DAWOOD UNIVERSITY OF ENGINEERING & TECHNOLOGY

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EnerFlow

smart energy tracking

SEMESTER EXPO-24

Overview

- The smart energy tracking project is developed in c programming language and provides a foundation for energy management system.
- In future several enhancements can be done like integrate it with smart meters or develop a mobile application version of this or expand the mechanism to also advance the production of energy.

Key features

- The key features of this energy consumption tracking project include user friendly interface, modularity, real time tracking, data security, data storage and insightful reporting.

Achievements

- Smart energy tracking not only promotes efficient energy use but also aligns with several SDGs: Affordable and Clean Energy, Responsible Consumption and Production.
- This project also aligns with the goals of the UNFCCC by reducing greenhouse gas emissions through management of energy consumption.

Limitations

- With out proper encryption and mechanism there is a risk of unauthorized access to user data and data tampering.
- Implementing real time tracking requires hardware sensors and compatible devices.
- The reporting functionality is limited based on the recorded consumption data. More advanced analytics are required for deeper insights.

Team members:

Syed Muhammad Sarim(23-AI-57)

Muhammad Raza (23-AI-49)

Hamza Asif (23-AI-93)

Alishba Khan (23-AI-79)

Working

- User log in to the program with username and password.
- Once authenticated, user can input energy consumption data for every hour from the current time period.
- The system processes the stored data to generate report displaying every hour of the day with energy usage values and highlights the peak usage hour.

```
PS C:\Users\Farrukh Raza\Desktop\pf project> gcc project0.c
PS C:\Users\Farrukh Raza\Desktop\pf project> ./a.exe

----------------------
       EnerFlow
----------------------
1. Authenticate User
2. Log Energy Consumption
3. Generate Report
4. Exit
Enter your choice (1-4): 1
Enter username: user1234
Enter password: pass1234
Authentication successful

----------------------
       EnerFlow
----------------------
1. Authenticate User
2. Log Energy Consumption
3. Generate Report
4. Exit
Enter your choice (1-4): 2
Enter energy consumption for hour 21 (current hour is 20): 15.5
Energy consumption for hour 21 logged successfully

----------------------
       EnerFlow
----------------------
1. Authenticate User
2. Log Energy Consumption
3. Generate Report
4. Exit
Enter your choice (1-4): 2
Enter energy consumption for hour 22 (current hour is 20): 18.2
Energy consumption for hour 22 logged successfully
```

```
       EnerFlow
----------------------
1. Authenticate User
2. Log Energy Consumption
3. Generate Report
4. Exit
Enter your choice (1-4): 3
 Hour of the Day   | Energy Consumption
-------------------------------------------
 00:00 - 00:59     | 0.00 kWh
 01:00 - 01:59     | 0.00 kWh
 02:00 - 02:59     | 0.00 kWh
 03:00 - 03:59     | 0.00 kWh
 04:00 - 04:59     | 0.00 kWh
 05:00 - 05:59     | 0.00 kWh
 06:00 - 06:59     | 0.00 kWh
 07:00 - 07:59     | 0.00 kWh
 08:00 - 08:59     | 0.00 kWh
 09:00 - 09:59     | 0.00 kWh
 10:00 - 10:59     | 0.00 kWh
 11:00 - 11:59     | 0.00 kWh
 12:00 - 12:59     | 0.00 kWh
 13:00 - 13:59     | 0.00 kWh
 14:00 - 14:59     | 0.00 kWh
 15:00 - 15:59     | 0.00 kWh
 16:00 - 16:59     | 0.00 kWh
 17:00 - 17:59     | 0.00 kWh
 18:00 - 18:59     | 0.00 kWh
 19:00 - 19:59     | 0.00 kWh
 20:00 - 20:59     | 0.00 kWh
 21:00 - 21:59     | 15.50 kWh
 22:00 - 22:59     | 18.24 kWh
 23:00 - 23:59     | 0.00 kWh
-------------------------------------------
 Total             | 33.74 kWh

Peak Consumption Hour: 22:00 - 22:59 with 18.24 kWh
```

Implementation

- Modules are implemented for user authentication, real time tracking, data storage, reporting, and user interface.
- Several libraries and functions (stdlib.h, string.h, time.h, stdio.h) are used for string manipulation, memory allocation, time handling, and file operations.

References

- Abe, Hiroto, and Kentaro Ohara. “Energy Management Control System [Enemap].” JAPAN TAPPI JOURNAL 61, no. 9 (2007): 1073–78. http://dx.doi.org/10.2524/jtappij.61.1073
- Nagle, Liam. “Development of a Computer Based Energy Management System.” Thesis, Cranfield University, 1998. http://dspace.lib.cranfield.ac.uk/handle/1826/4662