Intel® Unnati
Data-Centric Labs in Emerging Technologies

A Progress Report on

Introduction to Data Collection and Analysis Techniques in Power Manager Telemetry

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CHAPTER 1 Overview

Power manager telemetry involves the systematic collection, transmission, and analysis of data from power management systems to optimize performance and efficiency. Key data collection methods include sensors and meters for measuring electrical parameters, temperature, and environmental factors, as well as data loggers and networked devices like smart meters and IoT devices. SCADA systems provide real-time monitoring and control. Data is transmitted through wired methods such as Ethernet and serial communication, or wirelessly via Wi-Fi, cellular networks, Zigbee, and Bluetooth. Storage solutions range from on-premises databases and data warehouses to scalable cloud-based systems. Analysis techniques encompass descriptive analytics for understanding historical trends, predictive analytics using machine learning for forecasting and anomaly detection, and prescriptive analytics for decision optimization. Challenges include maintaining data quality, security, and integration, but adhering to best practices like standardization, regular calibration, data governance, and scalable infrastructure enhances energy efficiency, preventive maintenance, load forecasting, and regulatory compliance.

CHAPTER 2 Work Completed

We have so far completed the following:

- Data Collection Methods
- Data Transmission
- Data Storage Solutions

CHAPTER 3 Work in Progress

Currently we are:

- Enhanced Data Collection
- Improved Data Transmission
- Optimized Data Storage
- Advanced Data Analysis

CHAPTER 4 Future Plans

1. Integration of Advanced Sensors: Enhance real-time data collection accuracy by incorporating smart sensors and edge computing devices.

2. Expansion of IoT and Wireless Networks: Improve data transmission speed and reliability by expanding the use of IoT devices and upgrading to 5G wireless networks.

3. Adoption of AI and Machine Learning: Implement advanced predictive and prescriptive analytics using artificial intelligence and machine learning techniques to enable proactive maintenance and optimization.

4. Development of Secure Data Platforms: Protect sensitive data and ensure regulatory compliance by developing more secure and scalable data storage solutions, including advanced cloud-based platforms with robust cybersecurity measures..