Ensuring Reliable Data for Autonomous Service Systems: The Role of Business Intelligence and Electromagnetic Compatibility

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Abstract:

Autonomous service systems rely on vast amounts of data from sensors and connected devices. Ensuring data reliability is crucial for accurate decision-making, and this depends on robust Electromagnetic Compatibility (EMC), which prevents interference and signal distortion. This paper examines the synergy between EMC and Business Intelligence (BI) in supporting autonomous environments. A case study conducted at the Federal Institute of Education, Science, and Technology of Bahia (IFBA) - Vitória da Conquista demonstrated how sensor data, processed and visualized with Microsoft Power BI, can generate actionable insights when protected by EMC practices. Results show that reliable data acquisition enhances BI's effectiveness, enabling secure and efficient system operation. The study highlights the importance of integrating EMC with BI to transform raw data into trustworthy intelligence for innovation in autonomous service systems.