IoT Modeling for Digital Enterprises and Decision Analysis:
A Descriptive Presentation

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ABSTRACT

Shaping IoT for digital enterprises involves integrating smart devices into business processes to achieve operational efficiencies and drive innovation. The importance of IoT modeling in enterprise decision-making cannot be overstated as it enables companies to identify potential problems, optimize processes, and make informed decisions based on data-driven insights. This paper provides a descriptive overview of IoT modeling for digital enterprises and how decision analysis can be improved by using data generated by IoT.

KEYWORDS

IoT Modeling, Digital Enterprises, Decision Process, Strategy

INTRODUCTION

Enterprise internet of things (IoT) refers to the use of IoT technologies in the context of business and industry. It involves connecting devices, sensors, and machines to a network, allowing them to communicate and share data (Larson & Chang, 2016). This can include anything from smart factories and supply chain management systems to smart buildings and energy management systems. The benefits of IoT for businesses are numerous, including increased efficiency, reduced costs, and improved decision-making.

IoT modeling refers to the process of creating a virtual representation of a physical device or system using software tools and techniques (Anjum et al., 2024). This virtual model can then be used to simulate different scenarios and predict outcomes.

There are different types of IoT modeling techniques, including physics-based modeling, data-driven modeling, and hybrid modeling (Bakhsh et al., 2023). The process of physics-based modeling entails the utilization of mathematical equations to portray the physical dynamics of a given system. Conversely, data-driven modeling relies on historical data to construct a model capable of forecasting future results. Hybrid modeling, on the other hand, merges both physics-based and data-driven approaches to develop a more precise depiction of a system (Samanta & Tang, 2020).

By employing modeling techniques, decision-makers can effectively interpret the vast quantities of data produced by IoT devices and systems (Lopez-Ballester et al., 2023). Data analysis and visualization are particularly important in this context, enabling decision-makers to identify patterns and trends in data and make informed decisions. These technologies can help streamline decision-

making processes and improve efficiency, but they also raise questions about job replacement and the role of humans in decision-making.

EXPLORING IOT DEPLOYMENT IN MODERN ENTERPRISES

IoT is a network of interconnected devices that collect and exchange data, enabling businesses to optimize their processes and make informed decisions (Hkiri et al., 2024). The implementation of IoT in modern enterprises is influenced by technological advances, challenges and best practices. According to specialized literature, the importance of IoT for digital enterprises is evident through:

- Operational efficiency: IoT enables real-time monitoring of operations, reducing downtime and optimizing resource use.
- Innovation: By collecting valuable data, IoT supports the development of new products and services adapted to market needs.
- Customer satisfaction: IoT enables personalization of customer experiences by monitoring their behavior and tailoring offers accordingly.

One of the most significant contributions of IoT to digital enterprises is to improve operational efficiency. By using sensors and smart devices, organizations can monitor and control processes in real time, leading to optimized resource utilization and cost reduction.

The increasing accessibility and miniaturization of sensors have enabled organizations to collect large amounts of data from their surroundings (AboulEla et al., 2024). For example, in the manufacturing sector, IoT sensors embedded in machinery can provide real-time data about performance and maintenance needs, leading to more efficient operations. In addition, advances in connectivity technologies such as 5G have facilitated seamless communication between IoT devices, enabling faster data transmission and response times. The integration of IoT with cloud computing and big data analytics has enabled digital enterprises to process and gain valuable insights from the massive amounts of data generated by IoT devices (Guo et al., 2019). By leveraging these technological capabilities, businesses can improve their decision-making processes, optimize resource utilization, and improve customer experience.

Enterprise IoT implementation is influenced by various factors, such as technological advances, the evolution of sensors and connectivity technologies, and integration with cloud computing and big data analytics (Samanta & Tang, 2020). However, implementing IoT in modern enterprises also faces challenges, such as security and privacy issues, vulnerabilities in IoT devices and networks, and regulatory compliance. To ensure successful IoT implementation, businesses must adopt best practices such as comprehensive risk management strategies, regular security reviews and updates, and training employees on cybersecurity best practices.

Factors influencing the decision-making context in IoT modeling and analysis include the complexity of the system being modeled, availability and quality of the data, and level of expertise of the personnel involved (Tareq et al., 2022). The decision-making process in enterprise IoT modeling and analysis involves identifying the problem, collecting and analyzing data, generating insights, and making informed decisions based on the information generated.

To ensure the successful implementation of IoT in modern enterprises, adopting best practices is important. Comprehensive risk management strategies that encompass threat identification, risk assessment, and mitigation plans are required to proactively address potential security threats. In addition to methods and technologies, there are various tools that decision-makers can use to support their decisions. Data visualization tools, such as charts and graphs, can help decision-makers quickly understand complex data.

Data visualization is the process of displaying data (often in large quantities) in a meaningful way to provide insights that will support better decisions (Habeeb et al., 2018). Understanding large

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