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Evaluation Of Internet Of Things (Iot) For Monitoring And Control Of Home Electronic Appliances

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ABSTRACT

This research aims to evaluate the effectiveness and reliability of Internet of Things (IoT) technologies in the context of monitoring and control of household electronic appliances. Rapid developments in the IoT domain have opened up new opportunities to integrate home appliances into a connected digital ecosystem, with the aim of improving user efficiency, convenience, and security.

The methodology of this research includes the implementation of an IoT infrastructure consisting of sensors, actuators, and communication platforms, as well as the development of control applications via mobile devices. Selected household electronic appliances, such as lighting devices, air conditioners, and security systems, will be integrated into the IoT network to facilitate remote monitoring and control.

During the evaluation, performance parameters such as response time, connection reliability, and energy consumption will be measured and analyzed. In addition, user experience in using the control application via mobile devices will also be evaluated through questionnaires and interviews.

The results of this study are expected to provide in-depth insights into the potential and limitations of IoT implementation for monitoring and control of household electronic appliances. The implications of the results of this study can support the development of better solutions in creating a smart, efficient, and customizable home environment according to individual preferences and needs.

Keywords :
Internet Of Things (Iot)

1. Introduction

The background of this research is driven by the rapid development in Internet of Things (IoT) technology and its potential to change the paradigm of managing electronic appliances in households. With more and more electronic appliances

connected to the internet, new opportunities arise to improve user efficiency, convenience, and safety through better monitoring and control. Basically, modern households are increasingly filled with electronic equipment that can be connected to the internet. From lights and air conditioners to security systems, everything can be integrated into the IoT ecosystem. However, despite its great potential, an in-depth evaluation is still needed to understand the extent to which this technology can provide tangible benefits to users.

IoT Technology Development IoT technology is constantly evolving, and its implementation in a household context can have a significant impact on the way we interact with our everyday electronics. Increased Connectedness of Electronic Equipment: More and more electronic appliances are able to connect to the internet, creating the potential to centrally manage and control them. The demand for smart home appliances that can be integrated with IoT technology is increasing, creating a need for in-depth evaluation of performance and reliability. Through the implementation of IoT, there is potential to improve energy efficiency by managing the use of electronic appliances based on user needs and preferences. This evaluation is also motivated by the need to understand the extent to which this technology can be adopted and enjoyed by users, taking into account aspects of comfort and safety. Through this research, it is hoped that useful information and insights can be found to optimize the implementation of IoT in the monitoring and control of household electronic appliances, contributing to the sustainable development of smart households.

2. Theoretical Foundation

2.1 Technology Management Theory

This theory can be used to analyze the management and implementation of IoT technology, especially in terms of infrastructure, human resources, and risk management strategies. The concepts in this theory can guide the understanding of how technology is integrated into the household environment.

3. Research Methods

Mixed-methods research design that combines quantitative and qualitative methods. This approach allows for holistic data mining and an in-depth understanding of IoT implementation in households. The population of this study is household owners who have adopted IoT technology. The sample will be selected using a purposive sampling method, ensuring the inclusion of household owners with varying levels of technology adoption. An online survey will be used to collect quantitative data related to the adoption and management of IoT technology in households. In-depth interviews will be conducted with selected household owners to gain deeper qualitative insights. This involves direct observation of the IoT technology infrastructure in households, including hardware, networks, and software platforms.

Performance and reliability measurements of the infrastructure will be recorded. Involve multiple case studies to holistically evaluate the implementation of IoT technologies in specific households. These case studies will involve monitoring, interviews, and analysis of related documentation. Survey data will be analyzed using descriptive statistical methods and inferential analysis. This analysis will provide an overview of the adoption trends and effectiveness of IoT implementation in households. Qualitative data from interviews and case studies will be analyzed using a thematic approach. The qualitative findings will provide an in-depth understanding of user experiences, challenges, and risk management strategies. Based on the findings from the data analysis, an IoT technology management framework will be developed that can be used as a guide for households in managing the technology implementation. The research results will be verified through data triangulation, which compares and validates findings from different data sources, such as surveys, interviews, and direct observation.

4. Discussion and Research Results

4.1 Discussion

IoT Technology Infrastructure Analysis is IoT technology infrastructure in households involves various hardware, networks, and software platforms. This infrastructure needs to be considered in terms of availability, interoperability, and reliability. Effective implementation requires careful planning to support good connectivity and integration. The role of household residents in the management, maintenance, and utilization of IoT technology is very significant. The involvement of human resources needs to be considered in the sustainability and success of implementation. Adequate training and support are needed to ensure effective understanding and participation. Households adopt various risk management strategies related to security, privacy, and sustainability of IoT technologies. Successful implementation is highly dependent on these strategies. It is important to assess and improve security strategies, strengthen data privacy, and ensure environmentally sustainable solutions. The interactions between IoT system components affect overall performance and performance. A deep understanding of how these components interact with each other helps identify potential bottlenecks and weak points. This is important for improving system efficiency and responsiveness.

4.2 Research Results

IoT adoption trends and implementation effectiveness can be identified through survey data. Interviews and case studies provide in-depth insights into user experiences, challenges, and successes. Based on the findings of the analysis, an IoT technology management framework can be developed as a guide. This framework should cover critical management aspects, including planning, user involvement,

maintenance, and continuous improvement. Data triangulation validates the research results through comparison between survey, interview, and case study data. This verification ensures the validity and reliability of the findings, strengthening the reliability of the research results. The practical implications of this research may include guidance for households in improving the management and implementation of IoT technologies. Recommendations should focus on practical steps to improve security, efficiency, and user experience. By combining quantitative and qualitative analysis and applying technology management theory, this research provides a deep understanding of IoT implementation in household environments and generates valuable insights for policy development, best practices, and future research.

5. Conclusions and Suggestions

5.1 Conclusion

This research provides an in-depth understanding of the evaluation of Internet of Things (IoT) implementation in the household environment using the Technology Management Theory framework. Based on the analysis of infrastructure, the role of human resources, risk management strategies, and interactions between system components, a number of findings were found that provide valuable insights related to the management of IoT technology in households.

Effective IoT Infrastructure: The successful implementation of IoT in households is highly dependent on an effective infrastructure. Availability, interoperability, and reliability of the infrastructure are key to ensuring good connectivity and integration between devices. Central Role of Human Resources: Human resources play a central role in the sustainability and success of the implementation. The involvement of householders in the management, maintenance, and utilization of IoT technologies is a critical factor that affects adoption and overall performance.

5.2 Suggestion

1. Infrastructure Strengthening: Managers need to ensure the adoption of infrastructure that can support better connectivity and interoperability between IoT devices. Updating and investing in infrastructure is a priority.
2. User Training: Training programs for householders need to be strengthened. This includes training related to device management and simple troubleshooting, so that users can be more independent in the management of IoT technology.

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