Problem Statement: Power Manager Telemetry

Project Title: Energy-Efficient System Monitor and Advisor

Team:

- **College Mentor**: Dr. Sudhir Shenai
- **Student Team**: Pradhaan S (1NT21IS111) & Nayana S A (1NT21IS098)

Project Overview:

The goal of the Power Manager Telemetry project is to design and implement a robust system for monitoring key system components such as CPU, memory and disk in real-time. The system will utilize tools like psutil commands to gather detailed telemetry data. The collected data will be used to estimate power consumption and provide optimization recommendations. The system will feature a user-friendly interface for real-time monitoring and interaction.

Progress Overview (23/05/24 - 04/07/24):

1. Project Initialization (23/05/24 - 30/05/24):

- **Kickoff Meeting**:
    - Conducted initial meetings with the team.
    - Defined project scope, objectives, and deliverables.
- **Requirement Gathering**:
    - Identified key metrics to monitor (CPU, memory, disk, network).
    - Finalized tools and commands for data collection (psutil).
- **Research and Planning**:
    - Researched best practices for real-time system monitoring.
    - Planned the architecture of the monitoring system.
    - Defined the modules: Data Collection, Analysis, Optimization, User Interface.

2. Development Phase 1 (01/06/24 - 15/06/24):

- **Data Collection Implementation**:
    - Developed scripts for telemetry data collection using psutil commands.
        - CPU Data: cpu_percent = psutil.cpu_percent(interval=1)
        - Memory Data: memory_percent = psutil.virtual_memory().percent
        - Disk Data: disk_io = psutil.disk_io_counters().write_bytes
    - Implemented data parsing to extract relevant metrics.
- **Data Accuracy and Validation**:

- ○ Tested data collection scripts on various systems.
- ○ Validated the accuracy of collected data.
- ○ Ensured minimal overhead and system performance impact.

3. Development Phase 2 (16/06/24 - 30/06/24):

- • **Power Estimation Algorithm**:
  - ○ Developed algorithms for estimating power consumption based on telemetry data.
  - ○ Implemented calculations for CPU, memory and disk power usage.
- • **Analysis Module**:
  - ○ Created an analysis module to identify power consumption patterns.
  - ○ Implemented logic for generating optimization suggestions.
    - ■ CPU Frequency Scaling
    - ■ Disk Spin Down
    - ■ Memory Usage Optimization

4. User Interface Design (01/07/24 - 02/07/24):

- • **User Interface Development**:
  - ○ Started designing the user interface using Tkinter.
  - ○ Developed initial prototypes for real-time monitoring dashboards.
  - ○ Implemented basic interaction features for users to view telemetry data and optimization suggestions.

5. Testing and Validation Preparation (02/07/24 - 04/07/24):

- • **Plan Testing and Validation**:
  - ○ Prepared testing plans to ensure the effectiveness and accuracy of the tool.
  - ○ Defined test cases for each module (Data Collection, Analysis, Optimization, User Interface).

Summary:

The project is progressing well, with key milestones achieved in data collection, power estimation algorithm development, and initial user interface design. The team is preparing for the testing and validation phase to ensure the system's effectiveness and accuracy. The next steps include finalizing the algorithm, completing the user interface, and conducting thorough testing.

Conclusion:

The project is on track to achieve its objectives, with significant progress made in the initial phases. The team is focused on completing the remaining development tasks and preparing for a comprehensive testing phase to ensure the system meets all requirements.