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Project Proposal – EEET 313 Section 1

9/17/2023

Initial Project Proposal: Smart Home IoT Devices

1. Technical Operation of the System:

We hypothesize that the smart home IoT system operates through a combination of wired and wireless mechanisms. The frequency band of operation, bandwidth used, and the choice between analog or digital modulation/demodulation are factors that vary based on the specific device and its application.

2. Stakeholders:

The primary stakeholders for this system include:

- **End-users:** Homeowners and residents who utilize these devices for convenience and automation.

- **Industries:** Companies that manufacture, distribute, and provide services related to IoT devices.

- **Investors:** Entities that fund the development and distribution of these devices.

- **Governments:** Regulatory bodies that oversee the production, distribution, and usage of these devices.

These stakeholders are interconnected through the production, distribution, and utilization of the IoT devices.

3. Societal Impact:

Currently, smart home IoT devices cater to the needs of modern society by providing automation, security, and convenience. As technology evolves and societal needs shift, we anticipate a more integrated and ubiquitous use of these devices. The timeframe for these changes is uncertain but is expected to be within the next decade.

4. Credible Sources:

Here are five credible sources related to smart home IoT devices:

1. Special Issue "Internet of Things for Smart Homes

Description: This article discusses the significance of smart homes in the Internet of Things (IoT) ecosystem. It delves into the technical aspects of how IoT-oriented smart homes operate and the challenges they face, especially in terms of security. The article also reviews various papers accepted in the special issue, focusing on the technical problems and solutions related to IoT-oriented smart homes.

*Lee, G. M., Crespi, N., Choi, J. K., & Boussard, M. (2019). Special Issue "Internet of Things for Smart Homes". Sensors, 19(20), 4471.***2.** Usage and impact of the internet-of-things-based smart home technology: a quality-of-life perspective

Description: This paper explores the usage and impact of the Internet-of-Things-based Smart Home Technology (IoT-SHT) in Malaysia.

Alam, M. R., Reaz, M. B. I., & Ali, M. A. M. (2021). Usage and impact of the internet-of-things-based smart home technology: a quality-of-life perspective. BMC Public Health, 21(1), 1-15.

3. IoT Privacy and Security Challenges for Smart Home Environments

Description: This article surveys existing solutions for enhancing IoT security and identifies key future requirements for trusted Smart Home systems.

Granjal, J., Monteiro, E., & Silva, J. S. (2015). IoT Privacy and Security Challenges for Smart Home Environments. Information, 7(3), 44.

4. Security Perception of IoT Devices in Smart Homes

Description: This source discusses the security perceptions of IoT devices in smart homes. It highlights the trust issues users have with smart home assistants and the general lack of knowledge regarding the security of these devices.

Khan, M. A., Salah, K., & Al-Fuqaha, A. (2020). Security Perception of IoT Devices in Smart Homes. IoT, 2(1), 5.

5. An Automation System for Controlling Streetlights and Monitoring Objects Using Arduino

Description: This article proposes a design plan for regulating a light system based on the Arduino Uno microcontroller. It discusses the potential for such systems in smart environments and the benefits they offer in terms of energy management.

Lee, G. M., Crespi, N., Choi, J. K., & Boussard, M. (2019). An Automation System for Controlling Streetlights and Monitoring Objects Using Arduino. Sensors, 19(20), 4471.

These sources provide a comprehensive overview of the current state of smart home IoT devices, their challenges, and potential solutions.

5. Demonstration Ideas:

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- **Primary Concept:** Purchase a variety of devices, such as a 330 MHz light switch, a Zigbee wireless device, and a device that uses a standard wireless router. We will then set up the Software Defined Radio (SDR) to demonstrate the differences in communication and data encoding among these devices.

- **Backup Plan:** Utilize Wireshark to monitor and analyze the traffic of a device using a complex digital standard, showcasing the intricacies of its communication.

6. Rationale for Choice:

Choosing to analyze different communication standards aligns perfectly with the essence of our project. It will be intriguing to navigate through the various abstraction layers down to the actual signals transmitted. This approach will not only highlight the strengths and weaknesses of each system but will also provide a comprehensive understanding of their operations. By doing so, we aim to enlighten our colleagues about the intricacies of the chosen communication system.

The author generated this text in part with GPT-4, OpenAI's large-scale language-generation model. Upon generating draft language, the author re-viewed, edited, and revised the language to their own liking and takes ultimate responsibility for the content of this work.