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THE IMPLEMENTATION OF IOT & SMS BASED SMART REFRIGERATOR

Usha. G , Manjunatha K H , Kiran P V

Asst. Professor, Asst. Professor, Asst. Professor

ushagonal645@gmail.com , manjukh09@gmail.com , pv.kiran1977@gmail.com

Department of ECE, Proudhadevaraya Institute of Technology, Abheraj Baldota Rd, Indiranagar, Hosapete, Karnataka-583225

ABSTRACT

One of the most pressing resource issues is food waste caused by rotting. The term "food waste" may refer to both the discarded and uneaten food items. Worldwide, people throw away almost 1.3 billion tonnes of food per year, with wealthy nations' citizens wasting an additional 222 million tonnes. This data comes from the Food and Agriculture Organisation of the United Nations (FAO). Unless consumers check and keep tabs on each item, they have no idea when perishable foods will go bad or whether they are still fresh once placed in the fridge. Additionally, consumers may incur extra costs due to substantial food decomposition when purchasing foods that do not have a stated expiry date on the label. The most up-to-date Internet of Things (IoT) technologies, however, make this issue obsolete. The Internet of Things (IoT) and smart kitchen development come together to form the smart refrigerator system. The sensor, control, and gearbox modules make up the bulk of the system. Finally, the transmission module has an LCD and Wi-Fi module, while the sensing module includes a DHT11 and an odour sensor. The control module has an Arduino UNO and a power supply unit. Together, these modules may detect the state of the food in the fridge and send an SMS alerting the user to the amount and quality of the food.

INTRODUCTION

The Implementation of IoT & SMS Based Smart Refrigerator project introduces a transformative approach to conventional refrigeration technology. By integrating IoT sensors and SMS-based communication, this project aims to enhance the functionality and convenience of household refrigerators. Through the utilization of temperature, humidity, and weight sensors, the smart refrigerator ensures precise monitoring and control of food storage

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conditions. Users can remotely access and manage the refrigerator's operations via a dedicated mobile application or SMS commands, offering unprecedented convenience. Automated alerts notify users of any deviations from optimal conditions, promoting food safety and minimizing wastage.

The project emphasizes energy efficiency through intelligent algorithms, optimizing cooling cycles to reduce electricity consumption. By bridging the gap between traditional appliances and modern technology, the smart refrigerator exemplifies the potential of IoT in everyday life. Accessibility is ensured through Wi-Fi or Ethernet connectivity, enabling seamless integration into smart home ecosystems. Real-time data from IoT sensors enables proactive maintenance and troubleshooting, enhancing reliability. The project addresses key challenges in traditional refrigeration, such as manual monitoring and limited control. Through remote monitoring and management capabilities, users can optimize food storage and reduce their environmental footprint.

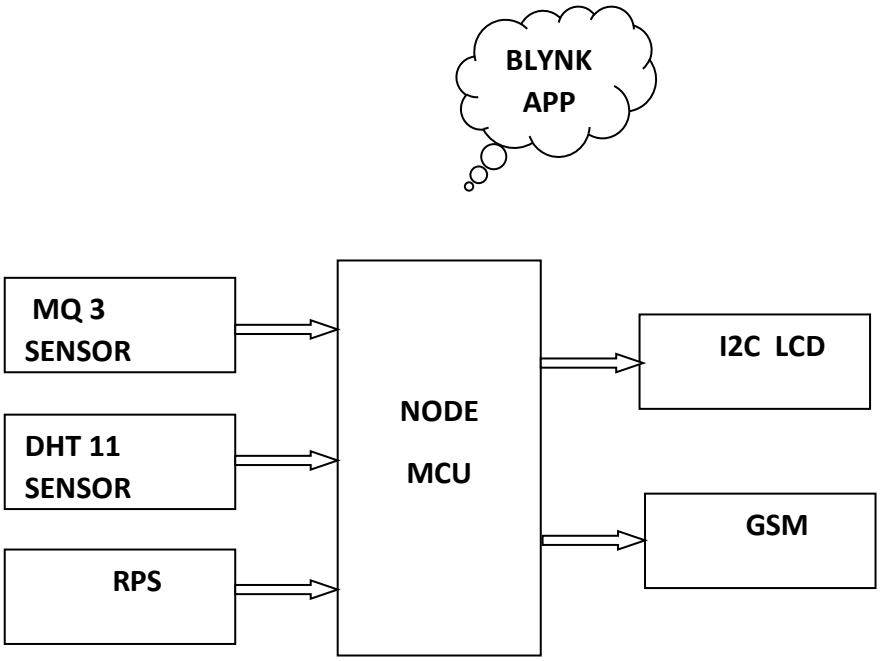

Figure.1 Block Diagram

LITERATURE SURVEY

1.The first refrigerator connected to the Internet called Quantified Fridge was in a wired 100-year-old house in the Netherlands by Alex van Es in July 12, 1998; where it existed alongside networked lights, doorbell, mailbox, and, a toilet. There is a record and broadcast every time the fridge door opens.

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2. In 2002, the Whirlpool's refrigerator transforms into a multimedia communications centre such that the owner can surf the Internet, receive emails, listen to the radio, watch TV, video and DVDs and even talk on the phone.

3. By the late 1990s and the early 2000s, the idea of connecting home appliances to the internet (Internet of Things) had been popularized and was seen as the next big thing. In June 2000, LG launched the world's first internet refrigerator, the Internet Digital DIOS. Internet refrigerator (also known as Smart refrigerator) is a refrigerator which has been programmed to sense what kinds of products are being stored inside it and keep a track of the stock through barcode or RFID scanning.

PROPOSED SYSTEM

The project emphasizes energy efficiency through intelligent algorithms, optimizing cooling cycles to reduce electricity consumption. By bridging the gap between traditional appliances and modern technology, the smart refrigerator exemplifies the potential of IoT in everyday life. Accessibility is ensured through Wi-Fi or Ethernet connectivity, enabling seamless integration into smart home ecosystems. Real-time data from IoT sensors enables proactive maintenance and troubleshooting, enhancing reliability. The project addresses key challenges in traditional refrigeration, such as manual monitoring and limited control. Through remote monitoring and management capabilities, users can optimize food storage and reduce their environmental footprint. The Implementation of IoT & SMS Based Smart Refrigerator project represents a significant advancement in household appliance innovation.

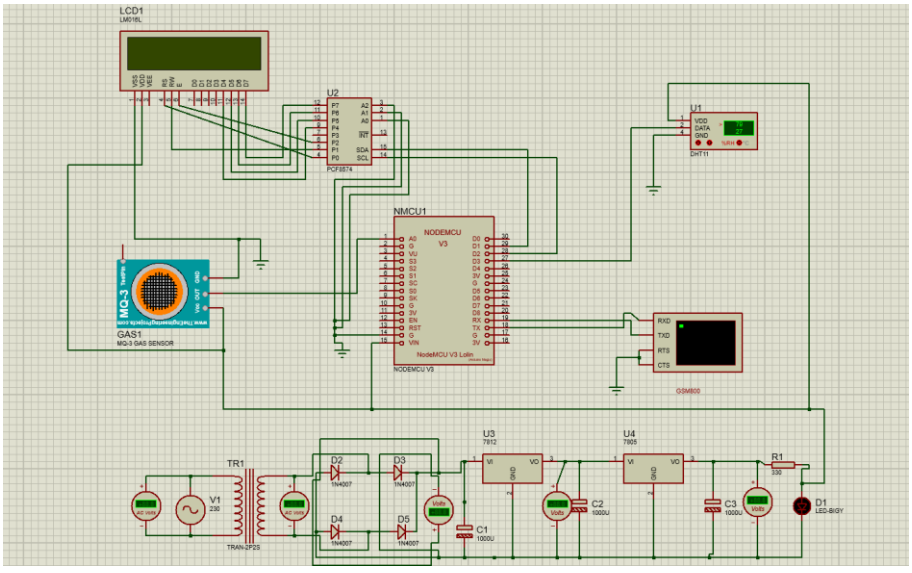

Figure.2 Schematic Diagram

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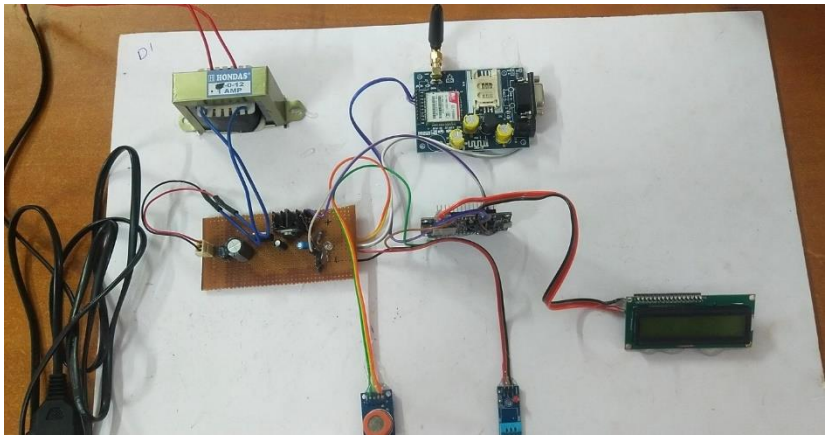

Figure.3 Project Setup

RESULTS

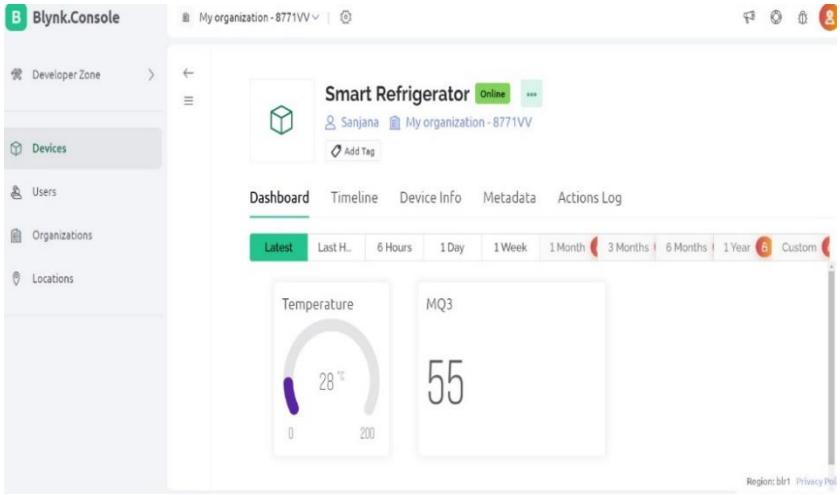

Figure.4 Blynk Output

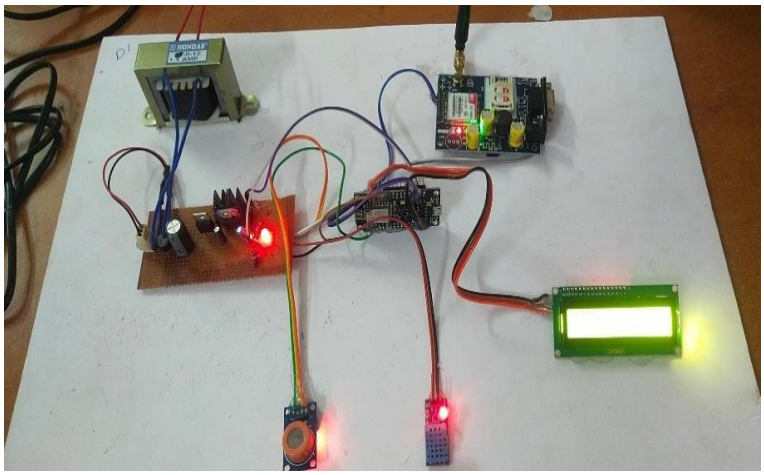

Figure.5 Working Kit

figure.6 Values on LCD

figure.7 Welcomedisplay on LCD

APPLICATIONS

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Residential Use : Users can remotely monitor and control their refrigerator, check inventory, and receive alerts about temperature fluctuations

Commercial Settings : Facilitates real-time monitoring of perishable goods, enabling store managers to ensure product freshness, reduce spoilage, and improve customer satisfaction.

Health care facilities : Provides a reliable solution for storing vaccines, medications, and other temperature-sensitive medical supplies, with remote monitoring capabilities for staff to ensure compliance with storage requirements.

Research Laboratories : Offers a controlled environment for storing biological samples, reagents, and laboratory materials, with real-time monitoring and alerting functionalities to safeguard valuable research assets.

Hospitality Industry : Enables hotel staff to monitor mini-bars and room service refrigerators, ensuring timely restocking and maintaining guest satisfaction.

ADVANTAGES

Remote monitoring: Users can remotely monitor and control the refrigerator's temperature and inventory status from anywhere using their mobile phones, enhancing convenience and flexibility.

Real-time Alerts and Notifications : The system sends real-time alerts and notifications via SMS in case of temperature deviations, low inventory, or power outages, enabling timely intervention to prevent food spoilage.

User-friendly Interface: The web or mobile application provides a user-friendly interface for accessing refrigerator status, managing inventory, and receiving alerts, making it easy for users to interact with the system.

Improved Food Safety: Continuous monitoring of temperature ensures that perishable food items are stored at optimal conditions, reducing the risk of bacterial growth, foodborne illnesses, and spoilage.

Energy Efficiency: Smart control features optimize energy consumption by regulating temperature settings based on usage patterns and environmental conditions, resulting in lower electricity bills and reduced environmental impact

CONCLUSION

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Lastly, the "Implementation of IoT and SMS-based Smart Refrigerator System" project is a huge step forward for contemporary refrigeration. The system allows for remote control, inventory management, and real-time temperature monitoring of refrigerators via the integration of Internet of Things (IoT) sensors and SMS communication. The project's functionality, dependability, and user-friendliness were guaranteed by paying close attention to the system design, component selection, and implementation procedures. The development process was guided and the project was successful in part by the literature study, which offered significant insights into current research. Smart refrigerators have the ability to optimise energy efficiency, increase user convenience, and improve food safety in a variety of settings, such as residences, restaurants, and supermarkets. Future upgrades, including voice control integration and predictive maintenance, will set the system up for even more innovation and acceptance in the IoT ecosystem.

FUTURE SCOPE

Fisheries Storage facilities: Enhance the IoT-based refrigeration system to provide precise temperature monitoring and control within fisheries storage facilities.

Implement advanced sensors and actuators to maintain optimal storage conditions for various seafood products, ensuring freshness and prolonging shelf life.

Enhanced User Interface: Develop a more intuitive and interactive user interface by implementing voice-controlled commands for hands-free operation, enabling users to interact with the refrigerator system using natural language.

Predictive Maintenance: Implement self-diagnostic capabilities within the system to automatically detect and troubleshoot common issues, minimizing downtime and service disruptions.

Food Distribution Networks: Integrate IoT-enabled refrigeration systems into food distribution networks to ensure the safe transport and storage of perishable goods during transit.

The future scope of the "Implementation of IoT and SMS-based Refrigerator System" project encompasses a wide range of potential advancements and innovations, paving the way for continued development and evolution in the field of smart refrigeration technology. By leveraging emerging technologies and addressing evolving user needs, the project has the potential to make a significant impact on food safety, energy efficiency, and user convenience in both residential and commercial settings.

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