sindhia	Elevator 1	<span>Completed</span>

Below the table, there is a section titled "Rejected Work Orders" which is currently empty.

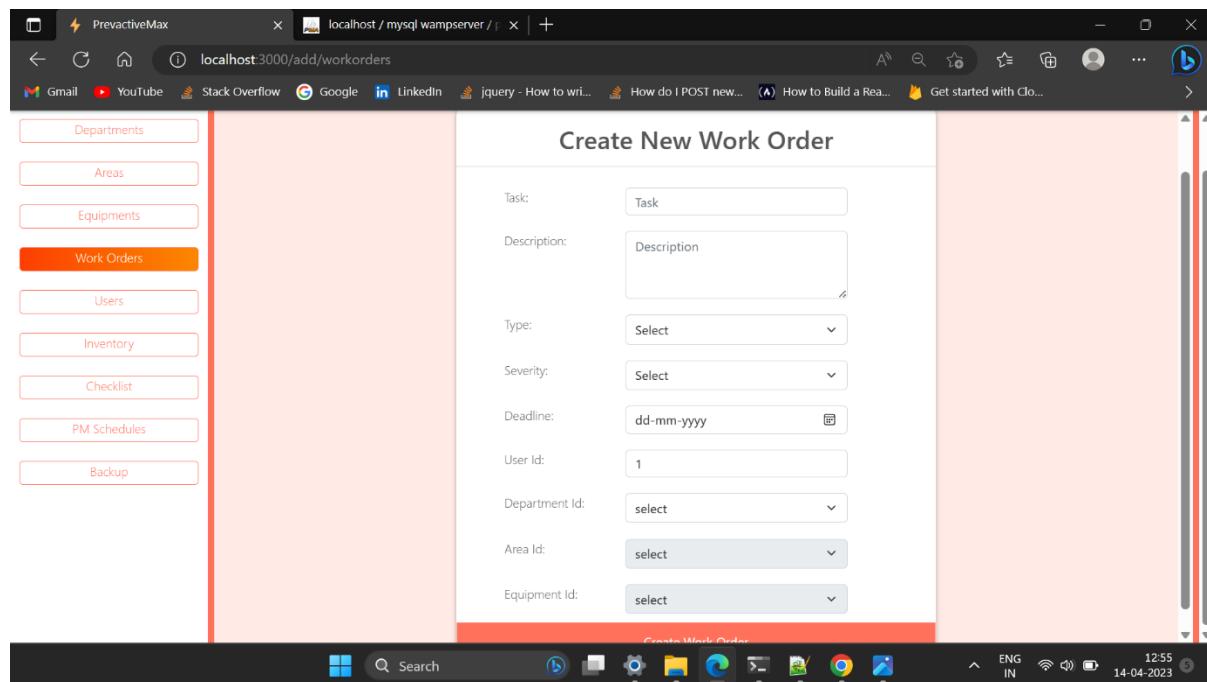
## 6.2 Approved Work orders

The screenshot shows the same web browser window and URL as the previous one. The main content area is titled "Work Orders" and displays a table of "Rejected Work Orders". The table has columns: Work Id, Task, Type, Severity, Made By, For Equipment, and Status. The data is as follows:

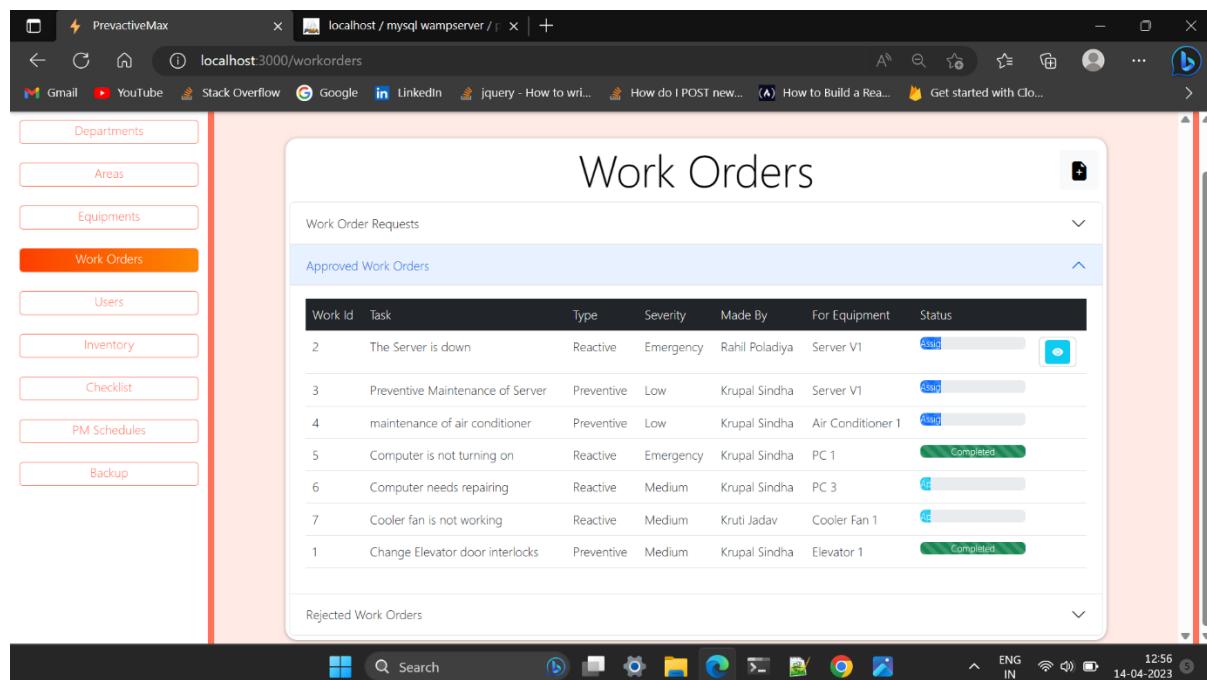
Work Id	Task	Type	Severity	Made By	For Equipment	Status

Below the table, there is a section titled "Approved Work Orders" which is currently empty.

## 6.3 Rejected Work Orders



## 6.4 Create New Work Order



## 6.5 Press and Hold For Actions

The screenshot shows a web browser window for 'localhost:3000/details/workorders?id=1'. The main content area displays a 'Work Order#1' titled 'Details'. The work order information includes:

- Task:** Change Elevator door interlocks
- Description:** Elevator door interlocks are making squeaking noise and need to be replaced
- Type:** Preventive
- Deadline:** 2023-03-28
- Requested By:** Krupal Sindhia
- Location:** @ Area: Elevator Loby, In Dept: Utilities
- Equipment:** Elevator 1
- Progress:** Completed (represented by a green progress bar)
- Assigned Technician:** Aryan Kenia
- Date of Assigning:** 2023-03-27 00:00:00
- Completion Date:** 2023-03-28 00:00:00

Below the details, there is a section titled 'Work Order Quotation' with a table showing inventory used:

sr.	Item	Qty	Cost
1	HD Steel Roller w/ Ball Bearings	5	9570
2	Interlock Control Panel	1	11179
	<b>Gross Total:</b>		20749

The left sidebar menu has 'Work Orders' selected. The bottom taskbar shows various application icons and the system date/time: 14-04-2023, 12:57, ENG IN.

## 6.6 View Work Order Status

The screenshot shows a web browser window for 'localhost:3000/details/workorders?id=1'. The main content area displays a 'Work Order Quotation' section with the following details:

- Title:** Quotation for Elevator Repair
- Description:** Elevator door bearings need to be replaced also need to oil and polish it.
- Estimated Cost:** ₹21000

Below this, there is a table titled 'Inventory Used' showing the same items and quantities as in the previous screenshot.

The left sidebar menu has 'Work Orders' selected. The bottom taskbar shows various application icons and the system date/time: 14-04-2023, 12:57, ENG IN.

## 6.7 View Work Quotation Details

## 7. Users

UserNo.	Employee Name	EmployeeId	Department	Type
1	Rahil Poladiya	E000033	IT	Master
2	Krupal Sindha	E109075	IT	Admin
3	Ravi Shah	E310407	Common	Technician
4	Kashish Verma	E890031	Engineering	Admin
5	Kruti Jadav	E152012	Engineering	User
6	Vivek Gajara	E404140	Common	Admin
7	Paresh Prajapati	E120001	Common	Master
8	Veeksha Shah	E750718	Logistics	User
9	Bherudra Patel	E200503	Utilities	Technician
10	Aryan Kenia	E124132	Logistics	Technician

### 7.1 Active Users

UserNo.	Employee Name	EmployeeId	Department	Type
1	Rahil Poladiya	E000033	IT	Master
2	Krupal Sindha	E109075	IT	Admin
3	Ravi Shah	E310407	Common	Technician
4	Kashish Verma	E890031	Engineering	Admin
5	Kruti Jadav	E152012	Engineering	User
6	Vivek Gajara	E404140	Common	Admin
7	Paresh Prajapati	E120001	Common	Master
8	Veeksha Shah	E750718	Logistics	User
9	Bherudra Patel	E200503	Utilities	Technician

### 7.2 Press and Hold For Actions

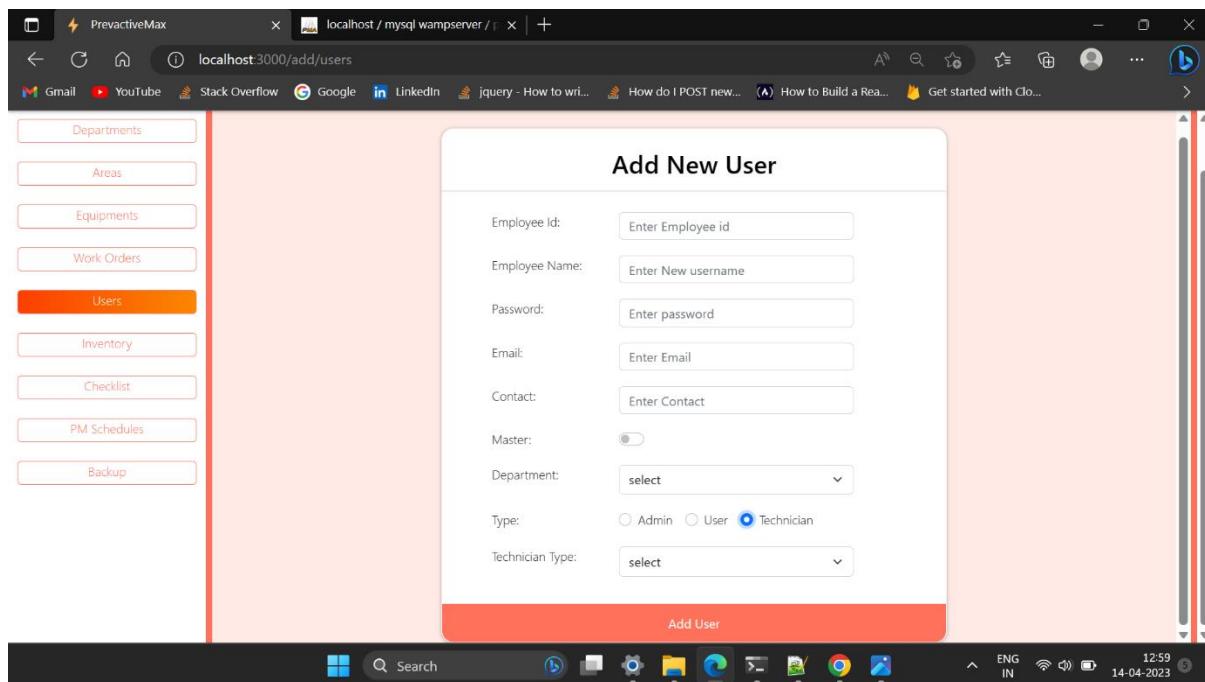
The screenshot shows the Prevactive Max application interface. On the left, there is a sidebar with various menu items: Departments, Areas, Equipments, Work Orders, Users (which is currently selected), Inventory, Checklist, PM Schedules, and Backup. The main content area has a title 'Users' at the top. Below it, there are two sections: 'Active Users' and 'Blocked Users'. Under 'Blocked Users', there is a table with the following data:

UserNo.	Employee Name	EmployeeId	Department	Type
12	Krutarth Yadav	E140321	Logistics	Technician
13	Yuvraj Raj	E1779030	Common	Technician
14	Wayne Bruce	E120481	Firing	Technician

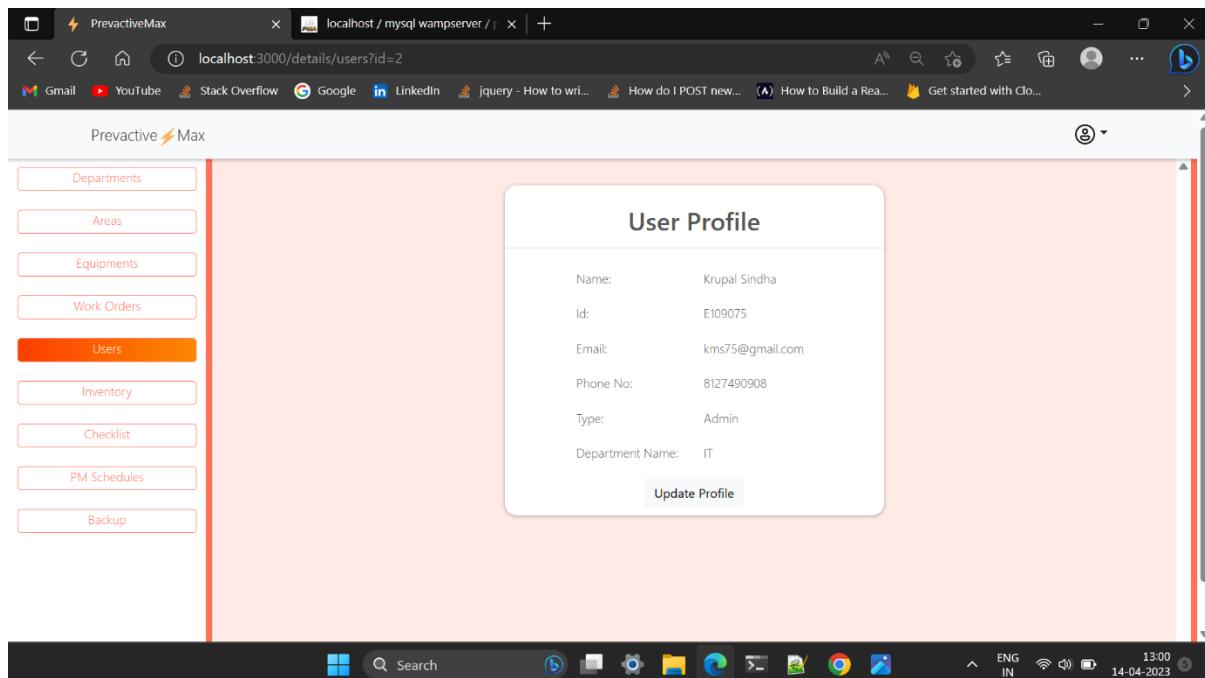
### 7.3 Blocked Users

This screenshot is similar to the one above, showing the 'Users' section of the Prevactive Max application. The sidebar and table structure are identical. However, the last two columns of the 'Blocked Users' table now contain small blue circular icons with white symbols, likely representing additional actions or details for each user row.

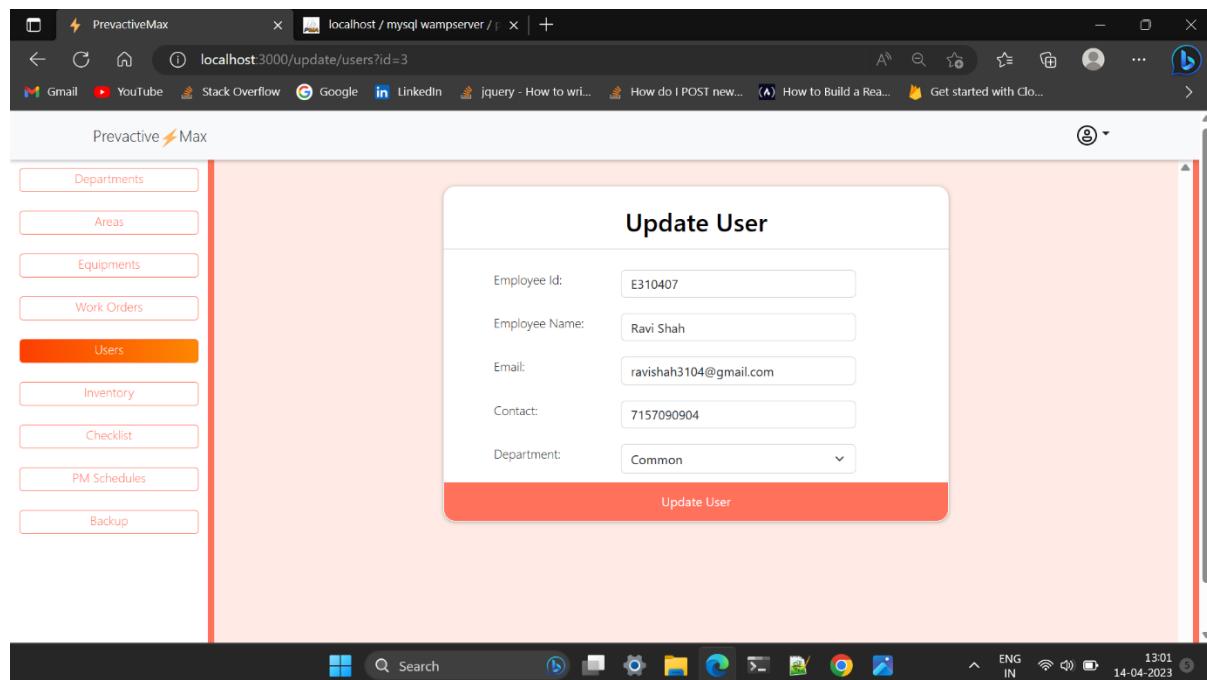
### 7.4 Press and Hold for Actions



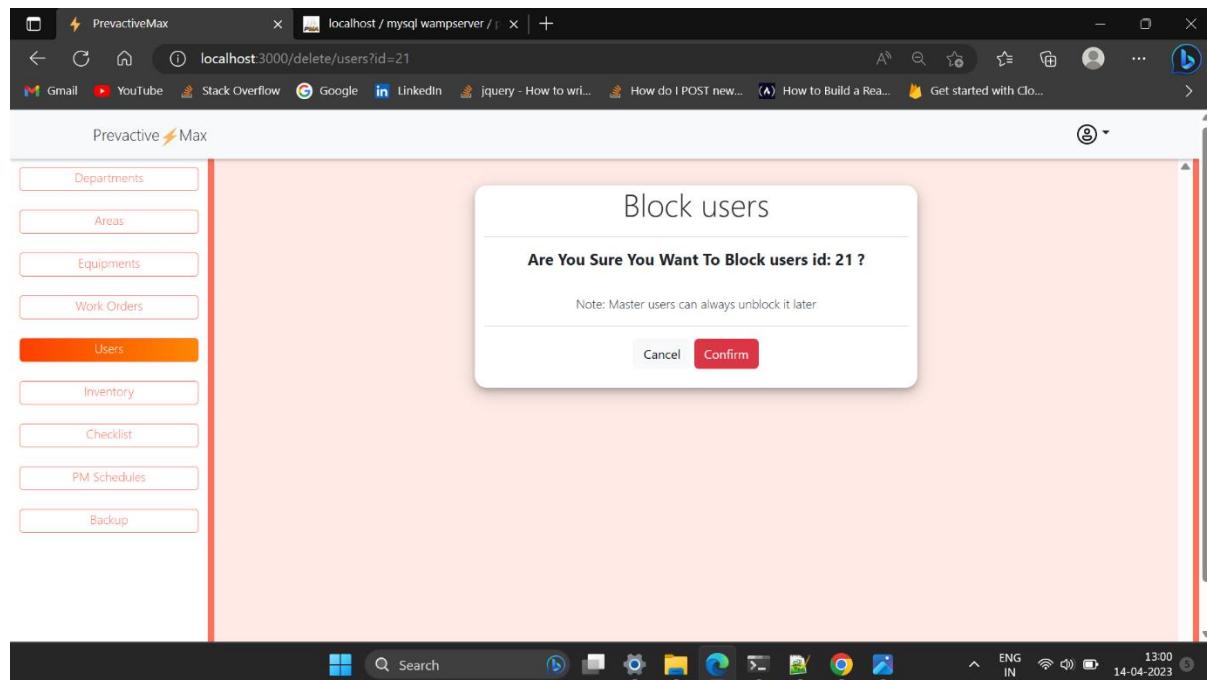
### 7.5 Add New User



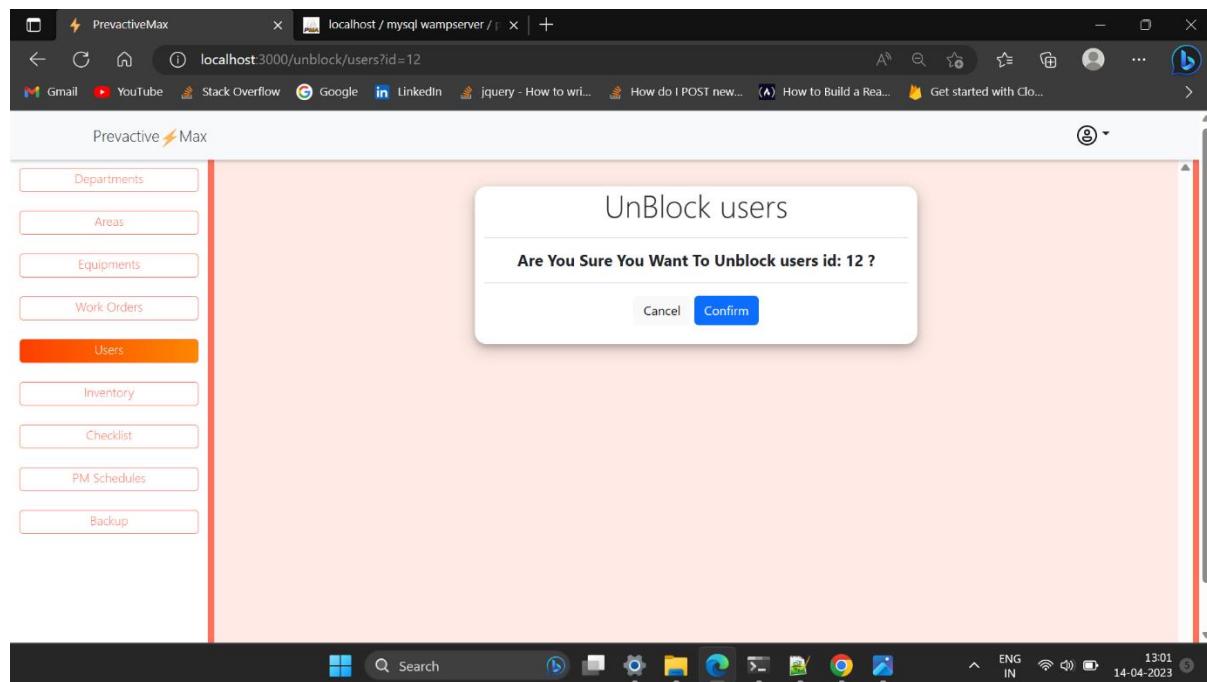
### 7.6 View User Profile



### 7.7 Update User Profile



### 7.8 Block User



### 7.9 Unblock User

## 8. Inventory

The screenshot shows a web browser window for 'localhost:3000/inventory'. On the left, there is a vertical sidebar with rounded corners containing several buttons: 'Departments', 'Areas', 'Equipments', 'Work Orders', 'Users', 'Inventory' (which is highlighted in orange), 'Checklist', 'PM Schedules', and 'Backup'. The main content area is titled 'Inventory' and contains a sub-section titled 'Active Inventory'. A table lists eight items with columns: 'Inventory Id', 'Item Name', 'Description', 'Cost(per pcs)', and 'Quantity in-stock(pcs)'. The items listed are:

Inventory Id	Item Name	Description	Cost(per pcs)	Quantity in-stock(pcs)
1	HD Steel Roller w/ Ball Bearings	Heavy-duty steel roller with ball bearings for smooth operation.	1914	50
2	Nylon Roller w/ Sealed Bearings	Nylon roller with sealed bearings for quiet operation.	1471	75
3	Door Interlock Switch	A safety switch that prevents the elevator from moving if the door is not properly closed.	1933	100
4	Interlock Control Panel	A control panel that manages the interlock system and provides visual feedback of the door status.	11179	19
6	Door Interlock Relay	An electronic relay that controls the door interlock system and ensures proper operation.	2288	60
7	Air Filters	Standard size air filters for AC units	230	150
8	Belts	Serpentine belt for AC compressor	400	50

The browser's address bar shows 'localhost:3000/inventory'. The taskbar at the bottom of the screen includes icons for File, Home, Task View, Start, Search, and various pinned applications like Microsoft Edge, File Explorer, and Task Manager. The date and time '14-04-2023 13:02' are also visible on the taskbar.

### 8.1 Active Inventory

The screenshot shows a web browser window for 'localhost:3000/inventory'. On the left, a vertical sidebar menu lists 'Departments', 'Areas', 'Equipments', 'Work Orders', 'Users', 'Inventory' (which is highlighted in orange), 'Checklist', 'PM Schedules', and 'Backup'. The main content area is titled 'Inventory' and contains a sub-section titled 'Out Of Stock'. A table displays the following data:

InventoryId	Item Name	Description	Cost(per pcs)	Quantity in-stock(pcs)
5	Door Contact Sensor	A sensor that detects the presence of objects in the elevator door's path, preventing it from closing and potentially causing harm.	1226	0

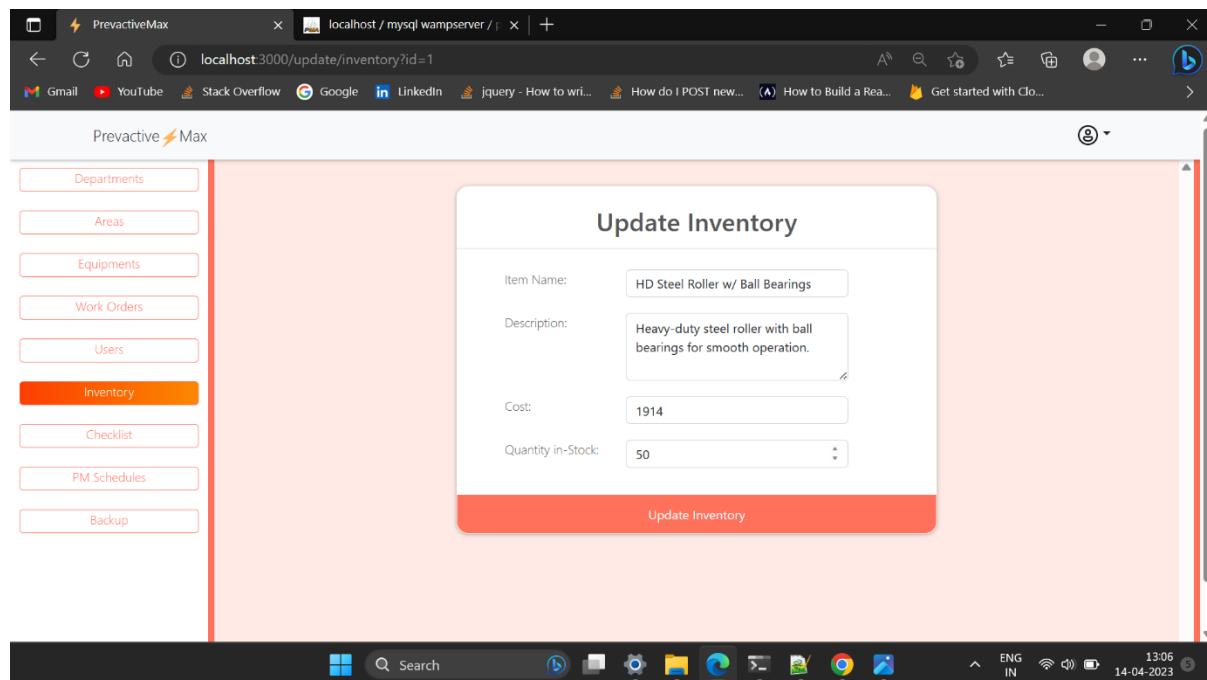
## 8.2 Out Of Stock Inventory

The screenshot shows a web browser window for 'localhost:3000/add/inventory'. The left sidebar is identical to the previous screenshot. The main content area is titled 'Add New Item to Inventory' and contains four input fields:

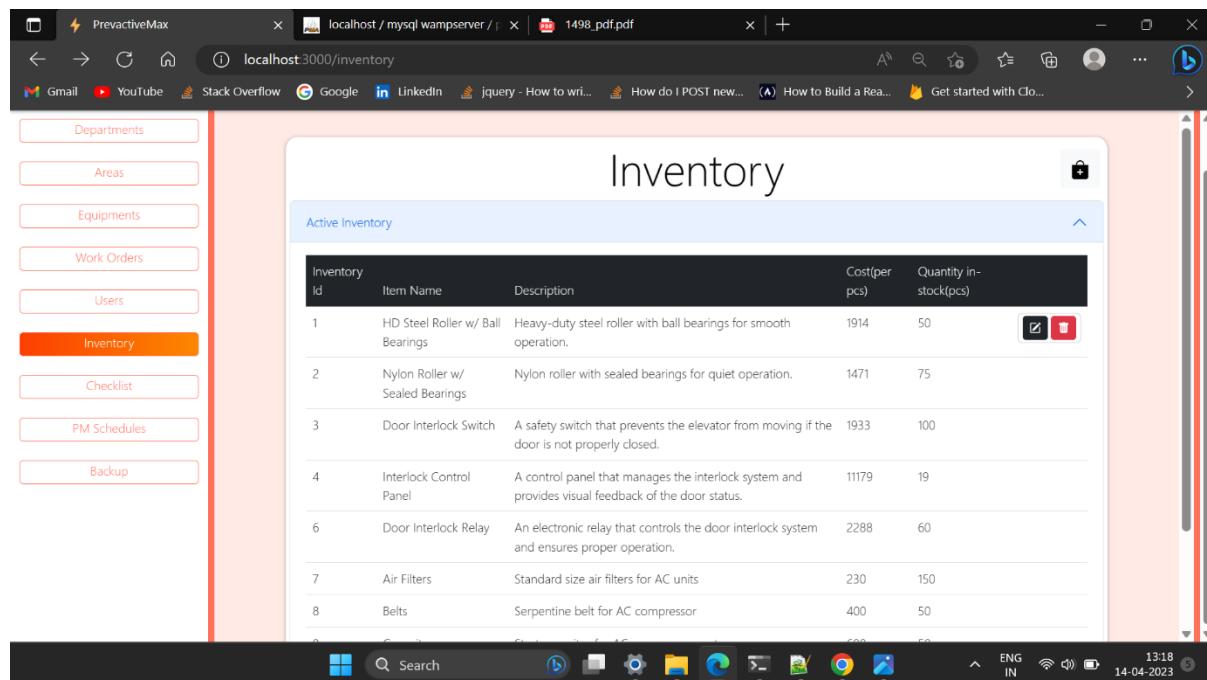
- Item Name:
- Description:
- Cost:
- Quantity in-Stock:

At the bottom right of the form is a red button labeled 'Add Inventory'.

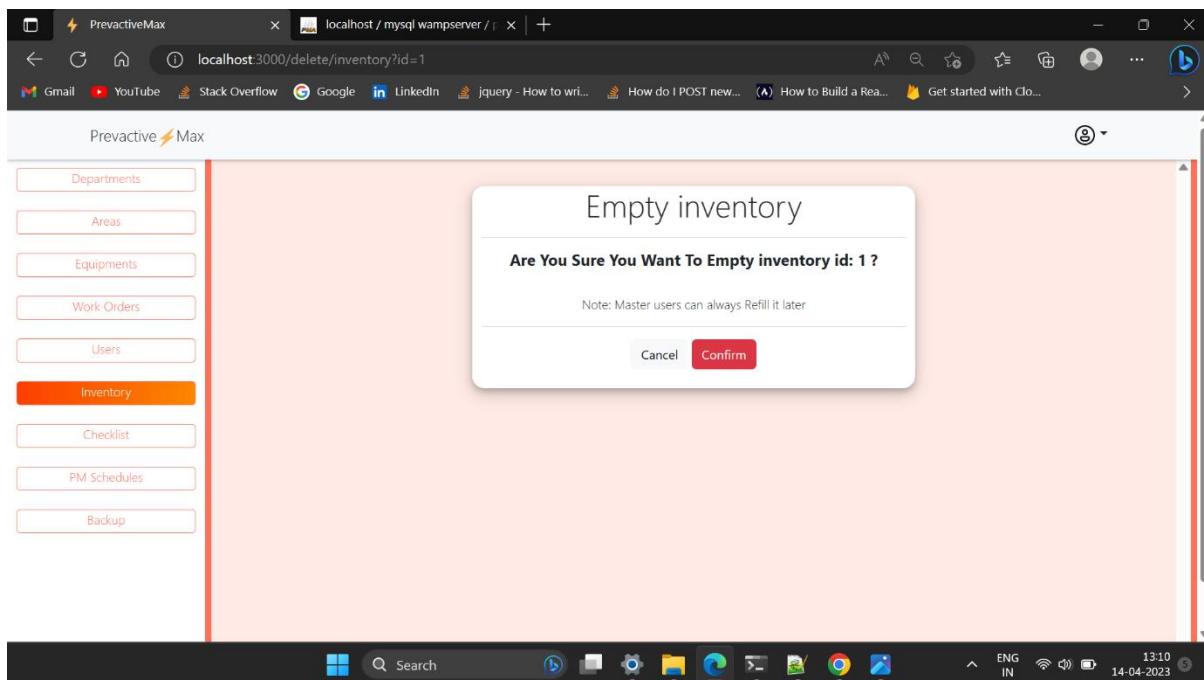
## 8.3 Add New Item To Inventory



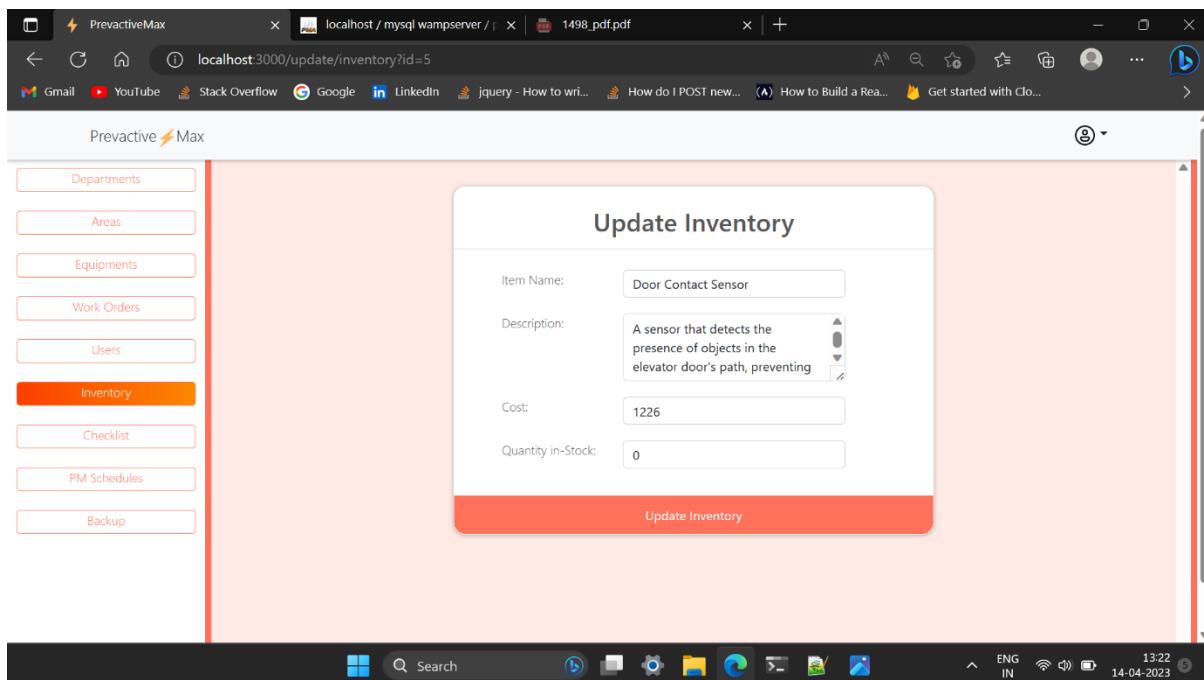
## 8.4 Update Inventory



## 8.5 Press and Hold For Actions



## 8.6 Empty Inventory



## 8.7 Update Empty Inventory

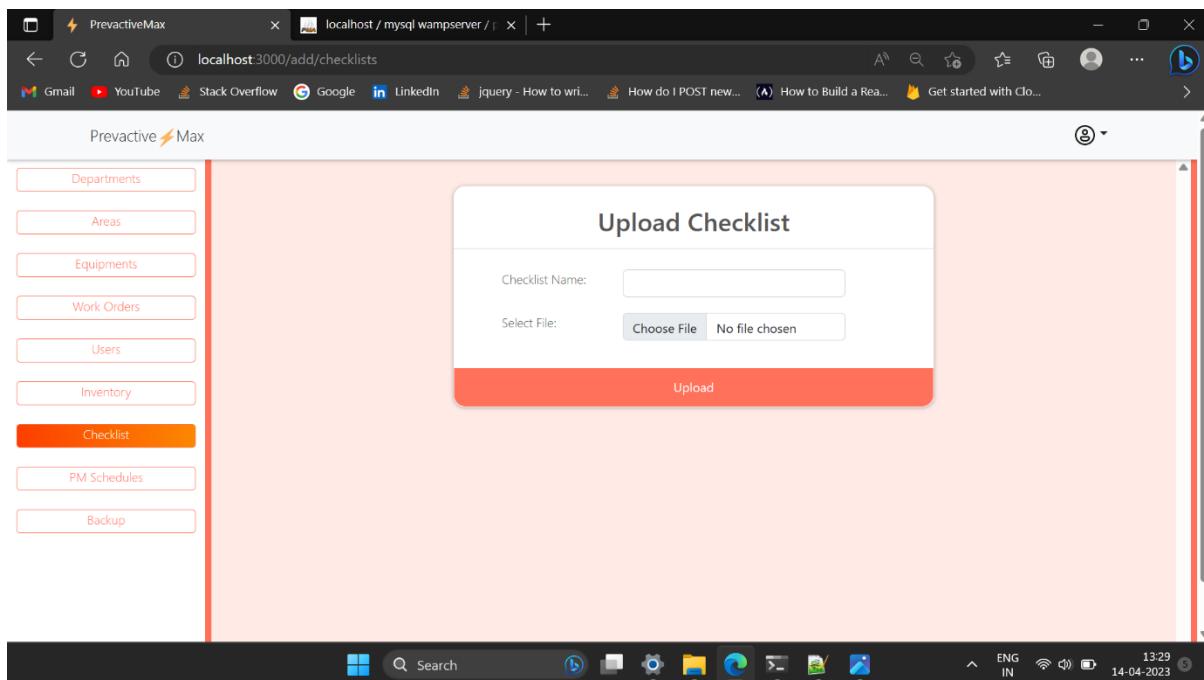
# 9. Checklist

Checklist Id	Checklist	Upload Date
1	AC Checklist	2023-03-26
2	Server Checklist	2023-03-26

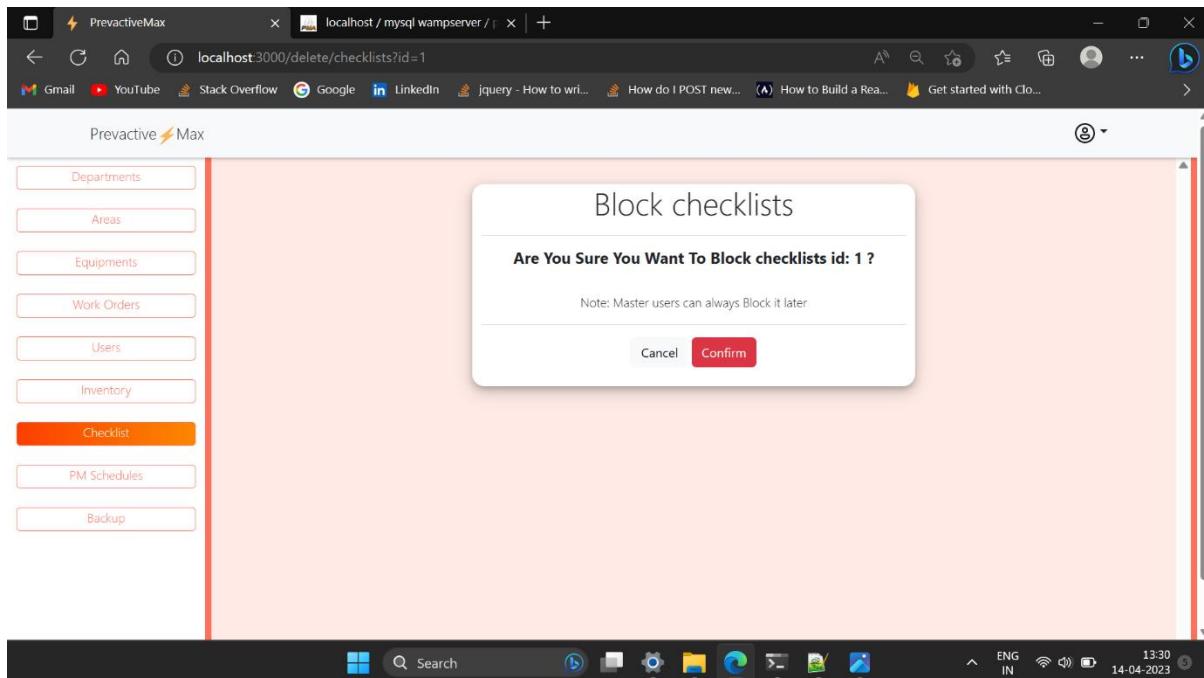
## 9.1 Active Checklist

Checklist Id	Checklist Name	Checklist Document	Upload Date

## 9.2 Blocked Checklist



### 9.3 Upload Checklist



### 9.4 Block Checklist

# 10. Preventive Maintenance Schedule

The screenshot shows a web browser window for 'localhost:3000/pmsched'. The left sidebar has a 'PM Schedules' button highlighted in orange. The main content area displays a table titled 'Preventive Maintenance Schedules' under the 'Past Schedules' tab. The table has columns: pmsid, eqid, and pmsdate. The data is as follows:

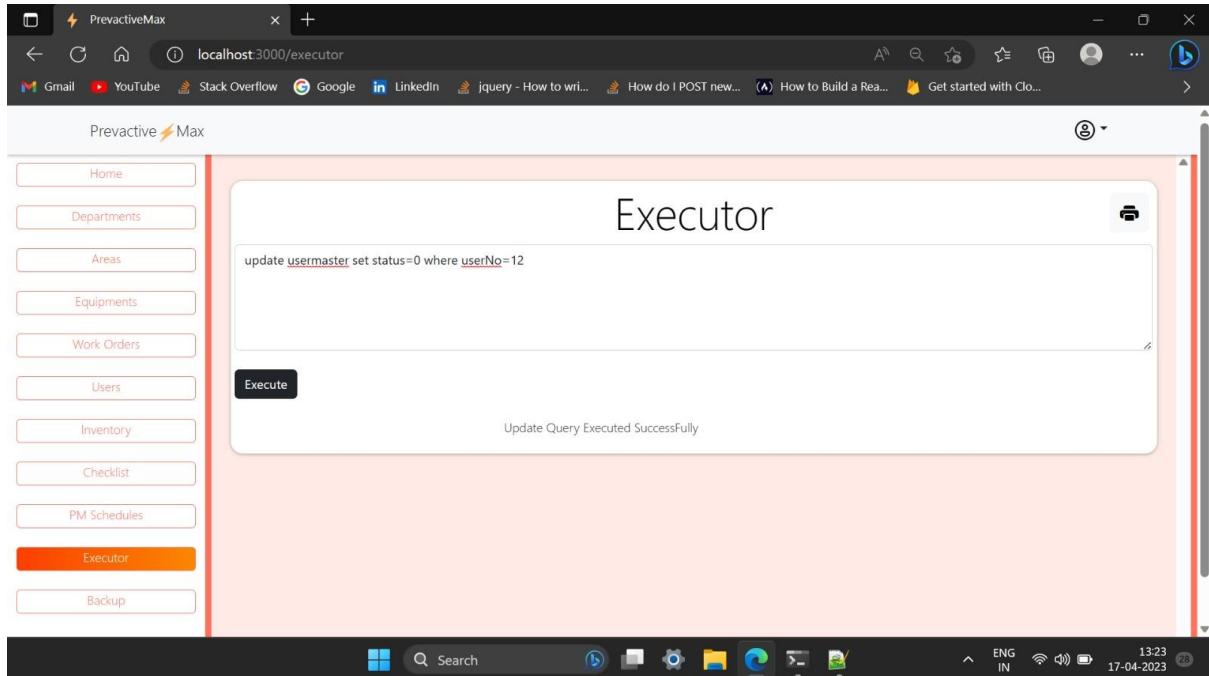
pmsid	eqid	pmsdate
1	Server V8	2023-03-12
2	Server V8	2023-03-29
3	Air Conditioner 1	2023-03-30

## 10.1 Past Schedule

The screenshot shows a web browser window for 'localhost:3000/add/pmsched'. The left sidebar has a 'PM Schedules' button highlighted in orange. The main content area displays a form titled 'PMSchedule' with two fields: 'Equipment:' (dropdown menu 'Select Equipment') and 'PMS Date:' (date input field 'dd-mm-yyyy'). Below the form is a red 'Add Schedule' button.

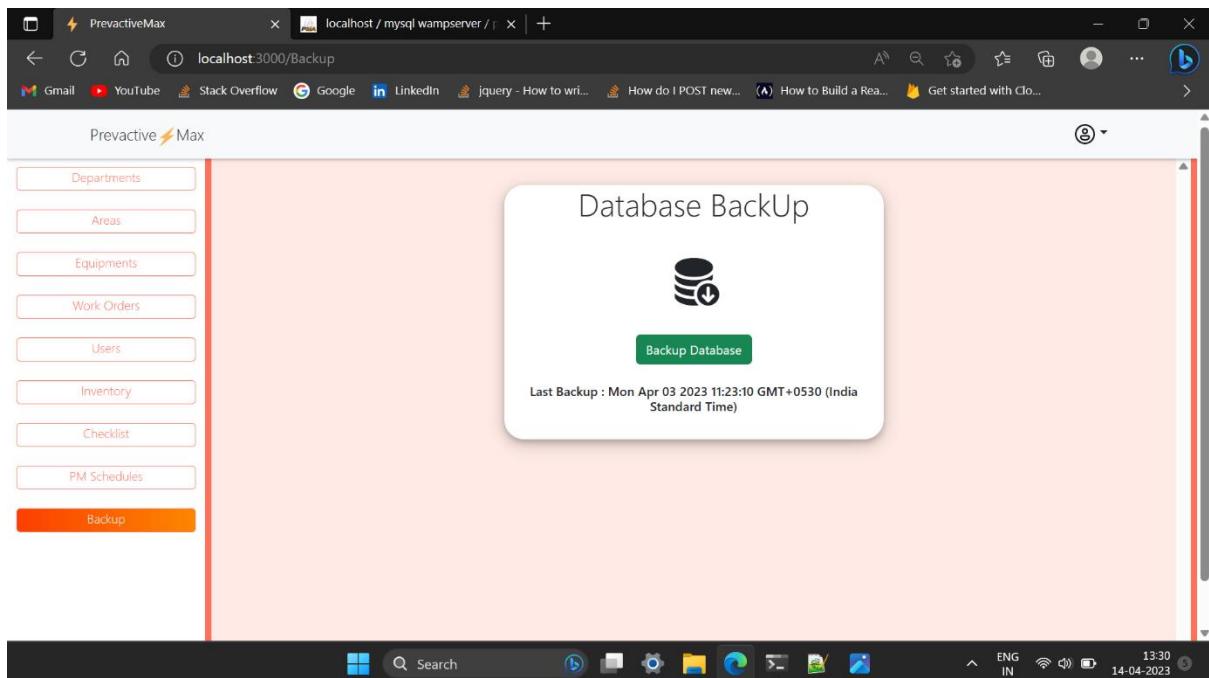
## 10.2 Add Schedule

# 11. Executor



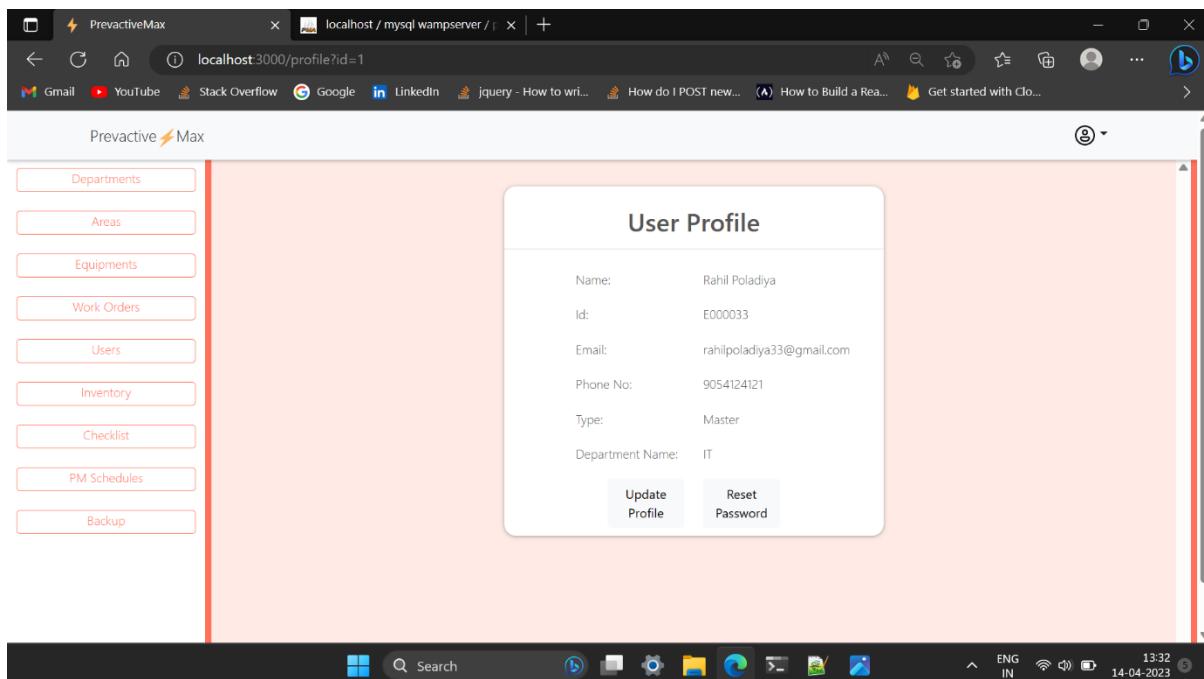
## 11.1 Executor

# 12. Backup

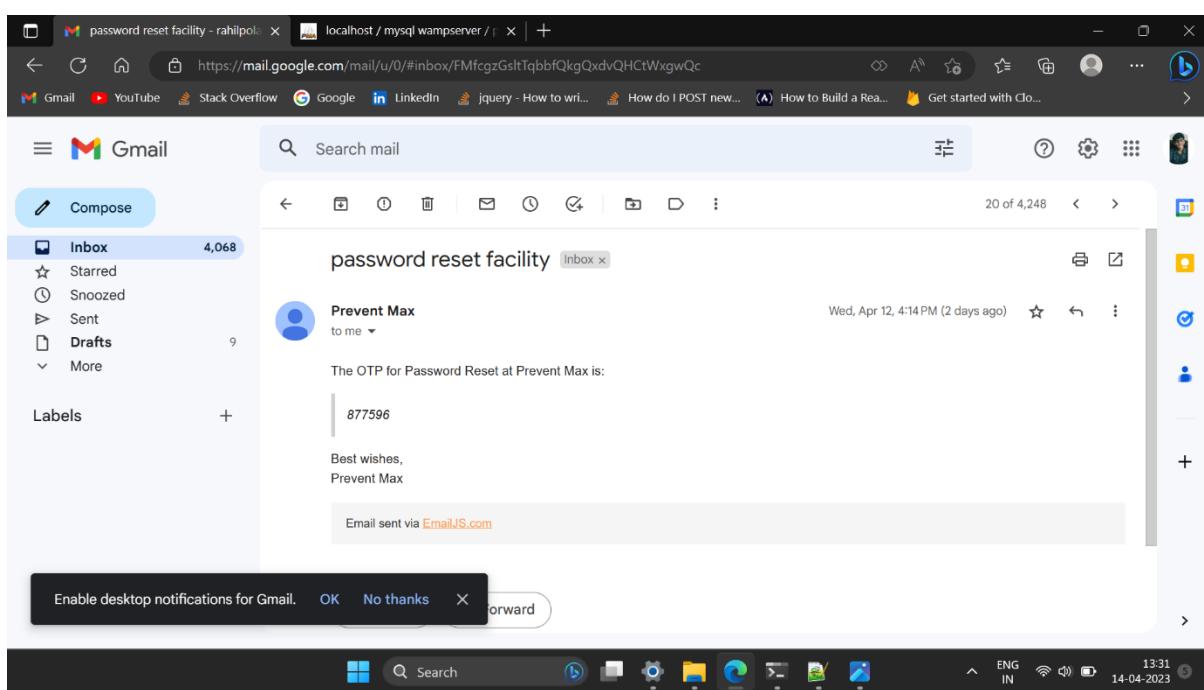


## 12.1 Database Backup

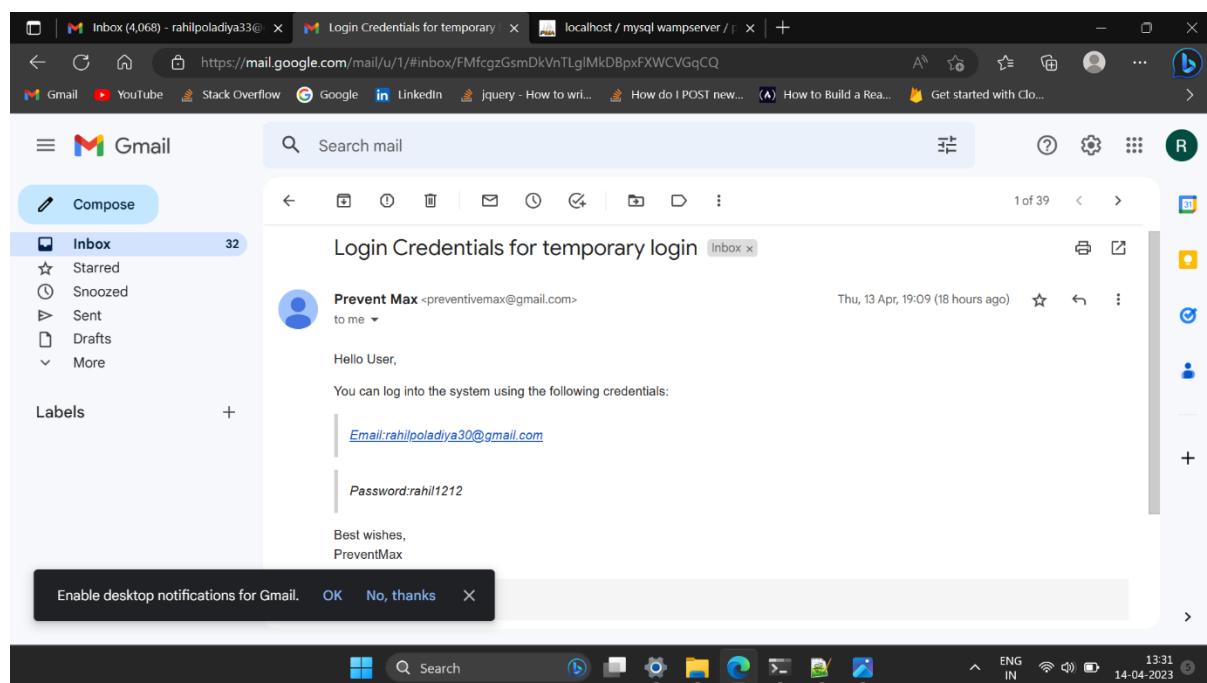
# 13.Profile



## 13.1 User Profile



## 13.2 OTP Verification for Change Password



### 13.3 Password Update

# Users Module

## 14. Work Order

Work Id	Task	Type	Severity	Made By	For Equipment	Status
8	dishwasher is leaking	Reactive	Medium	Kruti Jadav	Dishwasher	Requested

### 14.1 Work Order Request

Work Id	Task	Type	Severity	Made By	For Equipment	Status
7	Cooler fan is not working	Reactive	Medium	Kruti Jadav	Cooler Fan 1	Approved

### 14.2 Approved Work Orders

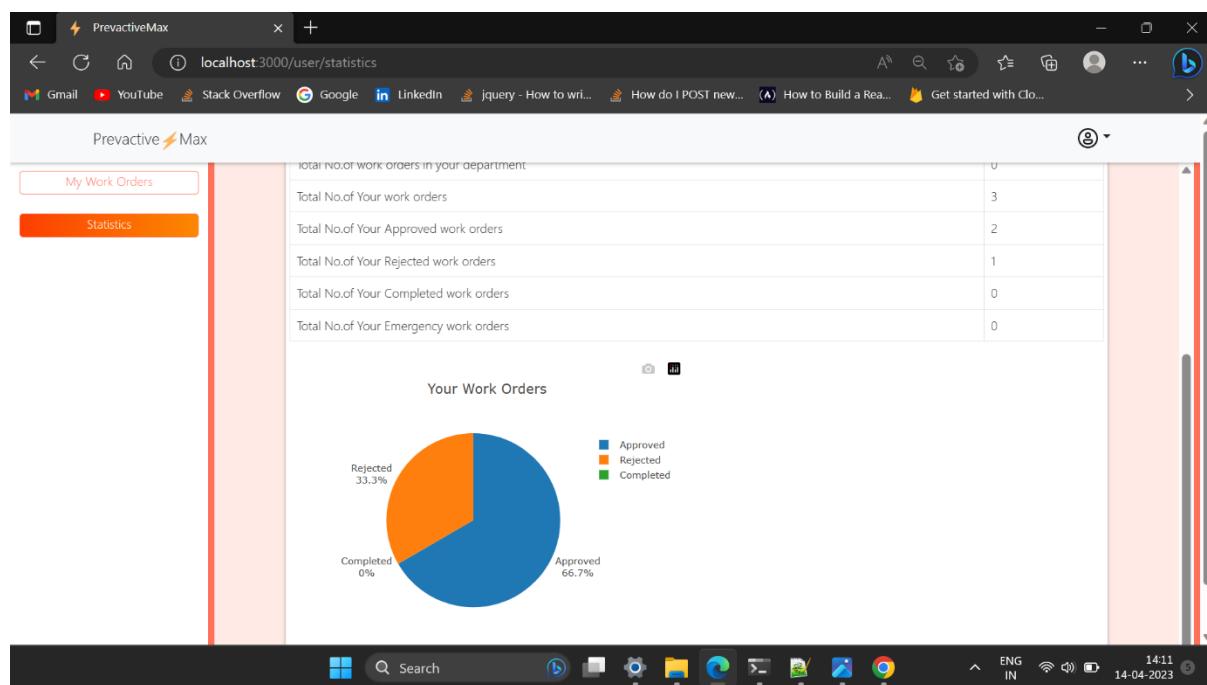
The screenshot shows a web browser window titled "Prevactive ⚡ Max" at the URL "localhost:3000/user/workorders". The main content area is titled "Work Orders" and displays three sections: "Work Order Requests", "Approved Work Orders", and "Rejected Work Orders". The "Rejected Work Orders" section is currently active, showing a table with one row. The table columns are: Work Id, Task, Type, Severity, Made By, For Equipment, and Status. The single entry is: Work Id 9, Task Blank Workorder demo, Type Reactive, Severity Low, Made By Kruti Jadav, For Equipment PC 2, and Status Rejected.

### 14.3 Rejected Work Order

## 15. Statistics

The screenshot shows a web browser window titled "Prevactive ⚡ Max" at the URL "localhost:3000/user/statistics". The main content area is titled "Statistics" and displays a table with various departmental statistics. The table has two columns: "Parameter" and "Value". The rows include: No. of employees in your department (Value: 3), No. of technician in your department (Value: 1), No. of equipments in your department (Value: 1), Total work orders (Value: 9), Total No.of work orders in your department (Value: 0), Total No.of Your work orders (Value: 3), Total No.of Your Approved work orders (Value: 2), Total No.of Your Rejected work orders (Value: 1), Total No.of Your Completed work orders (Value: 0), and Total No.of Your Emergency work orders (Value: 0).

### 15.1 Statistic Report



## 15.2 Statistic Report

# Admin Modules

## 16. Equipment

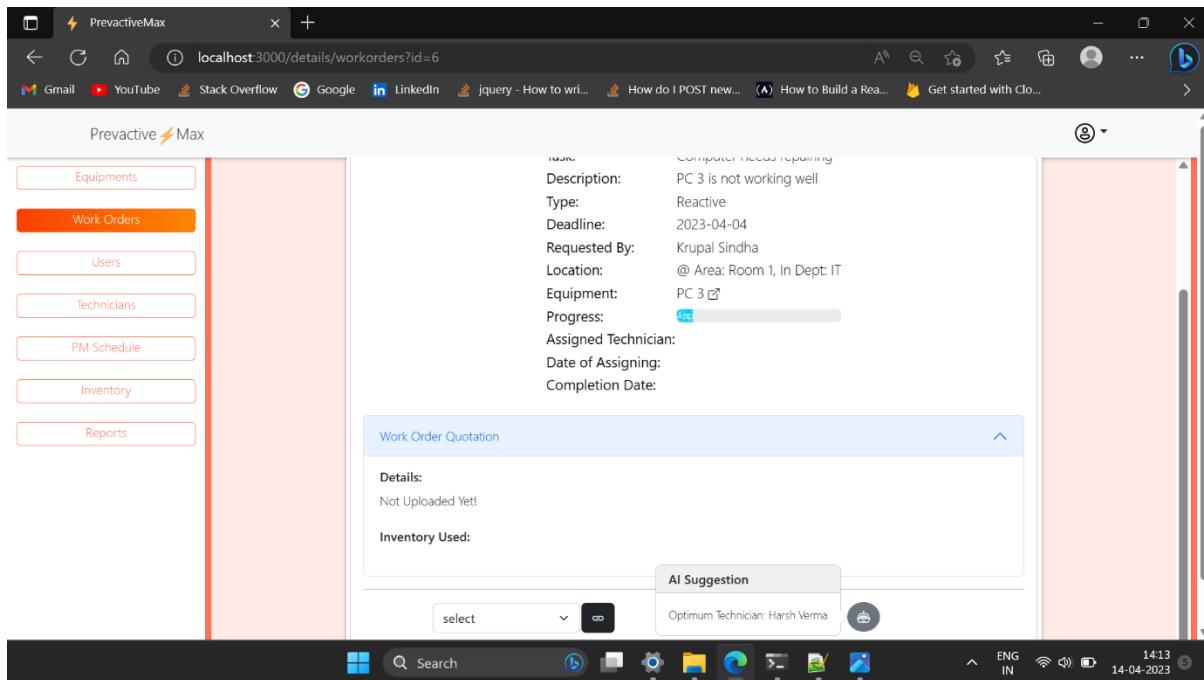
The screenshot shows a web browser window for 'localhost:3000/equipments'. The left sidebar has a 'Equipments' button highlighted in orange. The main content area is titled 'Equipments' and shows a table for 'Active Equipments'. The table includes columns for Equipment Id, Equipment Name, Description, Area, and Waranty Left. Each row contains a progress bar indicating the remaining warranty period.

Equipment Id	Equipment Name	Description	Area	Waranty Left
1	Server V1	DELL EMC Server - 500 TB capacity, Windows NT TigerLake , Intel i9 10H005	Server Room	<div style="width: 100%;">49631 days left</div>
2	Server V8	Oracle Server - 800 TB capacity, Windows NT 2000, AMD US 3G005	Server Room	<div style="width: 95%;">49631 days left</div>
3	Air Conditioner 1	Mitsubishi 2 ton Air Conditioner 2kW power consumption	Server Room	<div style="width: 90%;">49631 days left</div>
4	Elevator 1	Otis Elevator; Speed: 1000 feet per minute, Capacity: 580 Kgs, floors: 3, power-consumption: 7.5 kW	Elevator Loby	<div style="width: 100%;">49631 days left</div>
5	Elevator 2	Otis Elevator; Speed: 1000 feet per minute, Capacity: 580 Kgs, floors: 3, power-consumption: 7.5 kW	Elevator Loby	<div style="width: 100%;">49631 days left</div>
6	Generator 1	KOHLER diesel generator Power with 1000 kW output, V12 Engine, 400/230V, 3-	Generator	<div style="width: 100%;">49631 days left</div>

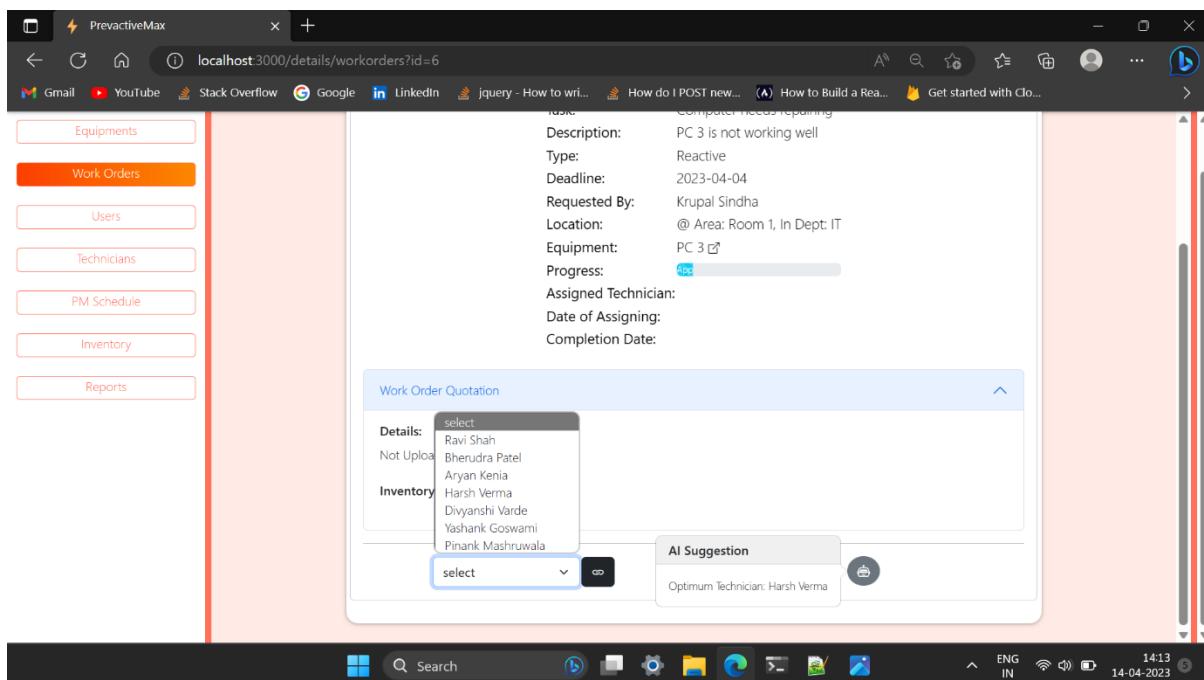
### 16.1 Active Equipment

The screenshot shows a web browser window for 'localhost:3000/details/equipments?id=2'. The left sidebar has a 'Equipments' button highlighted in orange. The main content area is titled 'Equipment' and shows detailed information for 'Server V8'. It includes fields for Name, Description, Area, Waranty, Start, Waranty End, Waranty Span, and two file upload buttons for 'Upload Waranty Doc' and 'Upload Equipment Doc'. A dropdown menu is open, showing options like 'select', 'AC Checklist', and 'Server Checklist'.

### 16.2 Select Checklist



### 16.3 AI suggestion for Technician



### 16.4 Manually Select Technician

The screenshot shows a web browser window for 'Prevactive Max' at the URL [localhost:3000/details/workorders?id=2](http://localhost:3000/details/workorders?id=2). The left sidebar has a 'Work Orders' button highlighted in orange. The main content area displays a work order for a 'Server V1'. The task description is 'THE SERVER IS DOWN!!'. The work order details include:

- Description:** The server is down please repair it as soon as possible
- Type:** Reactive
- Deadline:** 2023-03-26
- Requested By:** Rahil Poladhy
- Location:** @ Area: Server Room, In Dept: IT
- Equipment:** Server V1
- Progress:** Assigned (progress bar)
- Assigned Technician:** Harsh Verma
- Date of Assigning:** 2023-03-31 00:00:00
- Completion Date:**

Below the details, there is a 'Work Order Quotation' section with a 'Details:' field containing 'Not Uploaded Yet!' and an 'Inventory Used:' field.

## 16.5 Work Order Progress Status

The screenshot shows the same 'Prevactive Max' work order details page. The sidebar still has the 'Work Orders' button highlighted. The work order details now show an estimated cost of ₹1500. The 'Inventory Used:' field contains a link to a PDF document titled 'Quotation for Work Order'. The PDF document appears to be a standard quotation template with various fields filled in, including a signature at the bottom.

## 16.6 Work Order Quotation List

**Users**

Active Users

UserNo.	Employee Name	EmployeeId	Department	Type
1	Rahil Poladiya	E000033	IT	Master
2	Krupal Sindha	E109075	IT	Admin
3	Ravi Shah	E310407	Common	Technician
4	Kashish Verma	E890031	Engineering	Admin
5	Kruti Jadav	E152012	Engineering	User
6	Vivek Gajara	E404140	Common	Admin
7	Paresh Prajapati	E120001	Common	Master
8	Veeksha Shah	E750718	Logistics	User
9	Bherudra Patel	E200503	Utilities	Technician
10	Aryan Kenia	E124132	Logistics	Technician
11	Salman Sheikh	E120012	Firing	User
15	Harsh Verma	E01052006	IT	Technician

## 16.7 Active Users

**Technicians**

Active Users

UserNo.	Technician Name	EmployeeId	Department	Type
3	Ravi Shah	E310407	Common	Plumbing
9	Bherudra Patel	E200503	Utilities	HVAC
10	Aryan Kenia	E124132	Logistics	Elevator
15	Harsh Verma	E01052006	IT	Hardware
16	Divyanshi Varde	E170202	Engineering	Software
17	Yashank Goswami	E101054	IT	Hardware
18	Pinank Mashruwala	E150572	Logistics	Elevator

## 16.8 Active Technician

The screenshot shows a web browser window titled "Prevactive ⚡ Max" at the URL "localhost:3000/pmsched". The left sidebar contains navigation links: Equipments, Work Orders, Users, Technicians, PM Schedule (which is highlighted in orange), Inventory, and Reports. The main content area is titled "Preventive Maintenance Schedules" and displays a table under the heading "Past Schedules". The table has columns "pmsid", "eqid", and "prmsdate". The data is as follows:

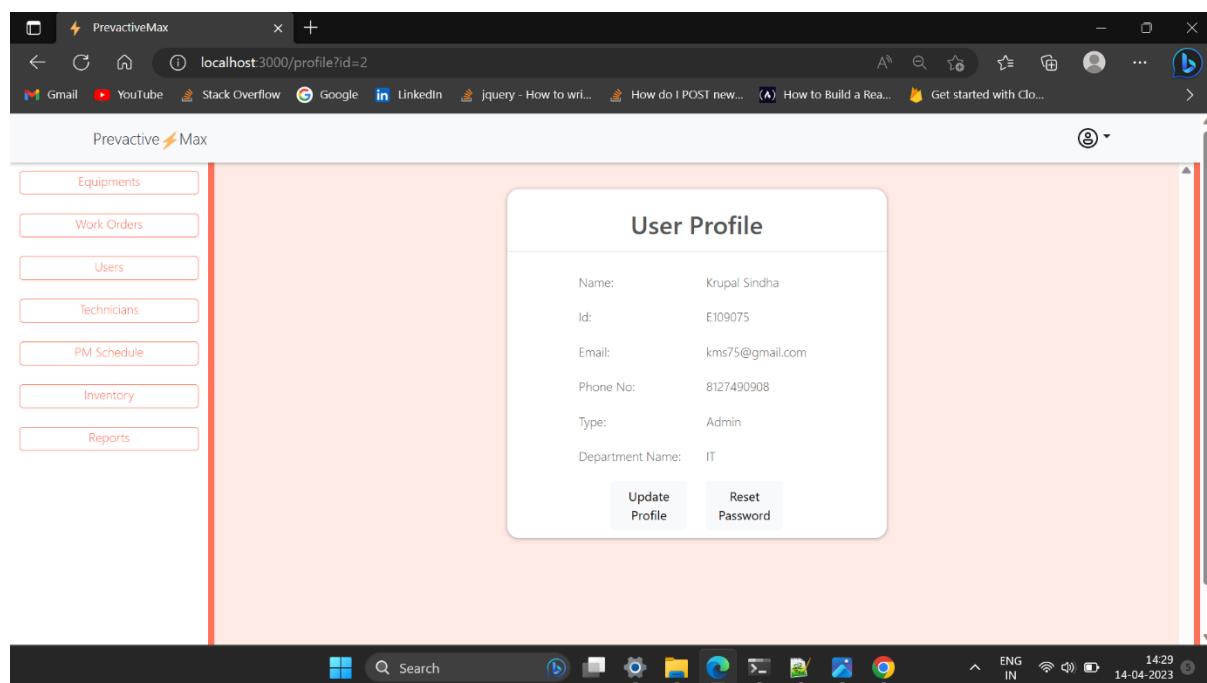
pmsid	eqid	prmsdate
1	Server V8	2023-03-12
2	Server V8	2023-03-29
3	Air Conditioner 1	2023-03-30

## 16.9 Past Schedules

The screenshot shows a web browser window titled "Prevactive ⚡ Max" at the URL "localhost:3000/inventory". The left sidebar contains navigation links: Equipments, Work Orders, Users, Technicians, PM Schedule, Inventory (which is highlighted in orange), and Reports. The main content area is titled "Inventory" and displays a table under the heading "Active Inventory". The table has columns "Inventory Id", "Item Name", "Description", "Cost(per pcs)", and "Quantity in-stock(pcs)". The data is as follows:

Inventory Id	Item Name	Description	Cost(per pcs)	Quantity in-stock(pcs)
1	HD Steel Roller w/ Ball Bearings	Heavy-duty steel roller with ball bearings for smooth operation.	1914	50
2	Nylon Roller w/ Sealed Bearings	Nylon roller with sealed bearings for quiet operation.	1471	75
3	Door Interlock Switch	A safety switch that prevents the elevator from moving if the door is not properly closed.	1933	100
4	Interlock Control Panel	A control panel that manages the interlock system and provides visual feedback of the door status.	11179	19
6	Door Interlock Relay	An electronic relay that controls the door interlock system and ensures proper operation.	2288	60
7	Air Filters	Standard size air filters for AC units	230	150

## 16.10 Active Inventory



## 16.11 Admin Profile

# Technician Modules

## 17. Equipments

**Equipments**

**Active Equipments**

Equipment Id	Equipment Name	Description	Area	Waranty Left
1	Server V1	DELL EMC Server - 500 TB capacity, Windows NT TigerLake , Intel i9 10H05	Server Room	99% (331 days left)
2	Server V8	Oracle Server - 800 TB capacity, Windows NT 2000, AMD US 3G005	Server Room	94% (331 days left)
3	Air Conditioner 1	Mitsubishi 2 ton Air Conditioner 2kW power consumption	Server Room	12% (231 days left)
4	Elevator 1	Otis Elevator, Speed: 1000 feet per minute, Capacity: 580 Kgs, floors: 3, power-consumption: 7.5 kW	Elevator Loby	19% (322 days left)
5	Elevator 2	Otis Elevator, Speed: 1000 feet per minute, Capacity: 580 Kgs, floors: 3, power-consumption: 7.5 kW	Elevator	18% (322 days left)

### 17.1 Active Equipment

## 18. Work Orders

**Work Orders**

**On-Going Work Orders**

Work Id	Task	Type	Severity	Made By	For Equipment	Status
2	The Server is down	Reactive	Emergency	Rahil Poladiya	Server V1	Inspecting
3	Preventive Maintenance of Server	Preventive	Low	Krupal Sindhia	Server V1	Assigned

Completed Work Orders

Scrapped Work Orders

## 18.1 On Going Work Orders

Work Orders

On-Going Work Orders

Work Id	Task	Type	Severity	Made By	For Equipment	Status
5	Computer is not turning on	Reactive	Emergency	Krupal Sindha	PC 1	Completed

Completed Work Orders

Scrapped Work Orders

## 18.2 Completed Work Orders

Work Orders

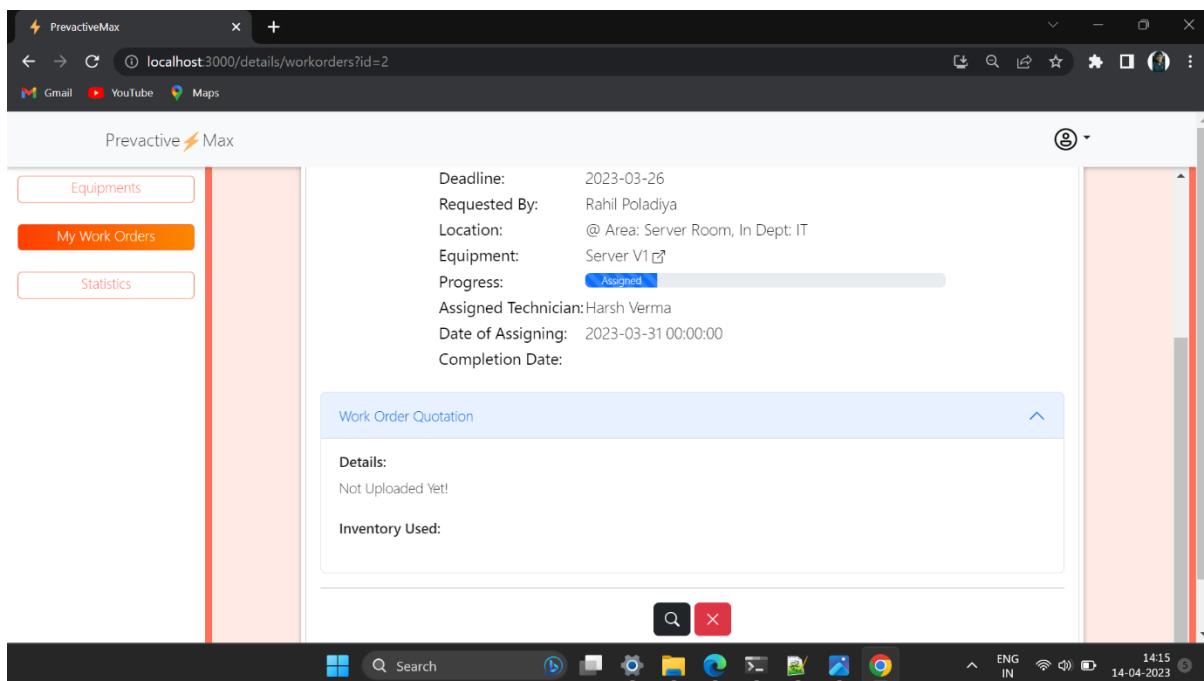
On-Going Work Orders

Completed Work Orders

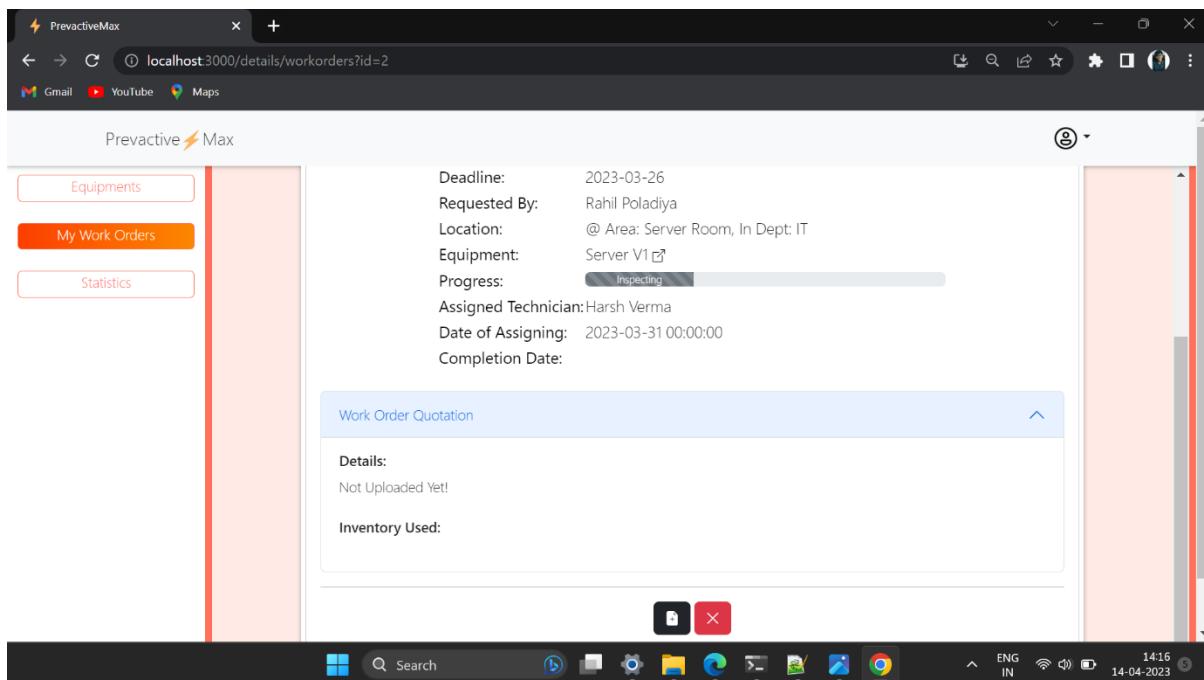
Scrapped Work Orders

Work Id	Task	Type	Severity	Made By	For Equipment	Status
---------	------	------	----------	---------	---------------	--------

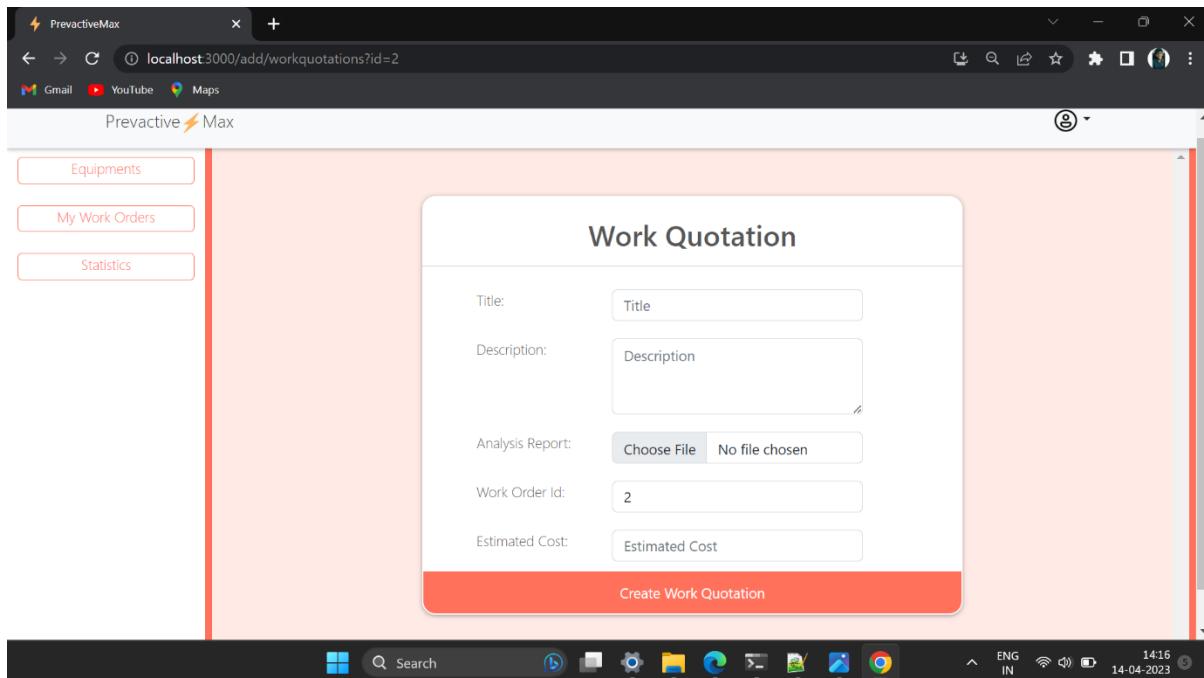
## 18.3 Scrapped Work Orders



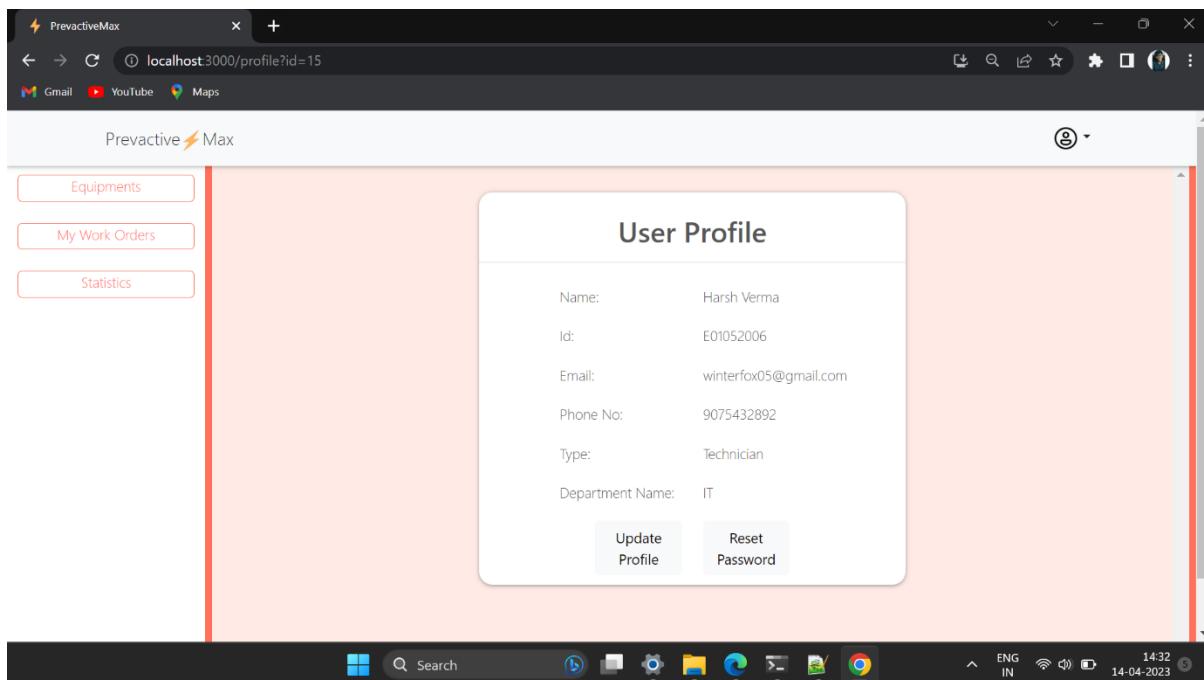
## 18.4 Work Order Assigned Stage



## 18.5 Work Order Inspection Stage



## 18.6 Work Quotation Create



## 18.7 Technician Profile

# 19. Statistics

The screenshot shows the 'Statistics' page of the PrevactiveMax application. On the left, there's a sidebar with links for 'Equipments', 'My Work Orders', and 'Statistics'. The main area has a title 'Statistics' and a table with columns 'Parameter' and 'Value'. Below the table is a pie chart titled 'Your Work Orders'.

Parameter	Value
Total work orders	9
Total No.of work orders in your department	7
Total No.of work orders assigned to you	3
Total No.of Your Pending work orders	1
Total No.of Your Completed work orders	2
Total Hours Worked	360

**Your Work Orders**

Pie chart data:

- Completed: 66.7%
- Pending: 33.3%

## 19.1 Parameter

This screenshot shows the same Statistics page as the previous one, but the focus is on the 'Total Hours Worked' section and the 'Your Work Orders' pie chart.

**Total Hours Worked**

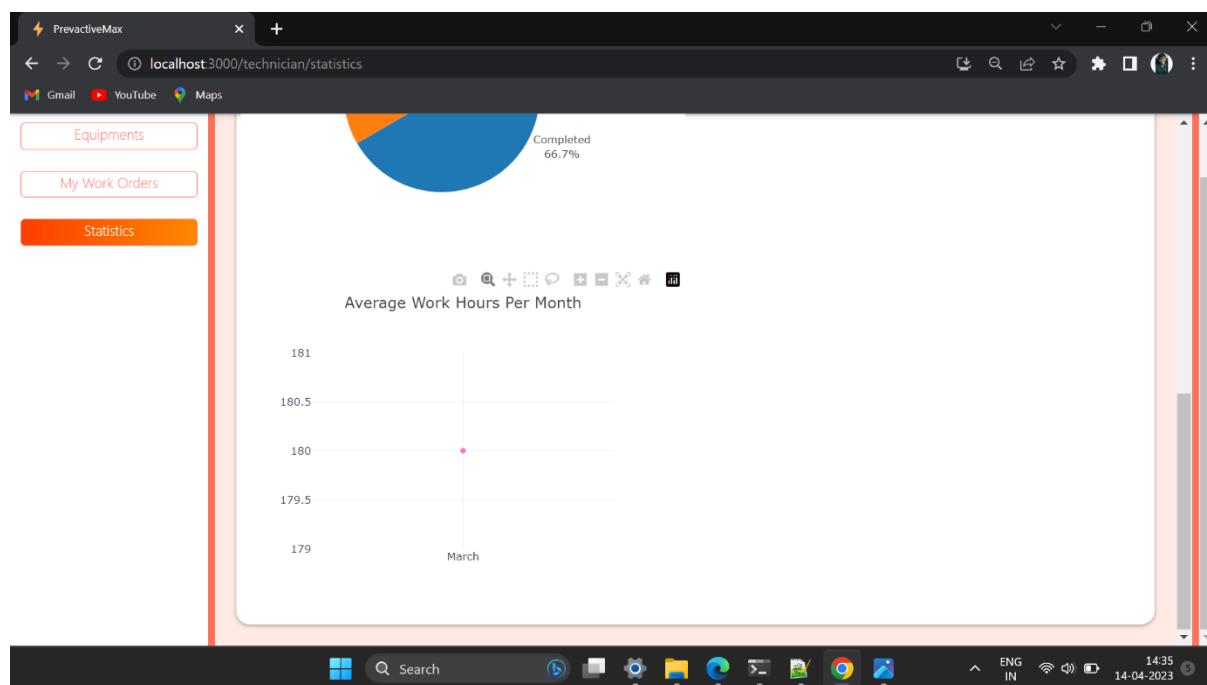
360

**Your Work Orders**

Pie chart data:

- Completed: 66.7%
- Pending: 33.3%

## 19.2 Total Work Orders Split



### 19.3 Average Work Hours Per Month

## 7.2 REPORT LAYOUTS

# Reports

The screenshot shows a web browser window with the title "PrevactiveMax" and the URL "localhost:3000/static/reports". On the left, there is a sidebar with several buttons: Equipments, Work Orders, Users, Technicians, PM Schedule, Inventory, and Reports (which is highlighted). The main content area has a title "Reports" and a sub-section titled "All Technicians Report". This sub-section contains a table with the following data:

Technician	Completed Work Orders	On Hand Work Orders	Total Work Orders	Total Hours Worked
Aryan Kenia	1	0	1	24
Bherudra Patel	0	1	1	null
Harsh Verma	2	1	3	360

Below this, there is another section titled "Graph" with the subtitle "Total Working Hours of each Technician". The bottom of the screen shows a Windows taskbar with various icons and the date/time "14-04-2023 14:22".

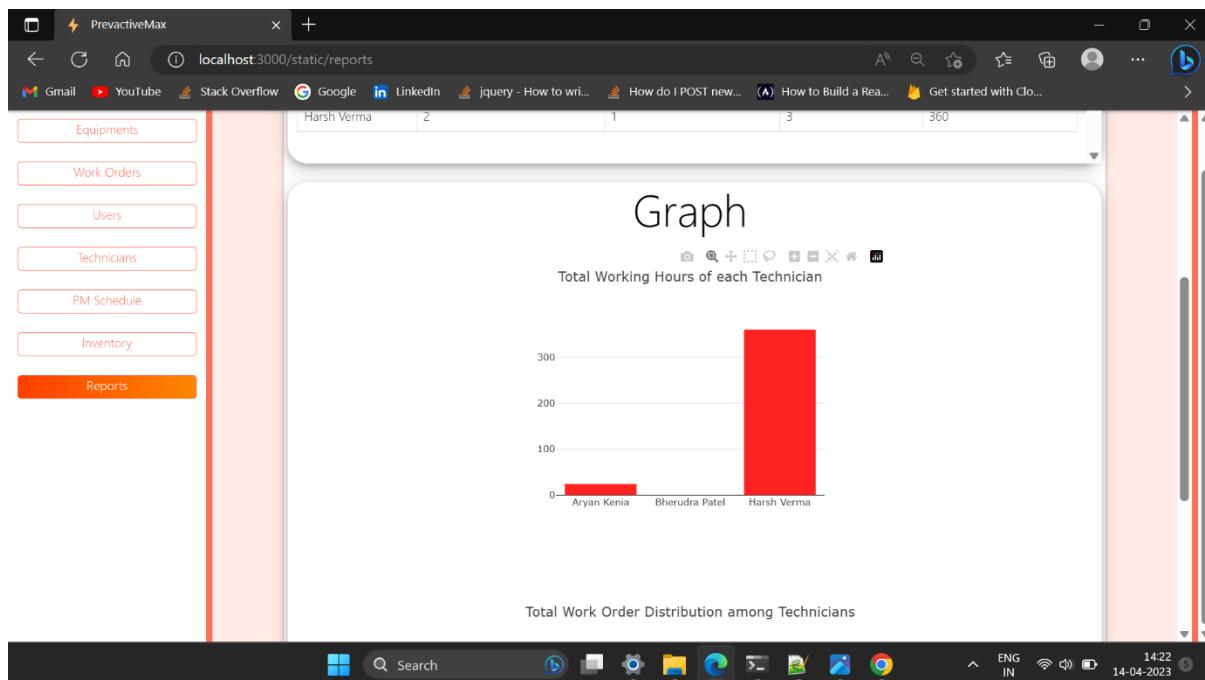
## All Technician Report

The screenshot shows a PDF document titled "All Technician Report". The content of the PDF is identical to the table shown in the previous screenshot, with the following data:

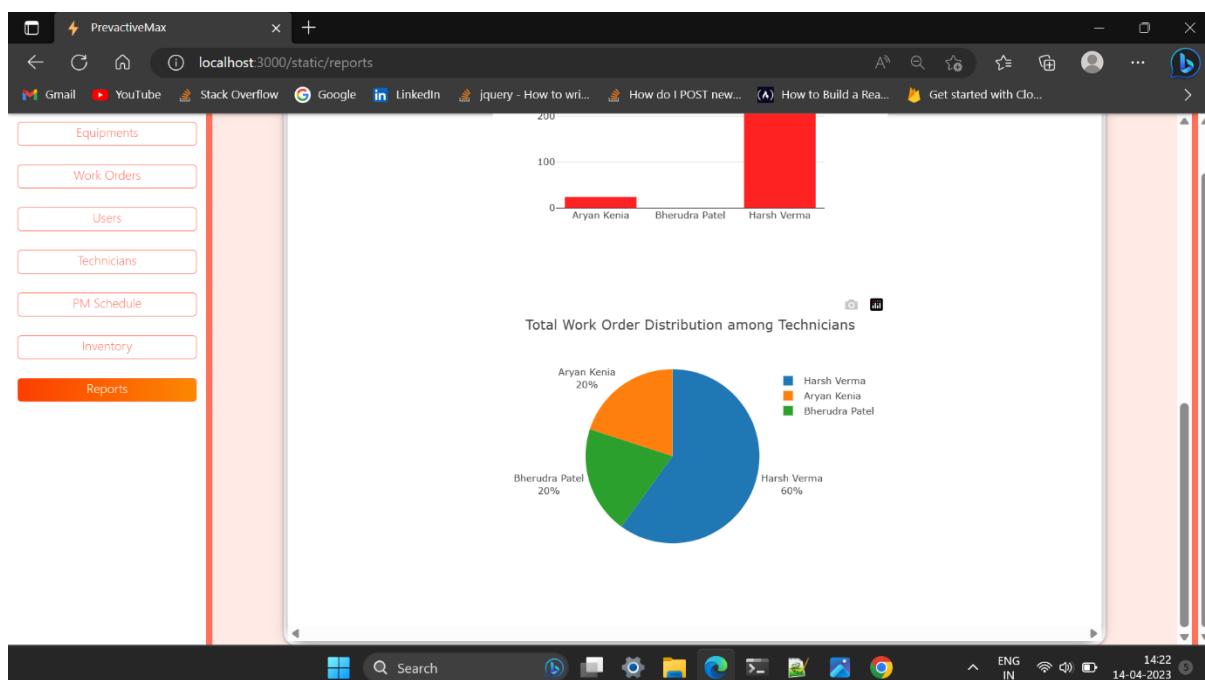
Technician	Completed Work Orders	On Hand Work Orders	Total Work Orders	Total Hours Worked
Aryan Kenia	1	0	1	24
Bherudra Patel	0	1	1	null
Harsh Verma	3	0	3	881

The PDF is displayed in a browser window with the file path "C:/Users/rahil/Downloads/report20230423T142210164Z.pdf". The bottom of the screen shows a Windows taskbar with the date/time "23-04-2023 19:52".

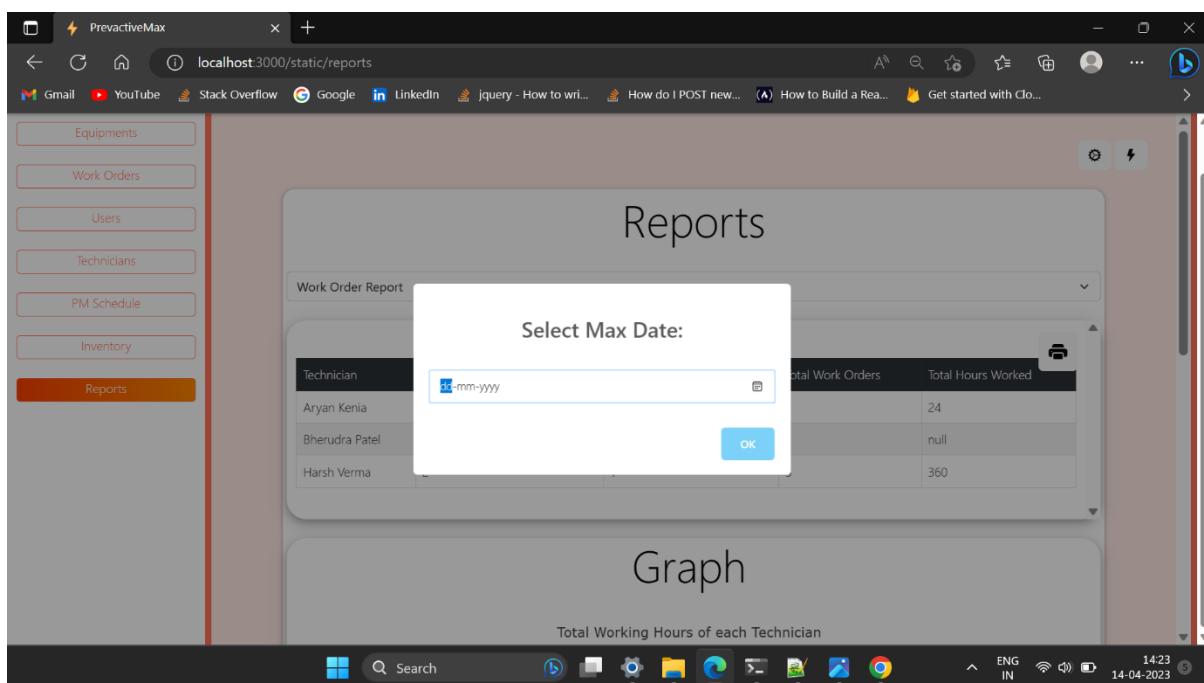
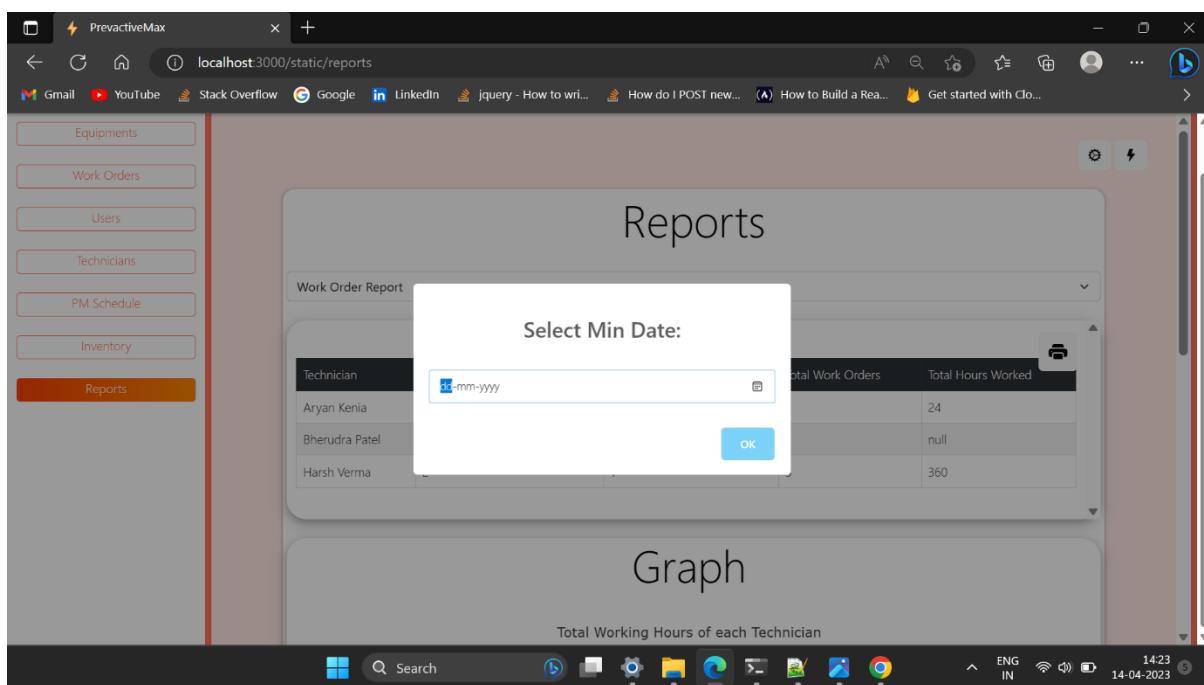
## Report Format in PDF



## Technician Working Hours Graph



## Technician Work Distribution Report



### Select Min and Max date For Generate Report

The screenshot shows a web browser window titled "PrevactiveMax" with the URL "localhost:3000/static/reports". On the left, there is a sidebar with several buttons: "Equipments", "Work Orders", "Users", "Technicians", "PM Schedule", "Inventory", and "Reports". The "Reports" button is highlighted with an orange background. The main content area is titled "Work Order Report" and displays a table of work orders. The table has columns: Work Order Id, Work Order, Requested By, Assigned Technician, Department, Area, Equipment, Request Date, and Status. The data in the table is as follows:

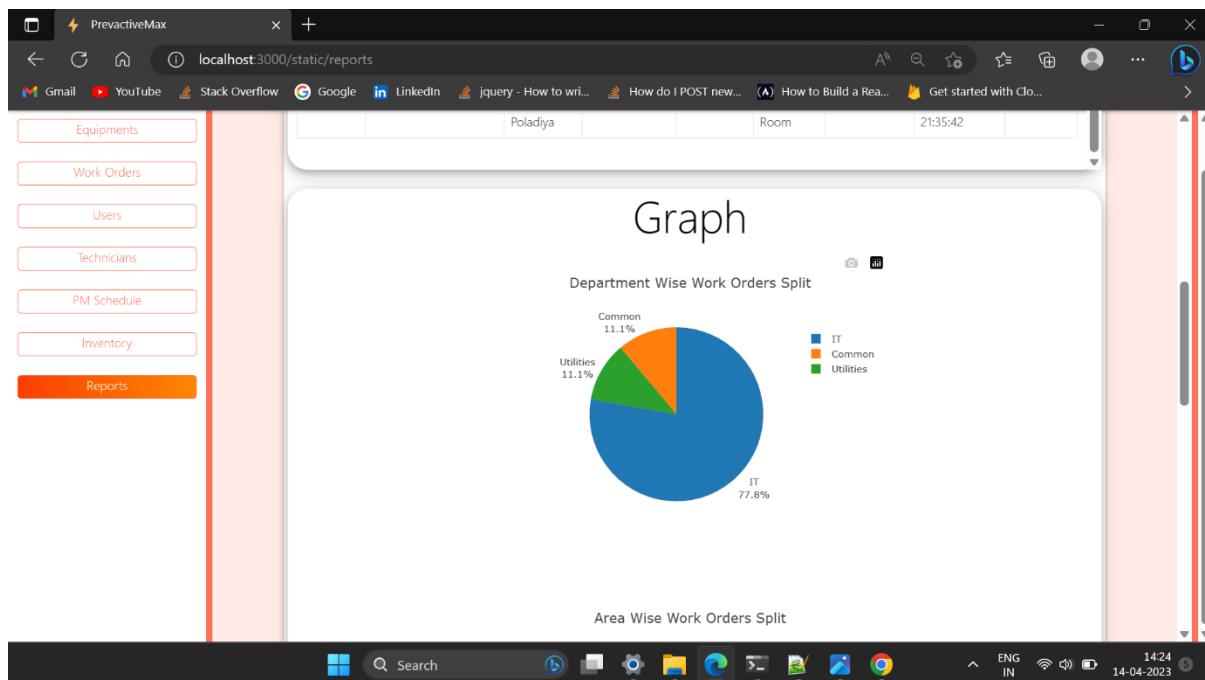
Work Order Id	Work Order	Requested By	Assigned Technician	Department	Area	Equipment	Request Date	Status
6	Computer needs repairing	Krupal Sindha	null	IT	Room 1	PC 3	2023-03-30 21:35:42	Approved
1	Change Elevator door interlocks	Krupal Sindha	Aryan Kenia	Utilities	Elevator Loby	Elevator 1	2023-03-25 21:35:42	Completed
4	maintenance of air conditioner	Krupal Sindha	Bherudra Patel	IT	Server Room	Air Conditioner 1	2023-03-30 21:35:42	Assigned
5	Computer is not turning on	Krupal Sindha	Harsh Verma	IT	Room 1	PC 1	2023-03-28 21:35:42	Completed
3	Preventive Maintenance of Server	Krupal Sindha	Harsh Verma	IT	Server Room	Server V1	2023-03-26 21:35:42	Assigned
8	dishwasher is leaking	Kruti Jadav	null	Common	Canteen	Dishwasher	2023-04-14 13:48:58	Approved
7	Cooler fan is not working	Kruti Jadav	null	IT	Cabin 2	Cooler Fan 1	2023-04-03 21:35:42	Approved
9	Blank Workorder demo	Kruti Jadav	null	IT	Room 1	PC 2	2023-04-14	Rejected

## Work Order Report

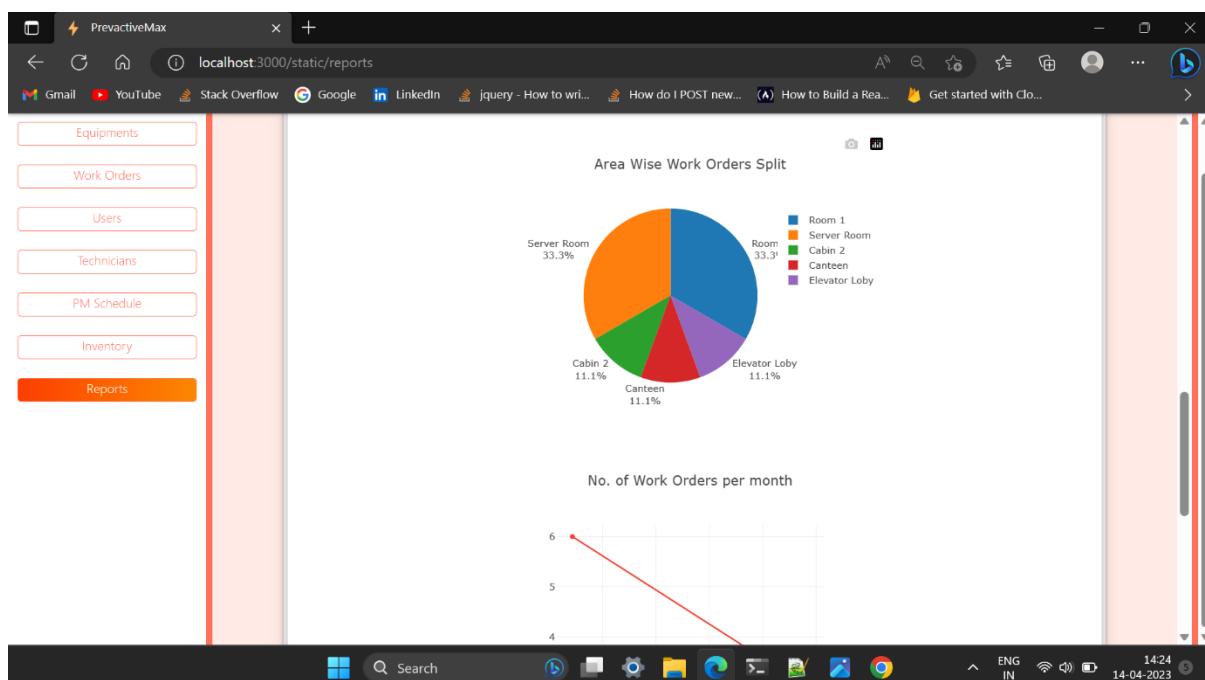
The screenshot shows a web browser window displaying a PDF document titled "report20230423T142613043Z.pdf". The PDF contains the same table of work orders as the previous screenshot. The data is as follows:

Work Order Id	Work Order	Requested By	Assigned Technician	Department	Area	Equipment	Request Date	Status
6	Computer needs repairing	Krupal Sindha	null	IT	Room 1	PC 3	2023-03-30 21:35:42	Approved
1	Change Elevator door interlocks	Krupal Sindha	Aryan Kenia	Utilities	Elevator Loby	Elevator 1	2023-03-25 21:35:42	Completed
4	maintenance of air conditioner	Krupal Sindha	Bherudra Patel	IT	Server Room	Air Conditioner 1	2023-03-30 21:35:42	Assigned
5	Computer is not turning on	Krupal Sindha	Harsh Verma	IT	Room 1	PC 1	2023-03-28 21:35:42	Completed
3	Preventive Maintenance of Server	Krupal Sindha	Harsh Verma	IT	Server Room	Server V1	2023-03-26 21:35:42	Completed
7	Cooler fan is not working	Kruti Jadav	null	IT	Cabin 2	Cooler Fan 1	2023-04-03 21:35:42	Approved
2	The Server is down	Rahil Poladiya	Harsh Verma	IT	Server Room	Server V1	2023-03-25 21:35:42	Completed

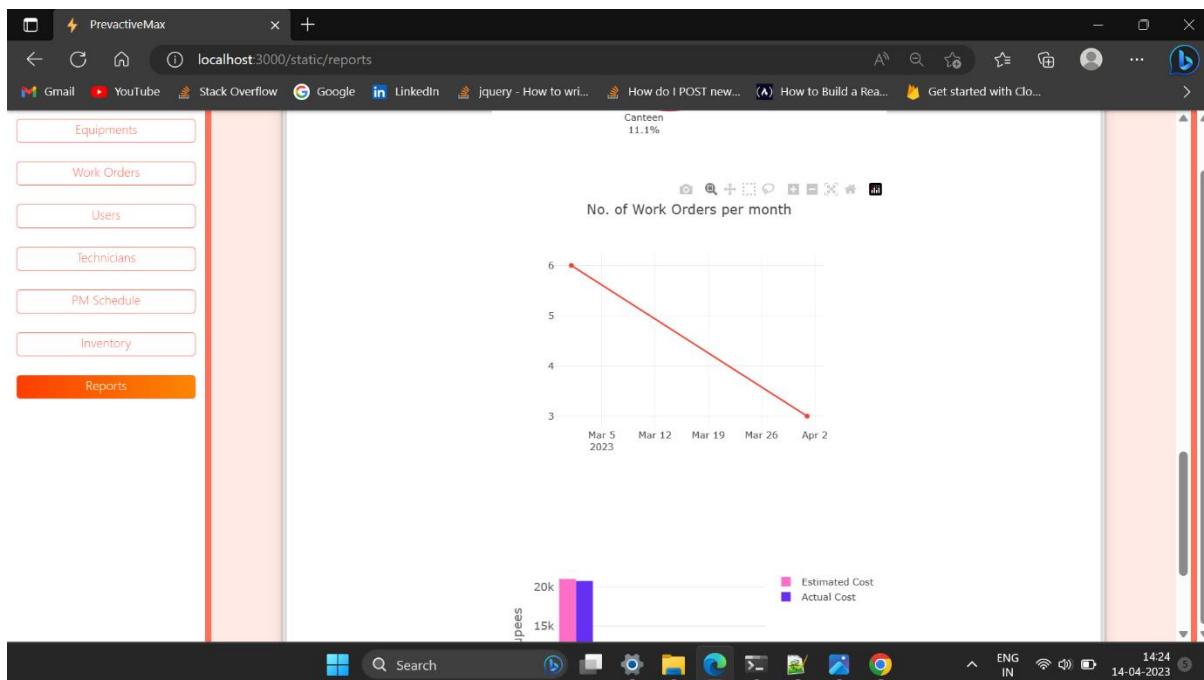
## Work Order Report PDF



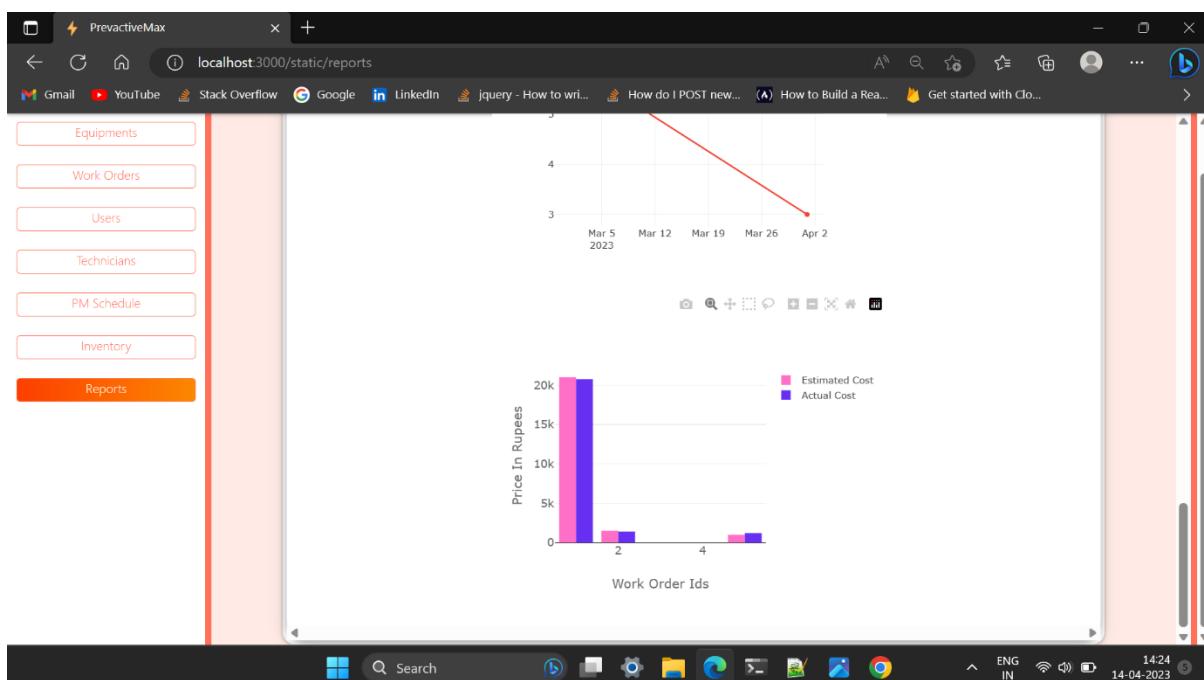
## Department Wise Work Orders



## Area Wise Work Orders



## No of Work Orders Per Month



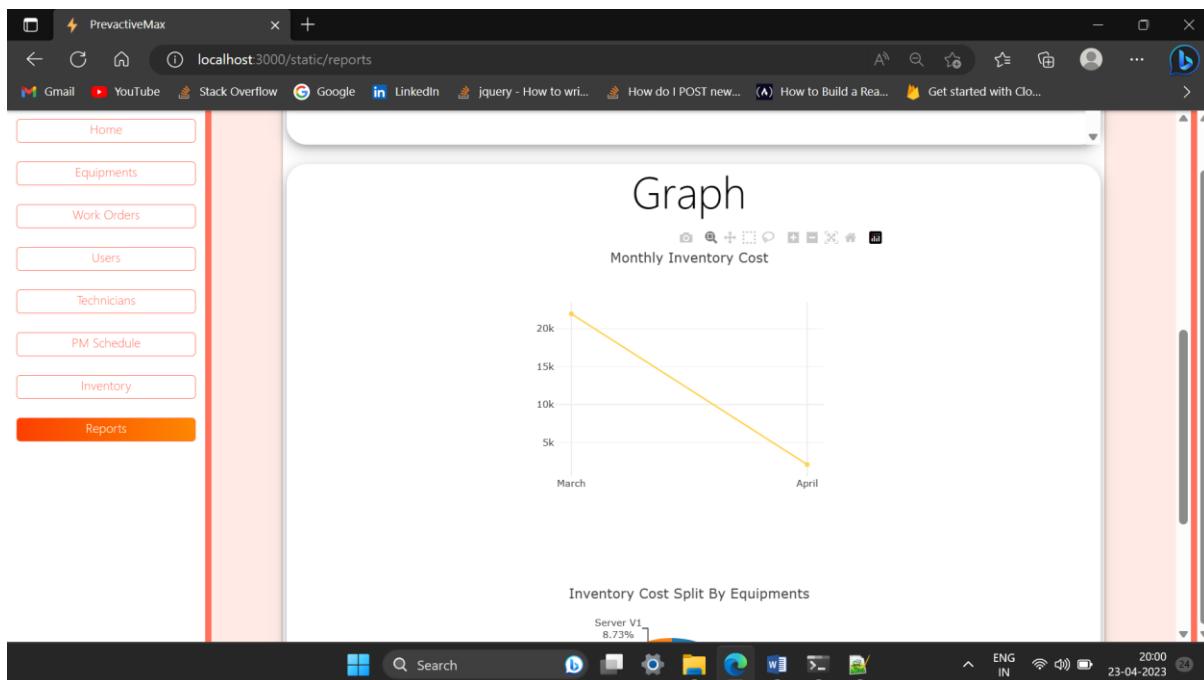
## Estimated vs Actual Cost of Workorders

Ent. No	Inv. Id	Inventory Item	Work Order Id	Work Order	Qty Used	Total Cost	Date Of Use
1	1	HD Steel Roller w/ Ball Bearings	1	Change Elevator door interlocks	5	9570	2023-03-28 02:18:01
2	4	Interlock Control Panel	1	Change Elevator door interlocks	1	11179	2023-03-28 02:18:01
3	9	Capacitors	5	Computer is not turning on	2	1200	2023-03-31 21:18:34
4	10	Cooling Fans	2	The Server is down	4	1400	2023-04-14 14:20:32
5	10	Cooling Fans	3	Preventive Maintenance of Server	2	700	2023-04-21 17:06:07

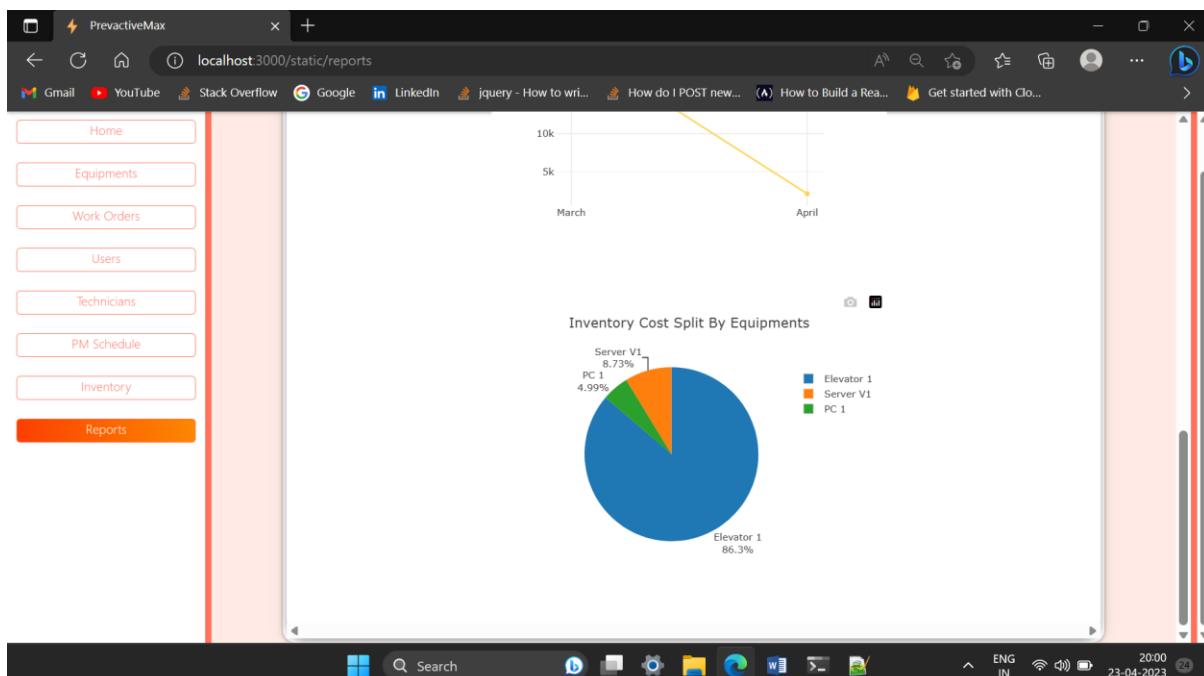
## Inventory Report

Ent. No	Inv. Id	Inventory Item	Work Order Id	Work Order	Qty Used	Total Cost	Date Of Use
1	1	HD Steel Roller w/ Ball Bearings	1	Change Elevator door interlocks	5	9570	2023-03-28 02:18:01
2	4	Interlock Control Panel	1	Change Elevator door interlocks	1	11179	2023-03-28 02:18:01
3	9	Capacitors	5	Computer is not turning on	2	1200	2023-03-31 21:18:34
4	10	Cooling Fans	2	The Server is down	4	1400	2023-04-14 14:20:32
5	10	Cooling Fans	3	Preventive Maintenance of Server	2	700	2023-04-21 17:06:07

## Inventory Report PDF



## Monthly Inventory Cost Graph



## Inventory Cost Split by Equipments

The screenshot shows a web browser window titled "CustomReports" on the "localhost:3000/custom/reports" page. On the left, there is a sidebar with buttons for "Equipments", "Work Orders", "Users", "Technicians", "PM Schedule", "Inventory", and "Reports". The "Reports" button is highlighted in orange. In the main area, there is a query editor with the SQL command: "select count(userNo),deptId from usermaster group by deptId". Below the query is an "Execute" button. To the right of the query editor, there are dropdown menus for "Select an Graph", "Index of Labels field:", "Index of Values field:", and "Color of Graph:" (set to red). A "Plot" button is also present. The results are displayed in two sections: "OutPut" which contains a "Table" and a "Graph". The "Table" section shows the following data:

count(userNo)	deptId
3	1
4	2
2	3
4	4
5	5

The "Graph" section shows a bar chart with the same data, where the x-axis represents the department ID and the y-axis represents the count of users.

### Custom Reports Drag and Drop Column to Plot Graph

This screenshot is similar to the previous one, but the "Plot" dropdown has been set to "bar". The "Graph" section now displays a bar chart with the following data:

deptId	count(userNo)
1	3
2	4
3	2
4	4
5	5

The rest of the interface remains the same, with the sidebar and the "Table" section showing the same data as the first screenshot.

### Custom Report and Graph

8

# SYSTEM TESTING

## 8.1 SYSTEM TESTING

Software testing is the process of evaluating a software application or system to identify defects or errors, and to ensure that it meets the specified requirements and works as expected. The main objective of software testing is to identify and report any issues or defects that could impact the functionality, usability, security, or performance of the software. This helps to ensure that the software is of high quality, reliable, and meets the needs of its users.

Our Project Prevactive Max has done through the following tests:

**Unit Testing:** Each and Every module of the system has been tested individually at nuclear level in order to make sure there are negligible amount of flaws left in the project.

**Conclusion:** System has performed well in unit testing and won't disappoint the stakeholders at nuclear levels.

**Integration Testing:** Integration Testing was performed on the Project at several points in order to rectify interfaces and interactions between different components of the system. This test was required to be performed over dual backend since this system uses three server technologies and utilizes 2 backend technologies PHP and Python, and they should work in harmony without any conflicts. Apart from that interaction between individual modules and components also need to ensure working in synchronization with each other.

**Conclusion:** The system as passed in integration testing without any conflict between modules and components of this system. Every module is individually unaffected by other modules as well as interact well with each other.

**System Testing:** the system testing was done when entire basic web application was developed. After integrating all the modules into the system and running entire system all together the system worked seamlessly well.

**Conclusion:** Our Project's System testing concludes that the project works well as a whole system. Each and every Modules can work perfect, as well as disruption in any one module cannot cause failure of entire system. Such as unavailable python server might disable/ effect only the functionality that is using it leaving rest the project unaffected.

**Regression Testing:** This Testing was done several times after the basic functionalities of the system were completed and new features were being added. Such as added search feature, AI feature, custom reports, executor etc. did not affect or damage the existing system.

**Conclusion:** New Features can be added to the system or changes can be made into most of the parts without affecting the entire basic functionality that was developed.

**Usability Testing:** The System was checked for its usability to determine if it is easy to use and meets the needs of the intended users.

**Conclusion:** The System is Easy and interesting to use for every kind of user.

9

# Future Enhancements

## 9.1 FUTURE ENHANCEMENTS

There are several ideas blooming in our young minds to make several future enhancements into this system. A few notable future enhancements that would give this project a quantum leap are:

- 1) Improving AI: the AI would primarily be improved such that it can also detect severity of the Task and then it would finally be able to Generate work orders automatically. Also we would configure the code such that the AI learns and stores the Data it was given and interpretations that it made in order to expand its dataset and slowly lead towards par accuracy. The AI would also be made capable of assigning works to the most optimum technician available, according to work's severity instead of just suggesting admin. This would reduce lots of administrative efforts. The AI shall also be made effective enough so that user wouldn't have to fill an entire form instead just providing task description with equipment name would be enough for the AI to generate and handle the work orders automatically.
- 2) Seq2Sql: we plan on providing a natural language processing AI model for the reports section where a Natural Language Sentence would be converted to SQL query to fetch data. This would help admins with no sql knowledge to generate reports using natural language.
- 3) Adding Notification: A notification system to this project would make it quite helpful to notify admins or technicians especially in times of emergency.
- 4) Adding a more mobile friendly design: This would make this project more adjustable to mobile devices so that users can access it from anywhere, anytime without the need of desktop. Although there are several mobile adjustments done but it still not quite mobile friendly.
- 5) Security: More Attention shall be paid to security of this system. Several security flaws discussed earlier shall be rectified in the further enhancements. Encryption, Decryption of data shall also be ensured in further updated.
- 6) The Backup Flaw: as discussed earlier the lack of backing up of documents and file that are being uploaded to system shall be rectified in further enhancements of the system.
- 7) System needs features such as alarms to warn a nearing preventive maintenance scheduled. Or auto generate work order using AI if the deadline has already passed. This feature shall also be introduced further.
- 8) Other Detailing and Polishing of the system shall be done in order to ensure system runs perfectly fine.

10

# Bibliography

## 10.1 BIBLIOGRAPHY

<https://www.w3schools.in/sdlc/iterative-model>

<https://www.geeksforgeeks.org/software-testing-basics/>