Electricity Distribution System

Design Project report submitted in partial fulfilment of the requirements for the degree of B.Tech. (and M.Tech (for DD))

by

Amar Kumar
(Roll No: CED17I029)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
INDIAN INSTITUTE OF INFORMATION TECHNOLOGY,
DESIGN AND MANUFACTURING, KANCHEEPURAM

December 2021

Certificate

I, **Amar Kumar**, with Roll No: **CED17I029** hereby declare that the material presented in the Project Report titled **Electricity Distribution System** represents original work carried out by me in the **Department of Computer Engineering** at **Indian Institute of Information Technology, Design and Manufacturing, Kancheepuram** during the year **2021**. With my signature, I certify that:

- I have not manipulated any of the data or results.
- I have not committed any plagiarism of intellectual property. I have clearly indicated and referenced the contributions of others.
- I have explicitly acknowledged all collaborative research and discussions.
- I have understood that any false claim will result in severe disciplinary action.
- I have understood that the work may be screened for any form of academic misconduct.

Date: December 8, 2021 Student's Signature: Amar Kumar

In my capacity as supervisor of the above-mentioned work, I certify that the work presented in this Report is carried out under my supervision, and is worthy of consideration for the requirements of internship work during the period May 2021 to October 2021.

Advisor's Name: Advisor's Signature

Abstract

This report documents the Design Project work I carried out by me. The idea is to develop a computer application which provides the service for Electricity Distribution. Basically, I will an application which can be used throughout India. Our service is flexible and user friendly. Its simplicity provides user experience more interactive

Acknowledgements

First of all, I would like to thank our Institute, Indian Institute of Information Technology Design and Manufacturing Kancheepuram, for arranging the Design Project program for us. I take this opportunity to express my gratitude to everyone who helped me during my design project. Throughout the project, I am grateful for their constant support, invaluable constructive criticism, and friendly advice.

I express my deepest thanks to my guide Dr. Masilamani V. for providing guidance and resource for completing the project and making the project development easier.

Last, but not least, I would like to thank my friends and classmates for their wonderful support and help.

Contents

List of Figures

Abbreviations

GUI	**G**raphics **U**ser **I**nterface
API	**A**pplication **P**rogramming **I**nterface
B2B	**B**usiness to **B**usiness
EDS	**E**lectricity **D**istribution **S**ystem

For/Dedicated to/To my...

Chapter 1

Introduction

1.1 Motivation

We already know the importance of electricity in our life. It has many uses in our day to day life. It provides us the comfort which we want. Now-a-days paper work has almost vanished because paper can be lost easily and many people find difficulties in finding it. Almost all the works are done digitally now-a-days. So, Digitalization of Electricity distribution system is must. It not only saves paper work but saves a lot time for a person because a person may need to travel a lot for getting a new connection at his home. And to get any updates regarding the electricity bill, he can easily get through the Electricity distribution system application.

1.2 Objectives of the work

Application for electricity distribution system has been designed to assist people managing their electricity connection at home. This saves a lot of time for people as they do not need to visit electricity office for buying connection at home. Instead, they can download this application and apply for a new connection. They do not need to go anywhere, they will be informed about the status of their connection, readings of the meter etc.

1.3 Technologies used

Python

Python is an interpreted high-level general-purpose programming language. Its design philosophy emphasizes code readability with its use of significant indentation. Its language constructs as well as its object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects.

MySQL

MySQL is an open-source relational database management system. MySQL is integral to many of the most popular software stacks for building and maintaining everything from customer-facing web applications to powerful, data-driven B2B services.

WxPython

wxPython is a wrapper for the cross-platform GUI API wxWidgets for the Python programming language. It is one of the alternatives to Tkinter. It is implemented as a Python extension module.

Chapter 2

Application Development

Now that we have known the importance of electricity in our life and motivation behind developing the application, it's time to develop the computer application.

2.1 Frontend

For frontend, we are using wxPython. wxPython is a wrapper for the cross-platform GUI API wxWidgets for the Python programming language. It is one of the alternatives to Tkinter. It is implemented as a Python extension module. It is easy to use and its documentation is easily available for getting any source of information regarding development of the computer application. As wxPython is a cross platform GUI API for python, this application can be used in many operating system such as linux, windows, Mac OS etc.

2.2 Backend

For backend, we are using python, Python is an interpreted high-level general-purpose programming language. Its design philosophy emphasizes code readability with its use of significant indentation. Its language constructs as well as its object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects.

2.3 Database

For connecting frontend with backend, there need a database so that all the information from the backend can be shown in the frontend. For this, we are using MySQL. MySQL is an open-source relational database management system. MySQL is integral to many of the most popular software stacks for building and maintaining everything from customer-facing web applications to powerful, data-driven B2B services.

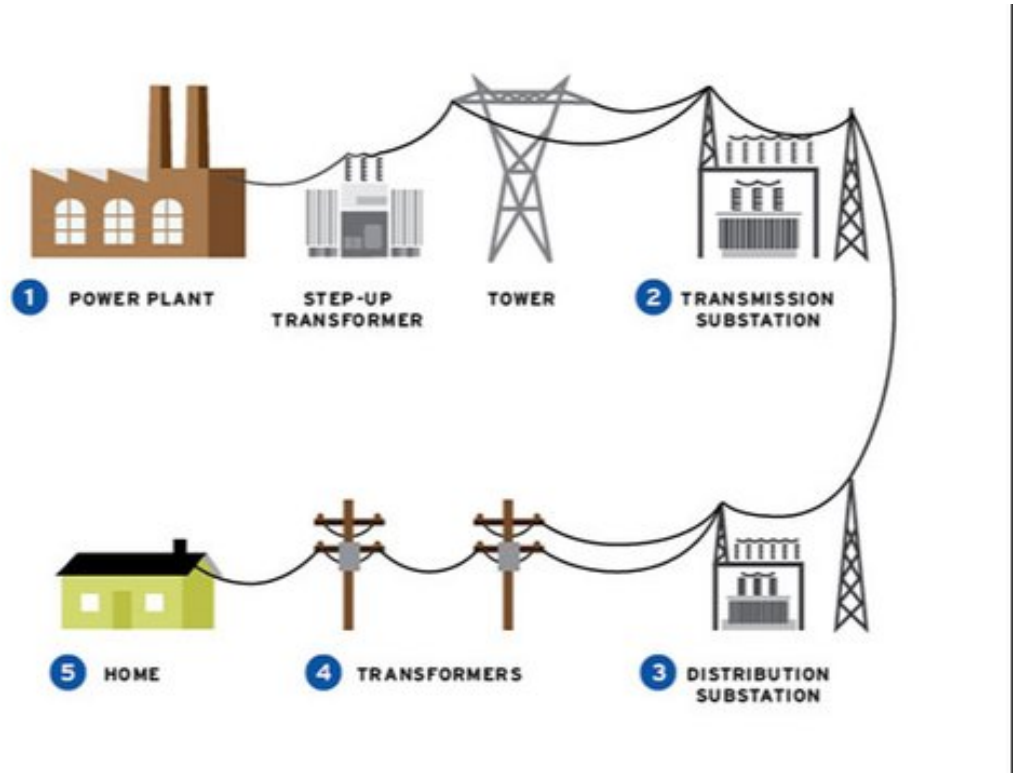
Chapter 3

Work Done

3.1 Understanding Electricity distribution system

we had to develop an application for electricity distribution system. For this, we need to understand the flow of EDS.

FIGURE 3.1: EDS Flow Diagram



Electricity is generated in power plant. From there, it goes to transmission company then to Distribution company and then it reaches to our home. There is electricity board in every states which handles all these things. Keeping these things in mind we developed our computer application.

3.2 Learnings

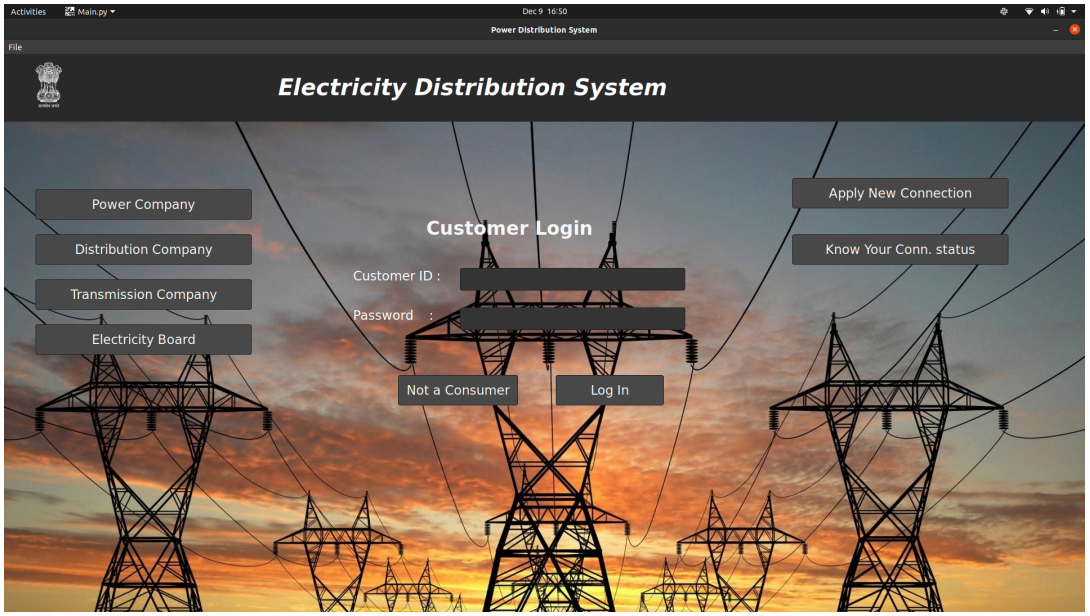
After the first phase of understanding EDS, some time was spent by me to learn the technologies

- Python language (For writing frontend and backend)
- WxPython (For GUI)
- MySQL (For writing queries to interact with database)

3.3 Pages Created by me

FIGURE 3.2: Home Page

This is the homepage of my computer application for Electricity distribution system



This contains the customer login page and all the electricity companies such as power company, distribution company, transmission company. This also includes button for applying new connection and a button for getting status of the newly applied connection.

FIGURE 3.3: Power Company

This page shows the power company list

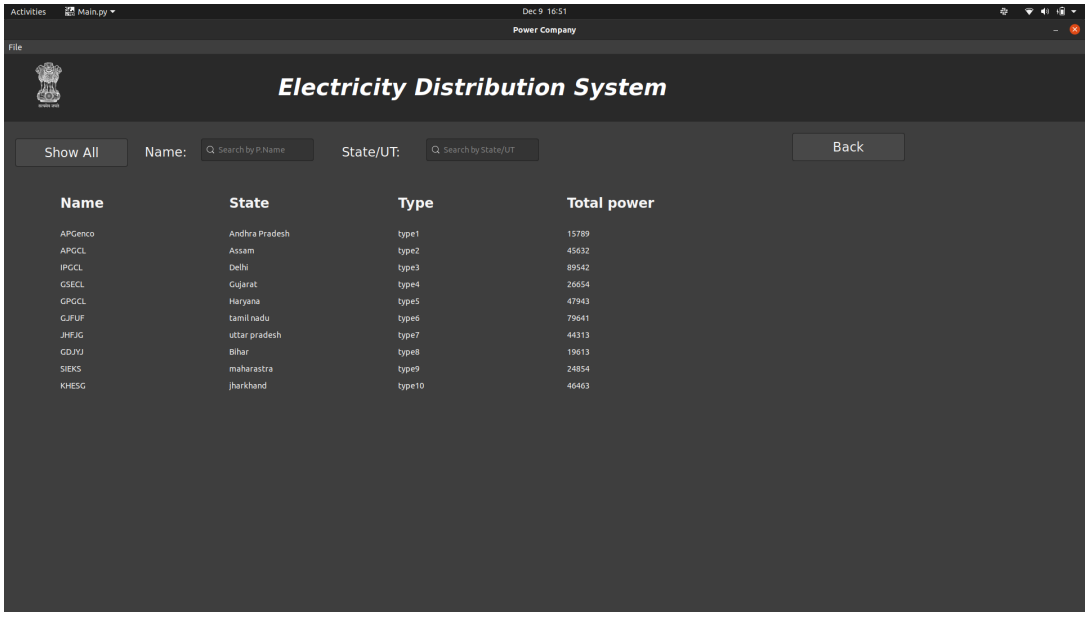
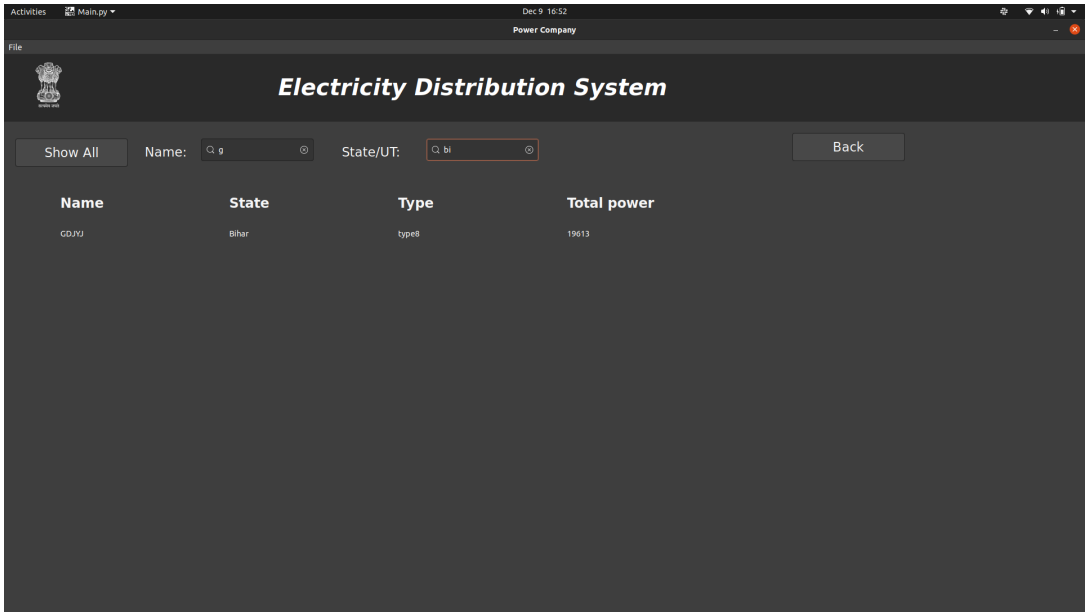


FIGURE 3.4: Power Company search

Power company search



Similar GUI is for Distribution company, Transmission company and electricity board. There is search option of Name and State in each company, which helps to easily find the required data

FIGURE 3.5: New Connection

This page is for new connection

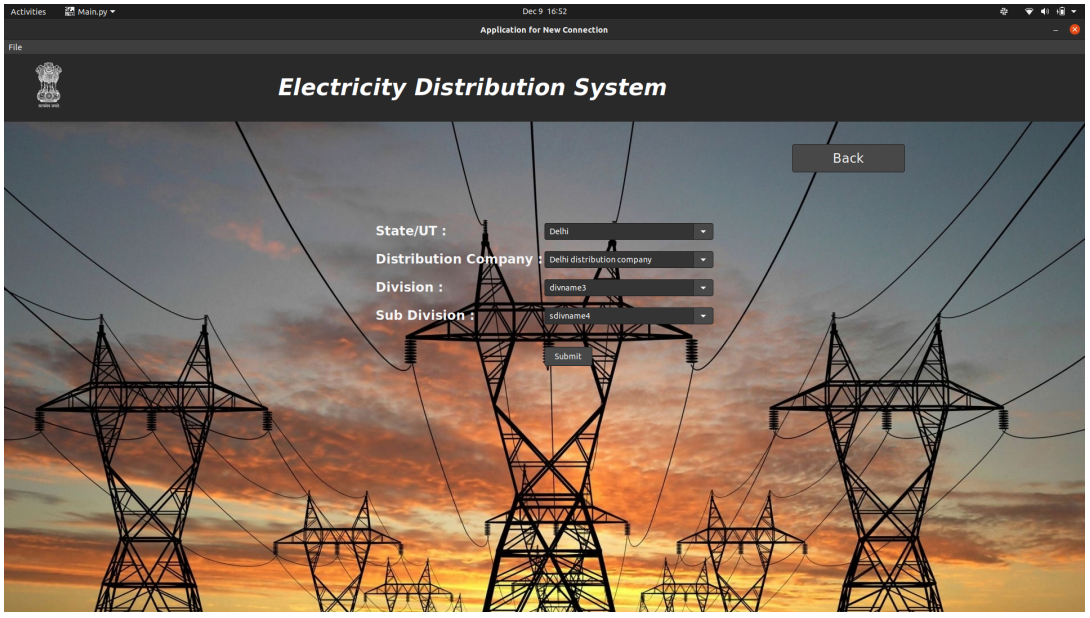
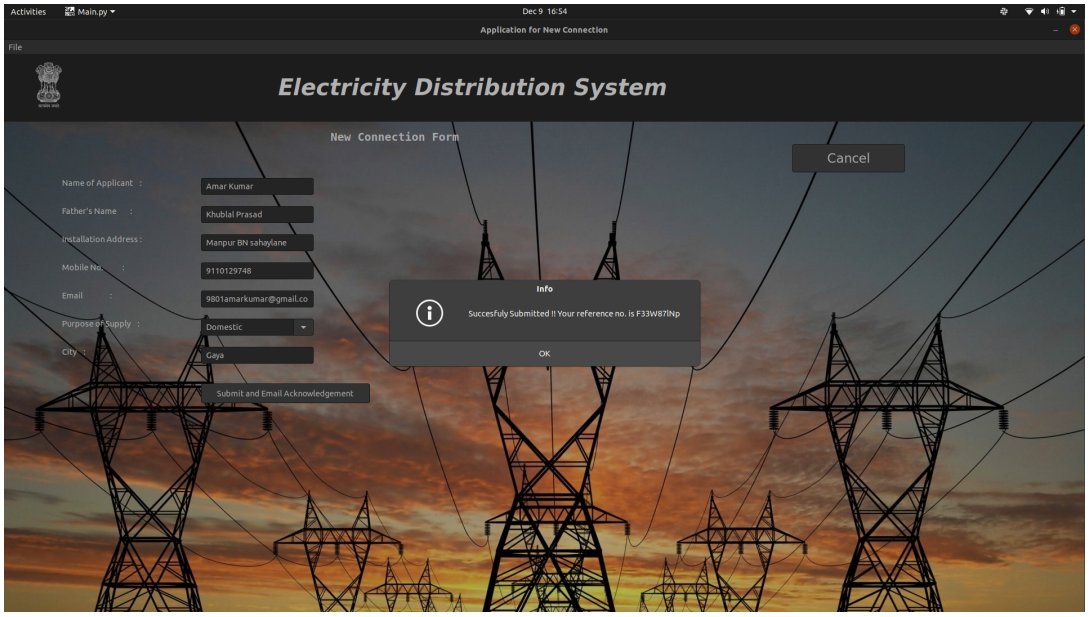


FIGURE 3.6: New Connection Submission

This page is for new connection submission



When we apply for new connection, we are required to fill some details and then on submission we get the reference ID through which we can check the status of our application. We also get a mail for reference ID.

FIGURE 3.7: New Connection Mail

This is email when a consumer applies for new connection

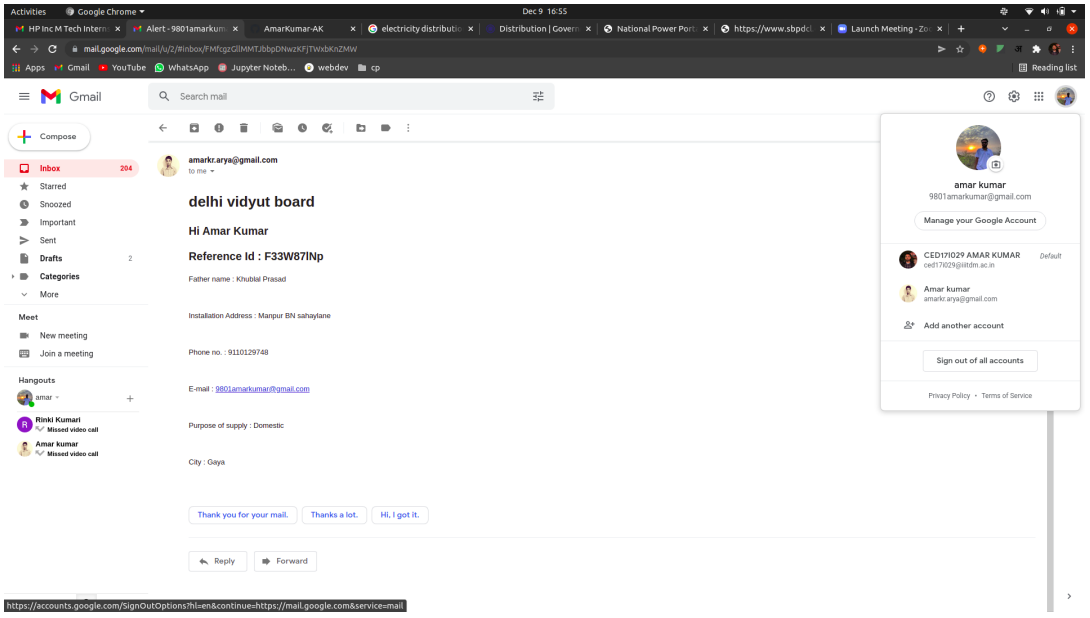
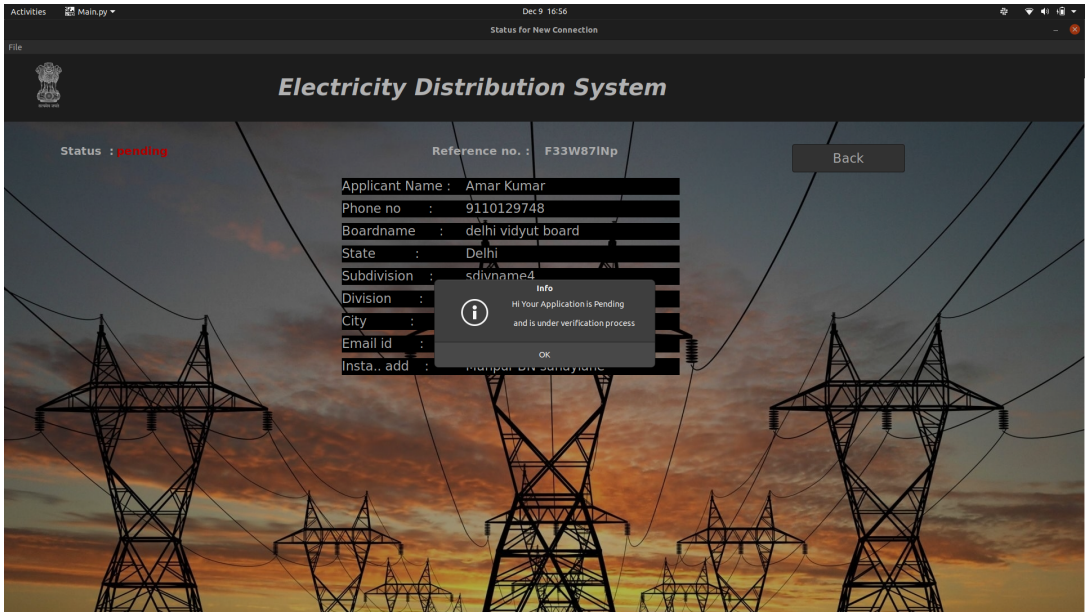


FIGURE 3.8: New Connection status

This page shows the status of new connection



When we submit application for new connection, we get a mail and we can check the status of our connection

FIGURE 3.9: Employer page

This page is for one of the Employer

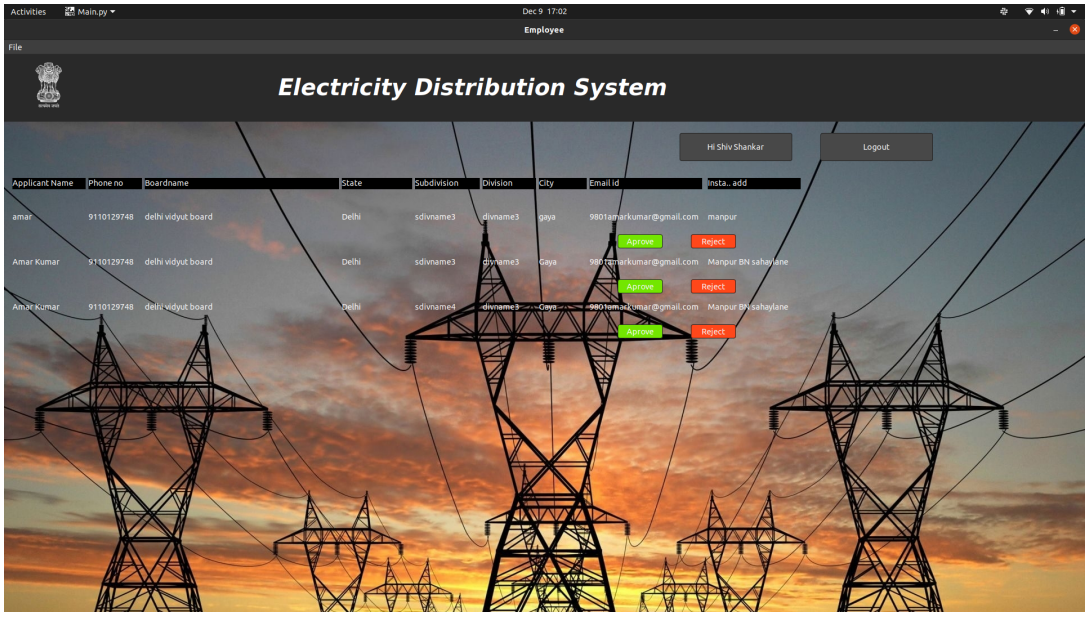
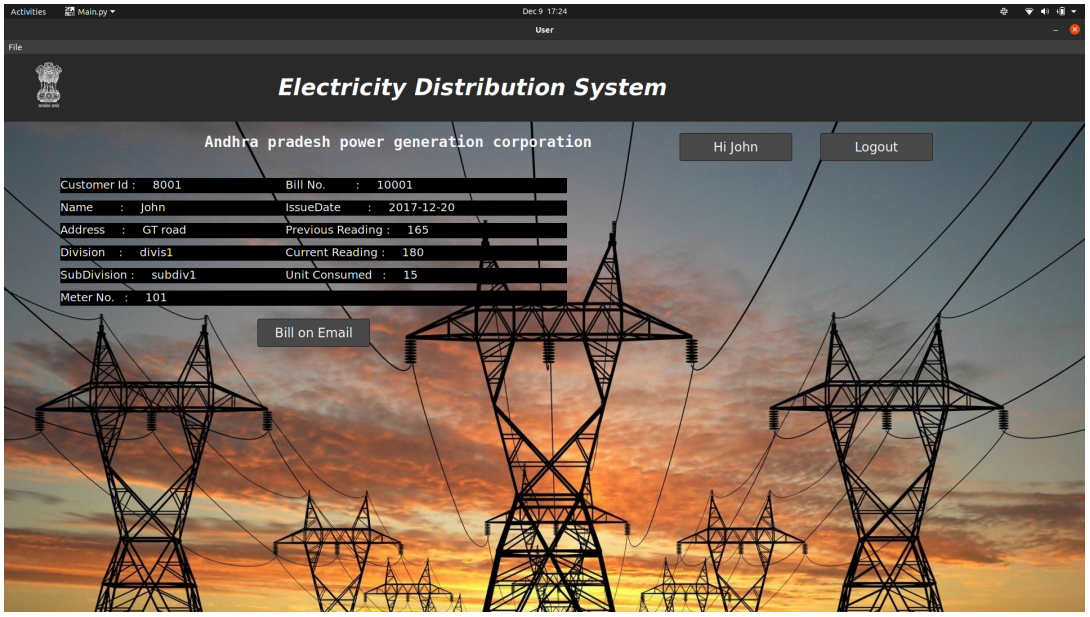


FIGURE 3.10: Customer login page

This page shows up on cusomer login



One employer is assigned the job to approve and reject the new connection applied by the consumer. When the employer approves the form then, consumer can login to the page and know the readings of the meter at their home.

There are many other pages for employer such as one employer updates the details of the consumer, one employer adds the transmission, distribution and power company. There is also a page to check the status of the application. We can also mail the readings of the meter on the mail ID which we wants. When the employer approves the application, the status of the application turns from pending to approved. There is also a page for the profile of the employer as well as there is also a page for the profile of customer.

Chapter 4

Conclusion and Future Work

4.1 Conclusion

A final Design for my computer application has been developed. Both frontend and Backend has been written which is easy to understand. This is the first version of my application, so not all features are implemented and some features are in development phase as well.

4.2 Future Work

- Customer should be able to add their profile picture as well.
- Electicity bill payment can be introduced inside this application.
- As of now, only Emailing service is implemented. So, messaging service can be implemented for better interaction.
- Regular update service about the Readings of the Electricity meter can be implemented so that customers need not login again and again for checking the Readings of the meter.
- When consumers apply for new connection, the status of the application(Approved or Rejected) can be emailed or messaged automatically.
- For employee to change reading, he needs to manupulate in database. This can be added in UI.

Chapter 5

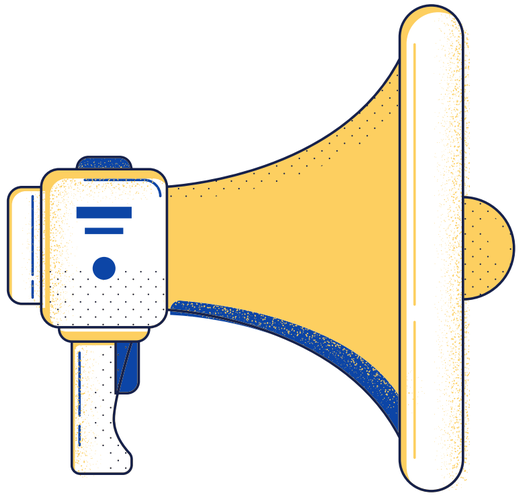
References

- https://docs.wxpython.org/wx.1moduleindex.html
- https://www.geeksforgeeks.org/mysqldb-connection-python/
- https://www.w3schools.com/TAGS/default.ASP
- https://www.geeksforgeeks.org/self-in-python-class/
- https://docs.python.org/3/library/email.mime.html
- https://docs.python.org/3/library/smtplib.html#module-smtplib

DESIGN PROJECT

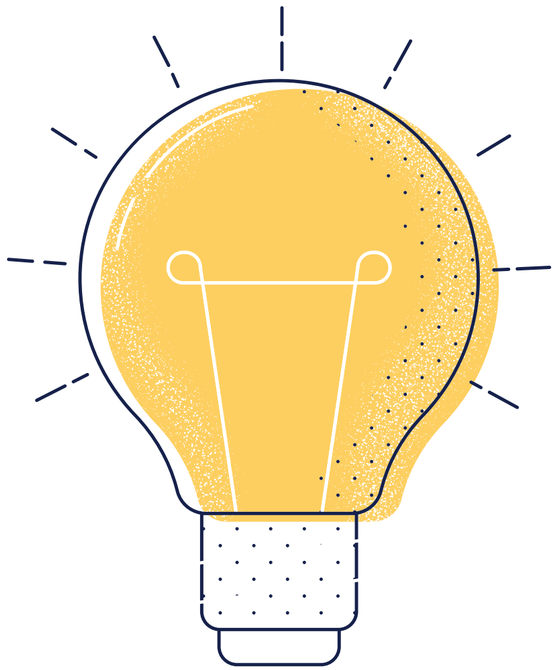
Electricity Distribution System

By Amar Kumar
(CED171029)



Problem Statement

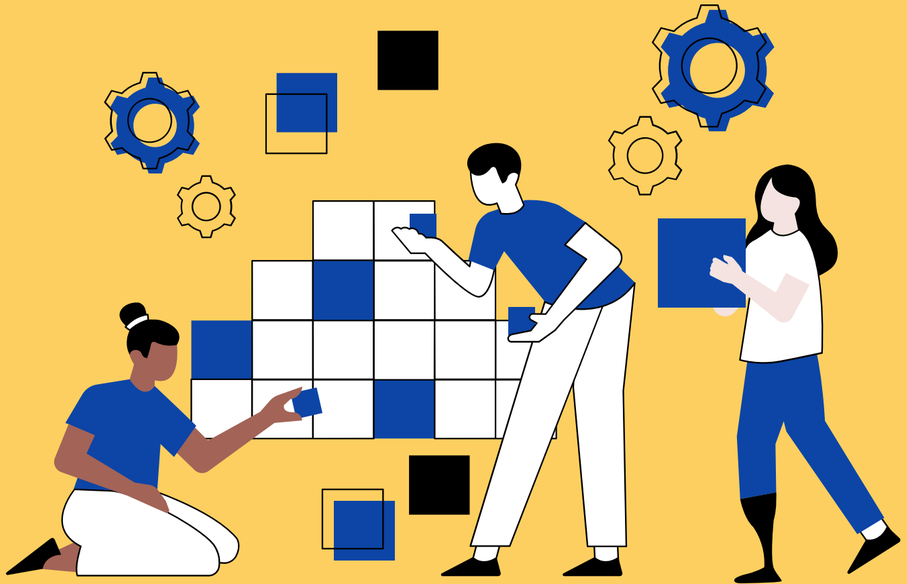
Make a platform where consumers can apply for a new Electricity connection, See readings of their meter, Email their readings, see their connection status etc.

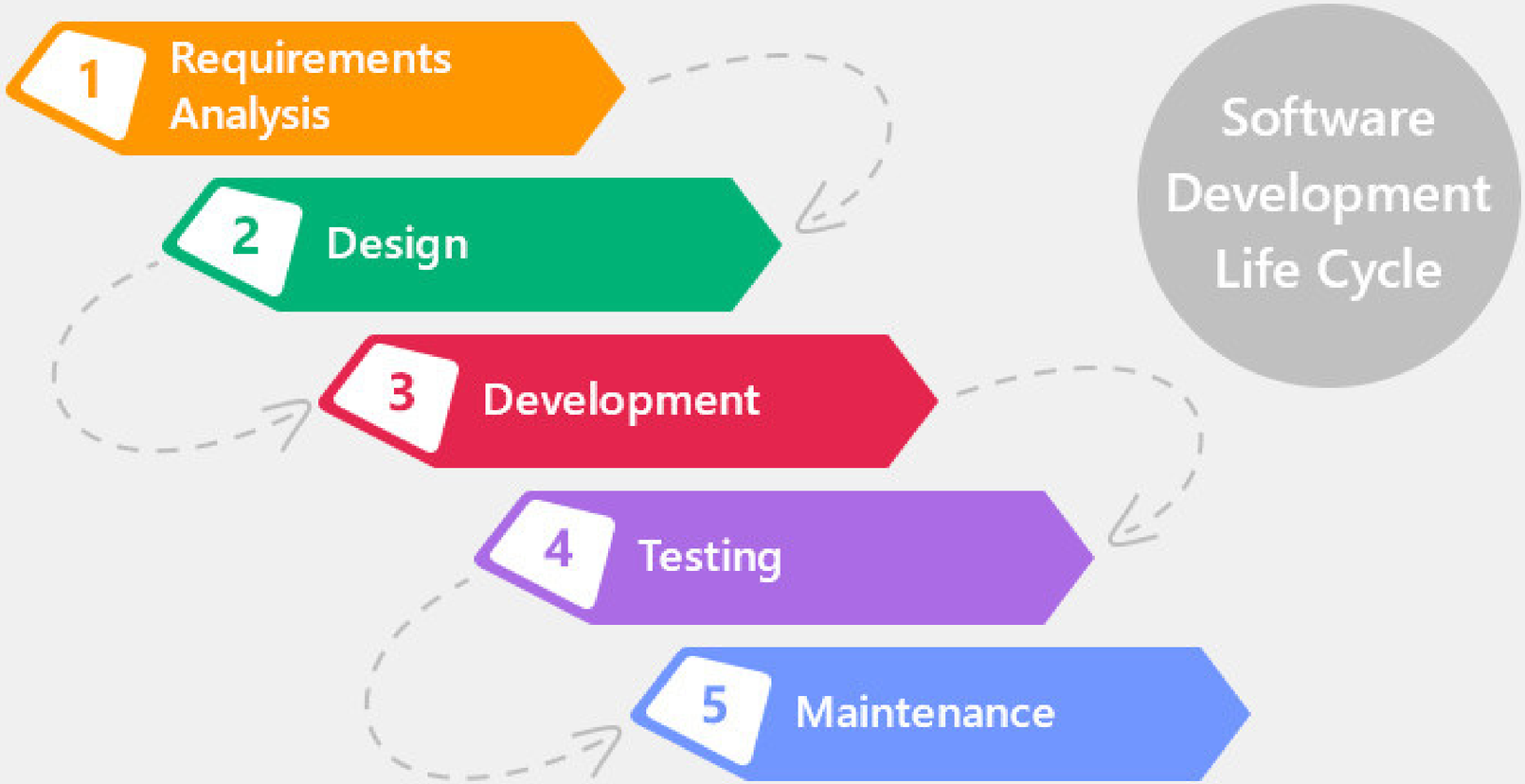


Objectives

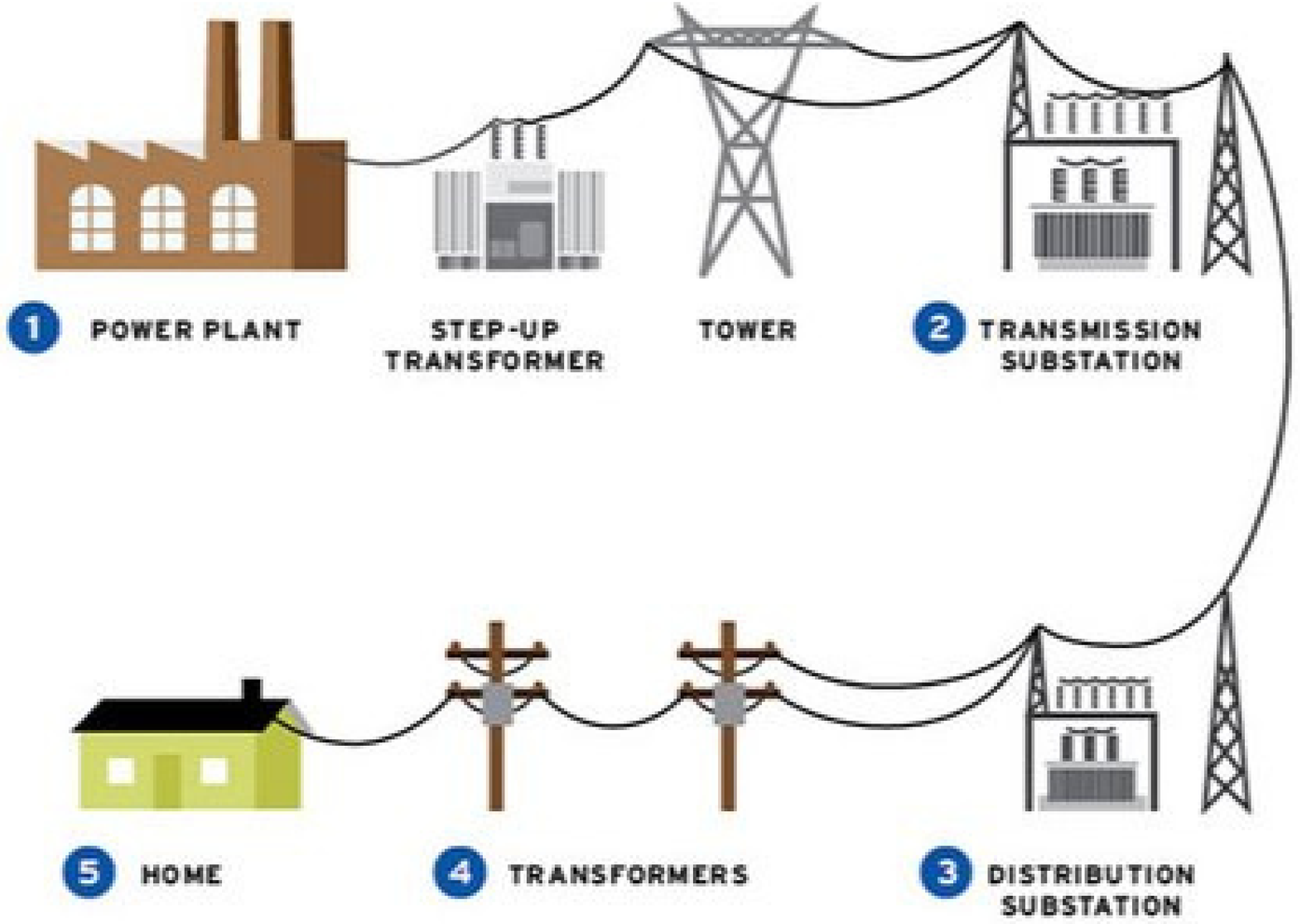
- To understand the flow of Electricity Distribution System
- Write the appealing and easy to understand and manage backend
- Design an appealing and user friendly UI for the frontend which would enable users to easily achieve their tasks.

Methodologies Used





Flow Diagram


1 POWER PLANT
STEP-UP TRANSFORMER
TOWER
2 TRANSMISSION SUBSTATION
5 HOME
4 TRANSFORMERS
3 DISTRIBUTION SUBSTATION

Flow Chart


Consumer Details Page
on submit
Receives a mail for reference ID
on submit
New connection Details Page
Employee Profile Page
Power Company
Distribution Company
Apply New Connection Page
Employee Login Page
Home Page
Know Your Status Page
Customer Login Page
Transmission Company
Electricity Board
Customer Profile Page
On clicking Bill on Email
Fill Reference ID Page
After approval by empoyer
Without approval or Rejection
After Rejection by employer
Receives a mail for readings of the meter
Approved Page
Pending Page
Rejected Page

Technologies Used

python™

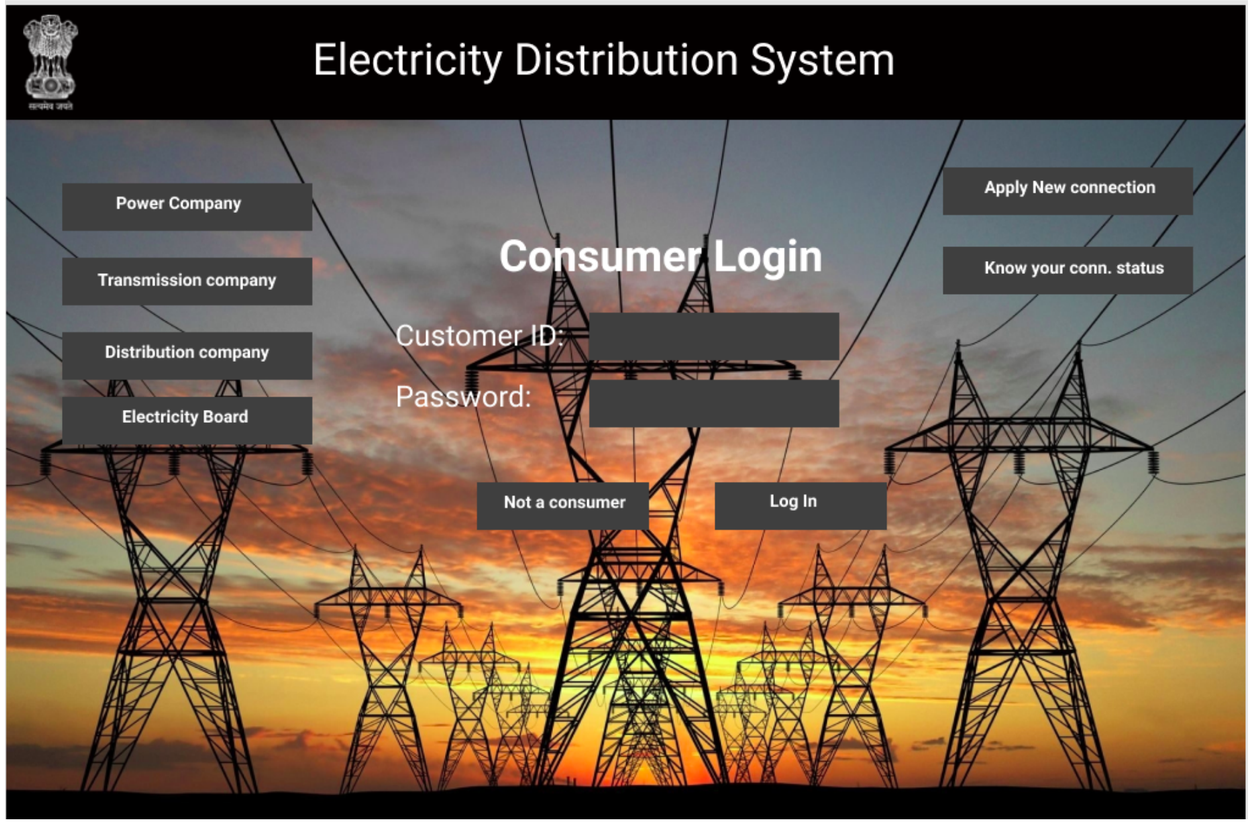
wxPython

http://wxPython.org/

Cross-Platform GUI Library

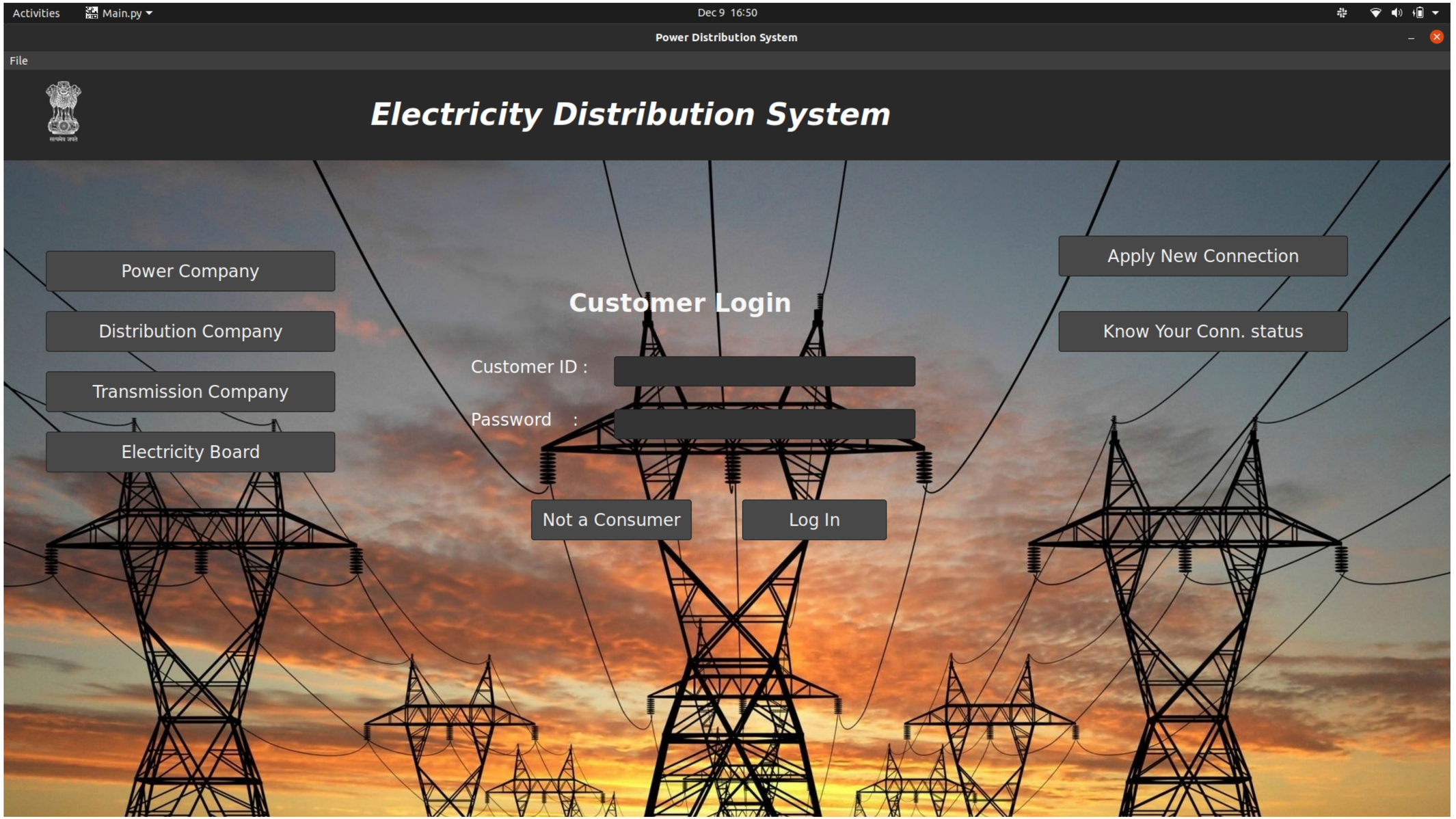
MySQL®

Prototyping Using Figma

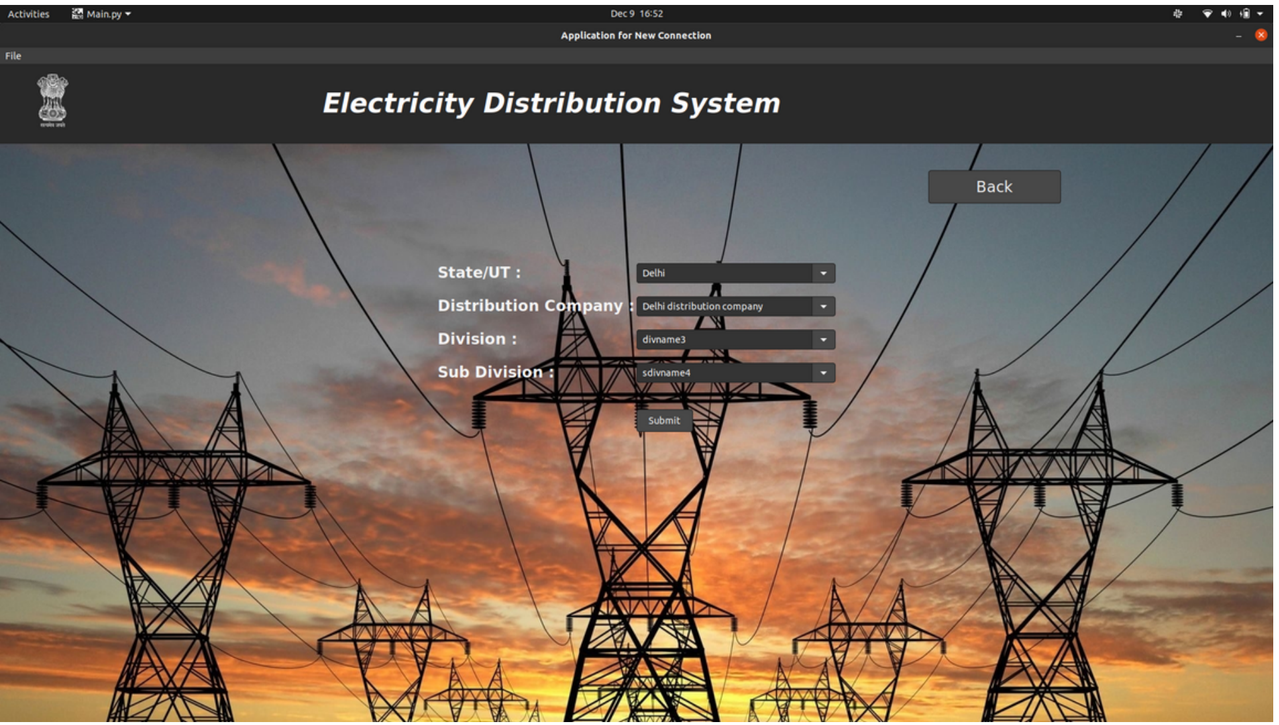


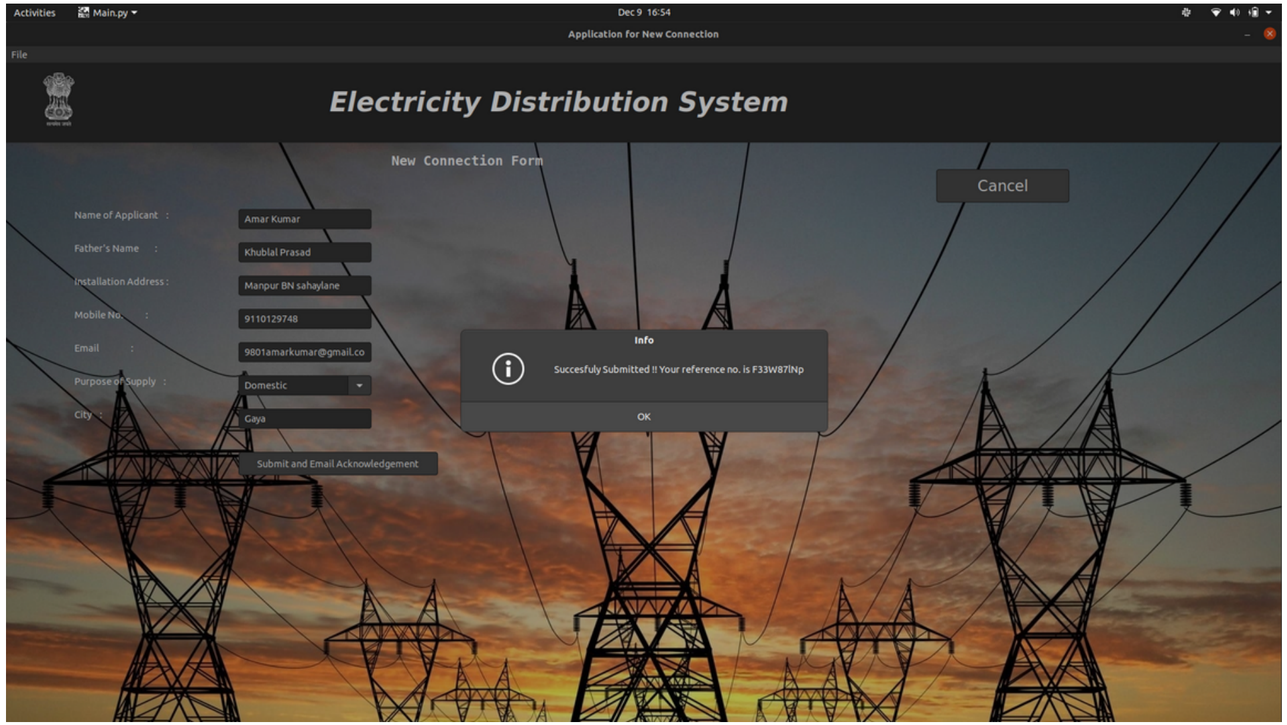
Work Done

Home Page

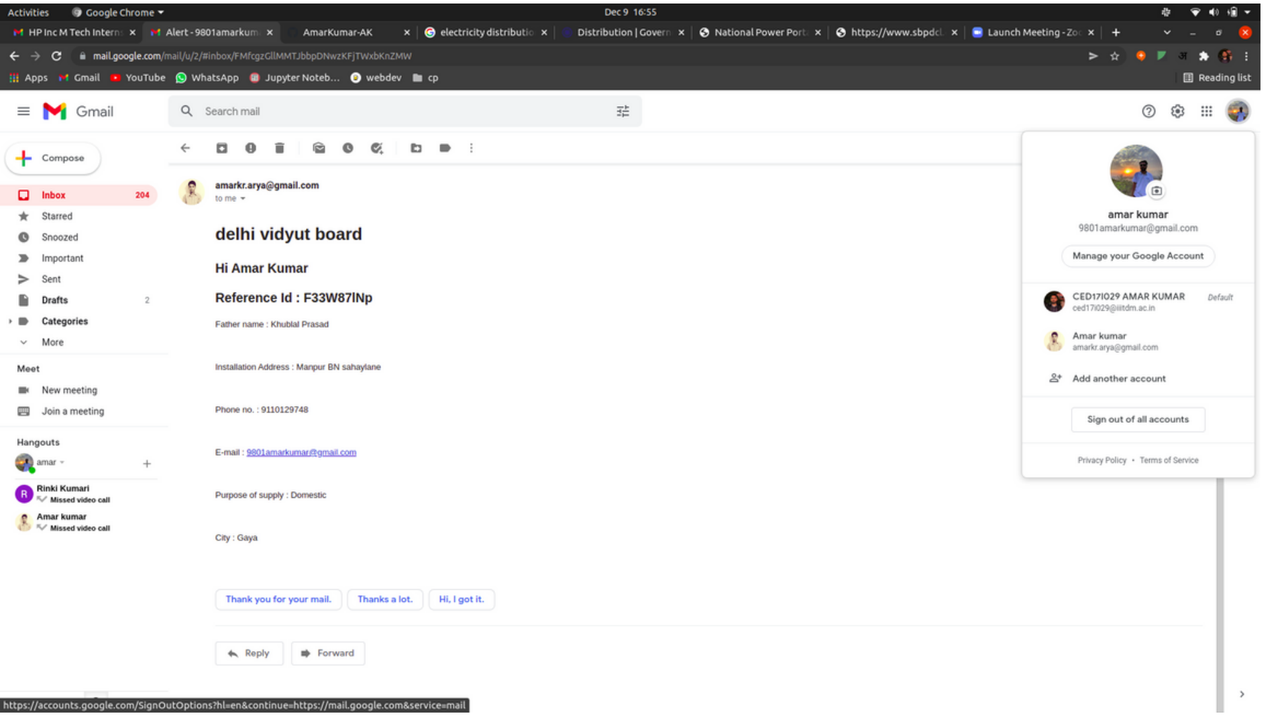

Activities
Main.py
Dec 9 16:50
Power Distribution System
File
Electricity Distribution System
Power Company
Distribution Company
Transmission Company
Electricity Board
Customer Login
Customer ID :
Password :
Not a Consumer
Log In
Apply New Connection
Know Your Conn. status

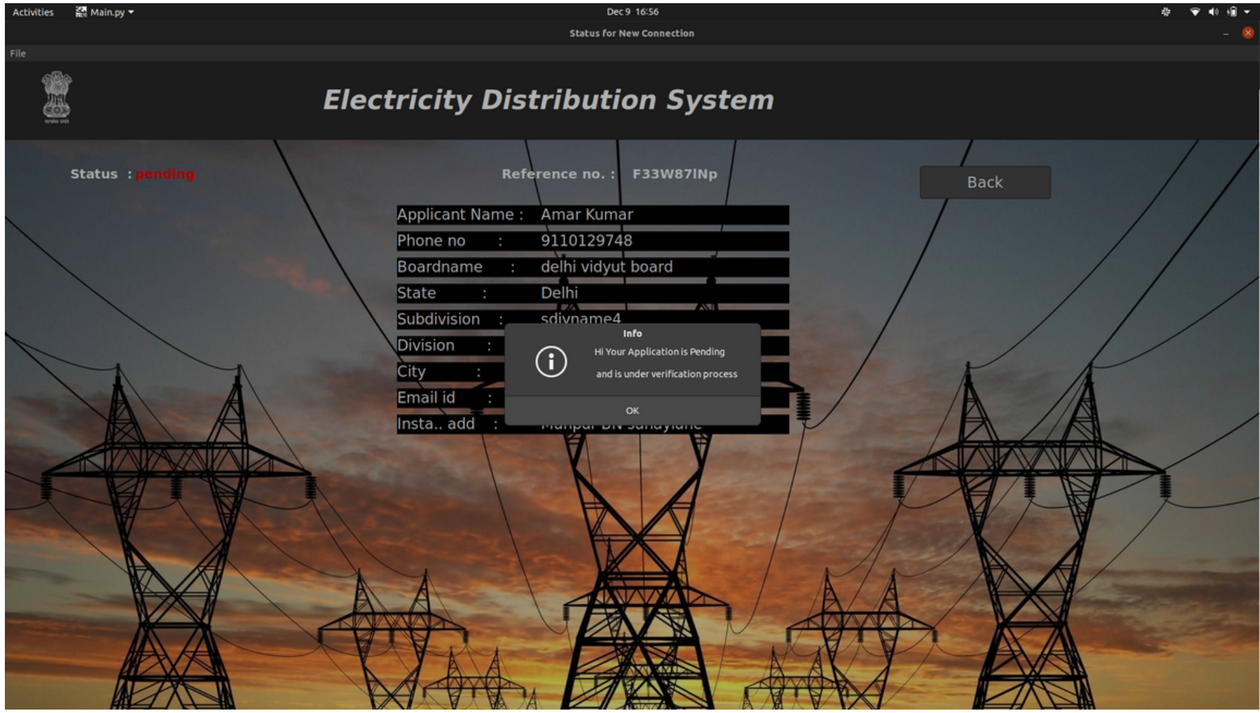
New connection Form



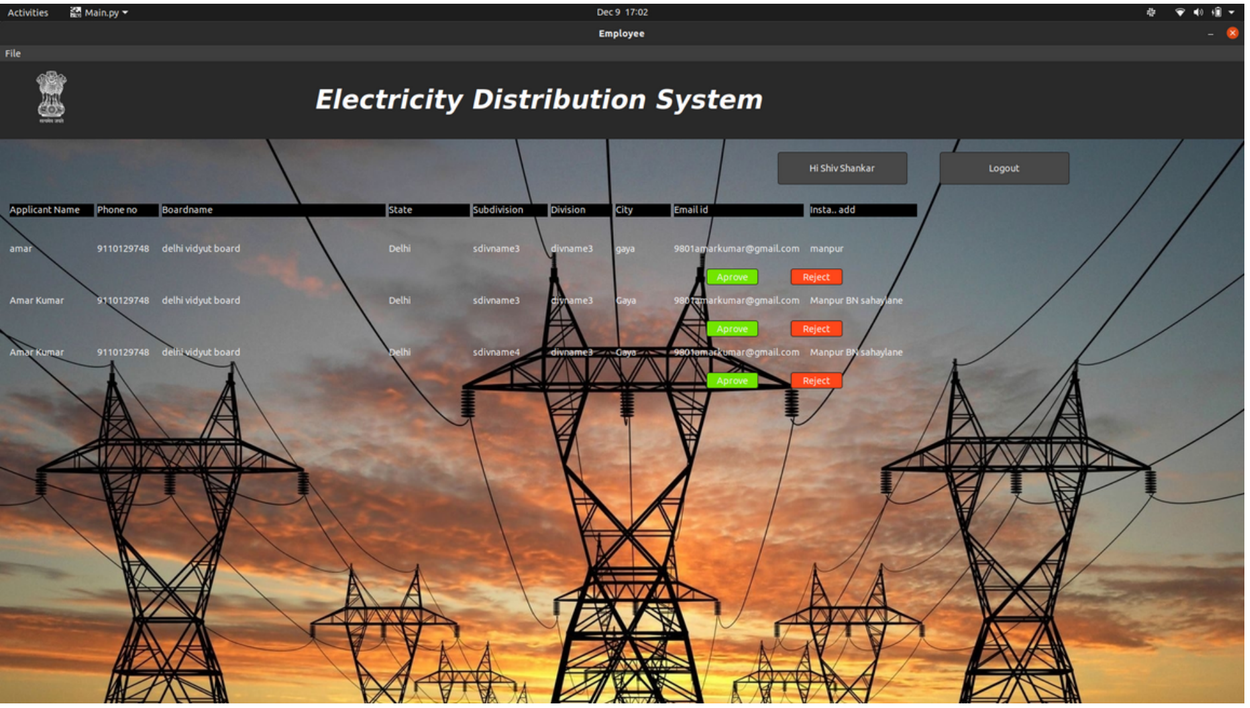


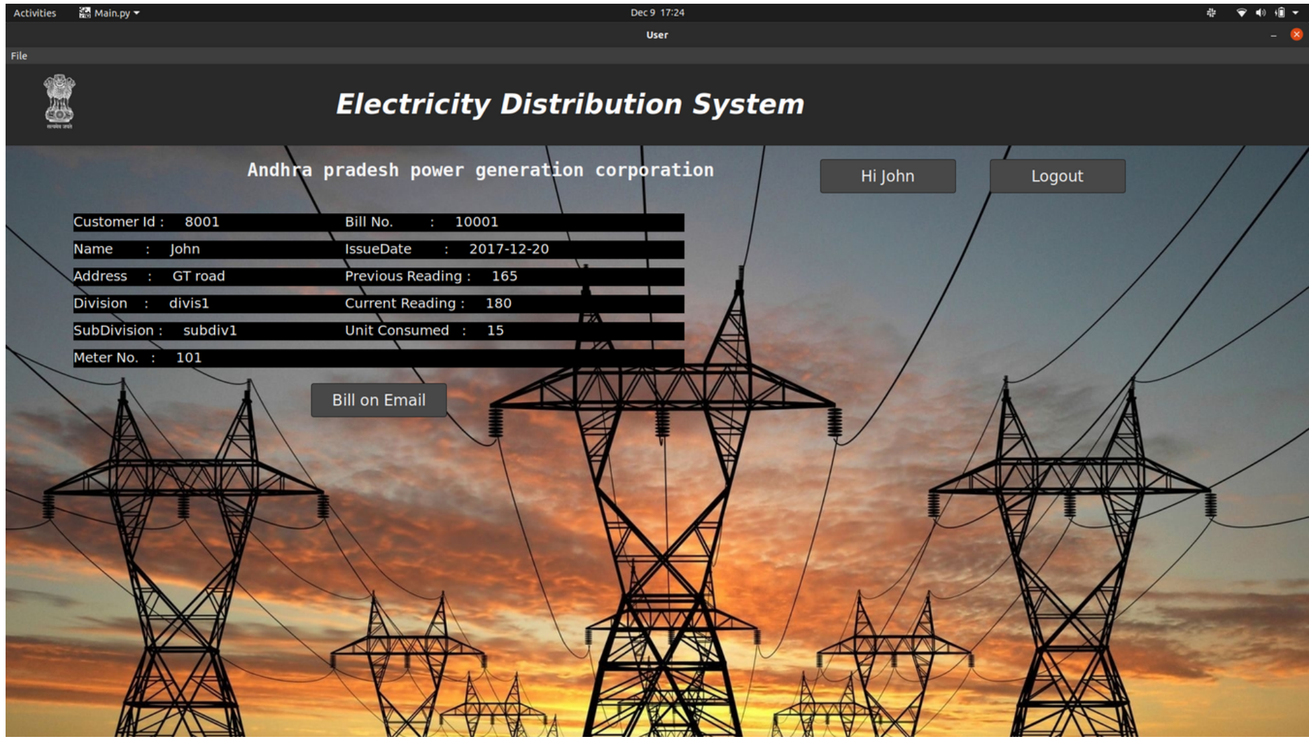
New connection mail & connection status





Employer page and customer page





Thank you