5G based data acquisition system applied to photovoltaic plants

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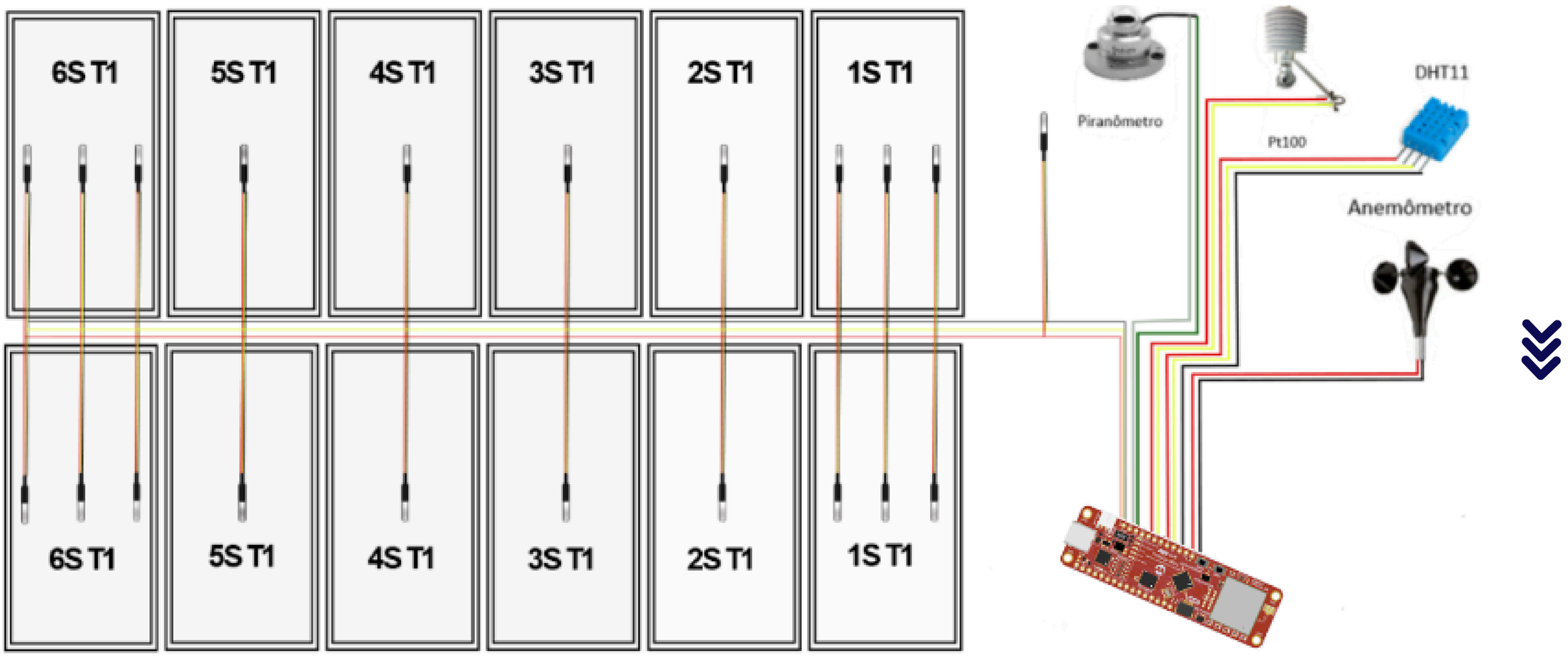
✓ INTRODUCTION

The integration of 5G and IoT facilitates real-time monitoring of systems like smart grids, contributing to more efficient energy management and enhanced coordination of operations. The low latency of 5G allows for faster, more efficient, and stable automation and connection of IoT resources. The convergence of 5G and IoT promotes the growth of a smart urban ecosystem, enabling businesses to establish IoT services without the need to develop their own network infrastructure.

✓ DATA VISUALIZATION

Fig. 6 Daily Irradiance (W/m²)

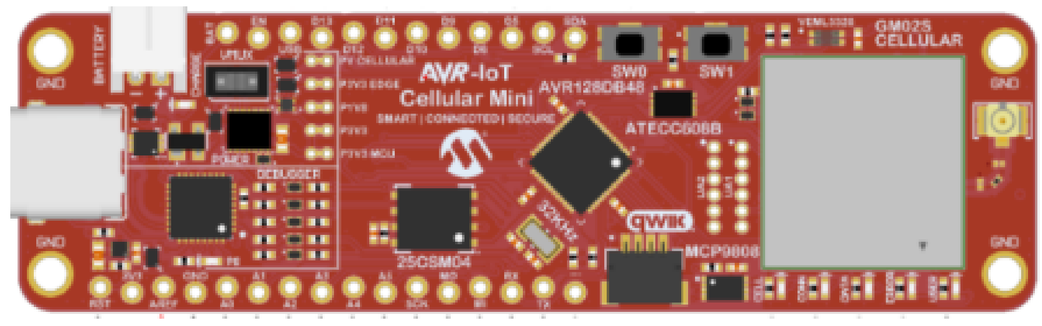
✓ 5G BASED MONITORING SYSTEM



✓ CASE STUDY

We propose a monitoring system based on the AVR-IoT microcontroller, renowned for its 5G connectivity and energy efficiency. This system incorporates specific sensors to gather pertinent data on local environmental conditions. PT100 sensors measure PV module temperatures, a pyranometer measures incident solar irradiance and an anemometer monitors wind speed, crucial for assessing panel heat dissipation and optimizing electricity production. The AVR-IoT serves as the system's central processing unit, responsible for collecting sensor data, processing information, and transmitting results to a remote server. A DHT11 sensor provides ambient temperature and humidity data, allowing correlation analyses with solar panel efficiency. Utilizing 5G connectivity, the AVR-IoT transmits collected data to a remote server, enabling plant operators to access real-time system operating conditions and performance.

✓ AVR IOT CELULLAR MINI



✓ CONCLUSION

We analysed the potential of Internet of Things (IoT) technology and 5G, specifically highlighting their key features and potential for synergy. Leveraging the insights from this review, we proposed a monitoring system for decentralised PV plants, built around the AVR-IoT microcontroller. This choice stands out for its efficient 5G connectivity and low power consumption, making it a robust and cost-effective solution for real-time PV plant monitoring.

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