DESIGN LAB

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Repository for files associated with Design Laboratory. Rack environment control.

Introduction

This project focuses on configuring and utilizing a Raspberry Pi 4 Compute Module for data acquisition and local server functionalities. The implementation includes setting up the operating system, establishing a local server, integrating Bluetooth communication, and developing a daemon process for continuous data collection. A web crawler was developed to fetch data from a specific IP address, store it in a MySQL database hosted on Apache2, and display it on a sample HTML webpage.

Project Timeline and Key Milestones

1. **November 7, 2024** – Received the Raspberry Pi 4 Compute Module along with accessories for initial configuration.
2. **November 8, 2024** – Successfully powered on and verified the proper functioning of the board.
3. **November 14, 2024** – Installed the operating system (Ubuntu 24 LTS) onto an NVMe storage device integrated into the module.
4. **November 14, 2024** – Successfully set up and launched a local server using Apache2.
5. **November 17, 2024** – Developed a main script operating in daemon mode, along with a database and a website hosted on the local server. Implemented a function to retrieve temperature data from a specified IP address and store it in the database.
6. **November 26, 2024** – Added a configuration file allowing modification of connection settings without altering the source code.
7. **December 9, 2024** – Integrated Bluetooth support, refined configurations for data retrieval from a specific IP address. Further work required on decoding data from the Bluetooth thermometer.
8. **December 18, 2024** – Final commit. Prepared the program for laboratory testing and introduced new configuration options. Basic usage instructions were documented.

#default

User manual

Ubuntu: User:pass = fit:alice User:pass = root:1111

Database http://localhost/phpmyadmin User:pass (privileges) = phpmyadmin:root (all privileges, non grant) User:pass (privileges) = root:1111 (all privileges + grant) User:pass (privileges) = fit:alice (~half privileges, account for editing suitable databases)

config.ini explanation [source] section is required for setup the proper connection to the database. You can provide an user and password to the database, host name and database name

[destination_ip] This section introduces the possibility of getting some data from specific IP address (for example in local network). In addition with section [temp_page] you can specify the parent element of html layout and id of child element.

[interval] This section is slightly important. You can provide the maximul interval time (in days) the data in database is held. If yolu give e.g. number 1, one day data from actual time (if program is running) will be deleted. It calculates the interval within now and time in stored in database.

Useful commands (Ubuntu) To on/off bluetooth: sudo rfkill toogle Bluetooth To restart/stop/start daemon: sudo systemctl restart/start/stop EnvironmentRackControl.service

Conclusion

This project successfully configured and implemented a Raspberry Pi 4 Compute Module for real-time data collection and local server hosting. The system enables efficient data acquisition through network and Bluetooth interfaces, ensuring flexibility and scalability for further enhancements. The integration of a web crawler allowed automated data retrieval and processing, making the system suitable for real-world applications involving continuous data monitoring and analysis.