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Wireless Sensor Network Based Smart BMS using LabVIEW

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Abstract: In the era of automation, everything including physical infrastructures getting sensors and update the data real time that makes people comfortable at their premises. This paper elucidates regarding the automation of science and technology hubs with the help of wireless sensors and monitor the real time data at dedicated LabVIEW based GUI remotely. In this work, wireless sensor nodes like omron, algodue, Logitech camera are used to gather the occupancy, energy consumption and live image data respectively, collected information will be propagated to remote accessed graphical user interface with the help of iot things speak which does the monitoring of happenings at centers and ensure the effective utilization of the resources through the audio video enabled guiding devices.
Keywords: LabView, STI Hub, IoT.

1. Introduction

Hubs are networking devices operating at a physical layer of the OSI model that are used to connect multiple devices in a network. They are generally used to connect computers in a LAN. A hub has many ports in it. A computer which intends to be connected to the network is plugged in to one of these ports. When a data frame arrives at a port, it is broadcast to every other port, without considering whether it is destined for a particular destination device or not.

Technology Hub: 'Tech hub' is described as a type of 'utopia' where things happen faster, people are smarter and meeting investors is easier - as a result, a space is created where ideas germinate and companies prosper. However, fostering the perfect blend of skills, education and community can be easier said than done. The rate of change in technology is immense. Technology is transforming our habits and the routines of our work and personal lives. This rate of change means technology companies have to be constantly innovating and creating to compete, therefore it's increasingly important for companies to be prospering in the right environment, both culturally and geographically. This paper is based on technology that is designed and implemented in a hub where the database regarding the power management, system security, internet usage and connectivity number of human entries, can be collected by interfacing and building GUI in a **LabVIEW** tool.

2. Literature

Dhawan Singh et.al., explained the overview of IoT Hardware Development Platforms. BLE, Bluetooth low energy; DAC, Digital to analog converter; DIY, Do it yourself; FPU, Floating-point unit; IDE, Integrated development environment; IoT, Internet of Things; PWM Pulse width modulation; RPi, Raspberry Pi; SoC, System on chip; Trusted execution environment (TEE); USB, Universal serial bus; Wi-Fi, Wireless fidelity[1].

C. K. M. Lee et.al., Developed an industrial Internet of things suite for smart factory towards re-industrialization, which supports industrial upgrading and transformation, promotes smart production and high value-added manufacturing processes, and helps to create new momentum for the economic. Under the current situation, industrialists encounter several challenges to achieve re-industrialization. The enormous extents of data exchange and communication, management, monitoring and control of IoT devices as well as the establishment and maintenance of a reliable cloud platform hinder industrialists to implement an integrated smart production management. Therefore, to achieve re-industrialization, an industrial Internet of things (IIoT) suite consisting of a micro-services-based IIoT cloud platform and IIoT-based smart hub is proposed, which helps to materialize re-industrialization and to conduct industrial upgrading and transformation to achieve smart production and high value-added manufacturing processes[2].

Swarup Deshmukh et.al. Study, explained Internet Of Things And Development Tools and Technology towards the research progress of IoT by analyzing the security requirements and presenting the different research areas of IOT and discusses the various open source software tools and hardware tools used for developing the IOT based Application.[3].

3. Methodology

Seat occupancy detection in Tech Hub: Occupancy and usage of systems by other users without intimation is always a negative act. Thus, a seat occupancy detection system is designed to detect and deny such unauthorized access to protect and secure the systems. These can also be used in hospitals, schools, and many other places for protecting against burglary (theft) or property damage, as well as personal protection against intruders. The human presence of security guard may not be completely trustworthy. In such cases, this system provides proper detection of intruder and provides security. By using this system, we can reduce robbery, secure the data by detecting the intruder occupying system seats.

A. Problem Statement

The customized IoT development and application software platform is required to translate the ideas into prototypes for complete automated test & monitoring system for the co-working community centers across the country. The IoT monitoring platform will help to perform predictive and prescriptive analysis from any remote location in the community center. This will empower the targeted beneficiaries with advanced digital tools knowledge.

B. WIFI enabling to Tech Hub

The human intervention in reading a meter have following problems. Have to go to meter point for reading the values. Cannot track accurately the usage. Cannot monitor the electric system and its fault. Transfer of data through modern devices connected to the Internet via IoT technology. Devices which collect consumption data and periodically send it to a central server for processing. And via internet anyone from any part of the world can monitor and control the loads through their handsets. It consists different methods like GSM communication, Real time clock, Internet of things (IoT), Automatic Meter reading etc. The goal behind the project is to have self-report in real-time, improving efficiency and bringing important information to the surface more quickly than a system depending on human intervention

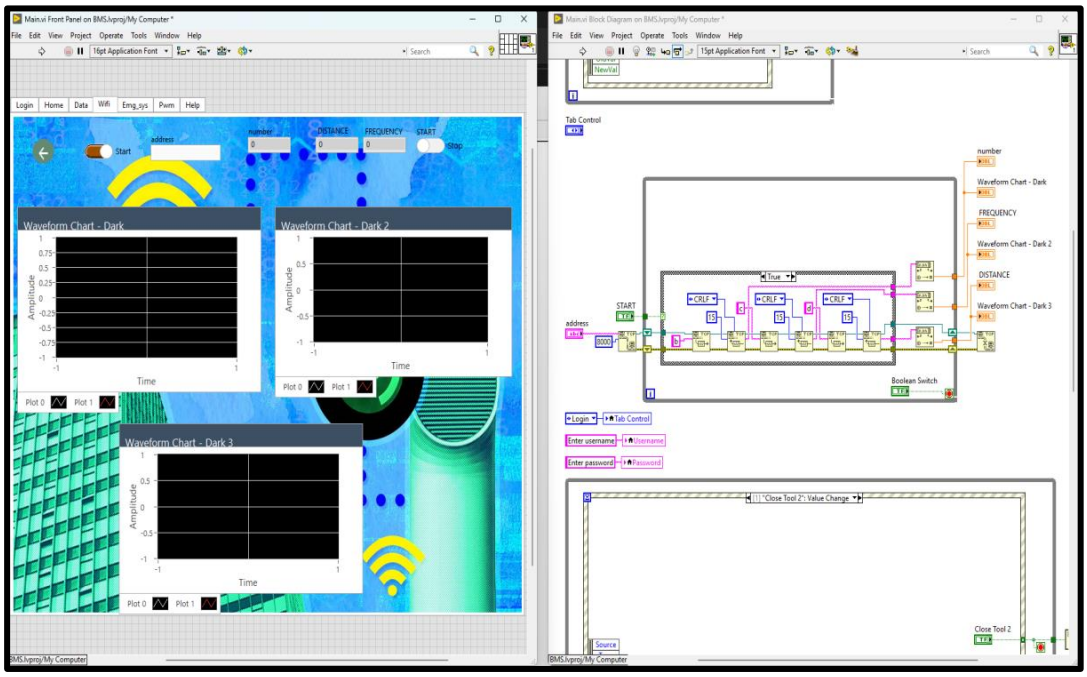

Figure 1: WIFI enabling to Tech Hub

C. GUI in Tech Hub

A GUI (graphical user interface) is a system of interactive visual components for computer software. A GUI displays objects that convey information, and represent actions that can be taken by the user. The objects change colour, size, or visibility when the user interacts with them. Building automation systems (BAS) are transforming from the legacy stand-alone security and safety systems to intelligent computerized network-based solutions. The modules are wired to form a network at field level, that are connected to a PC based main controller.

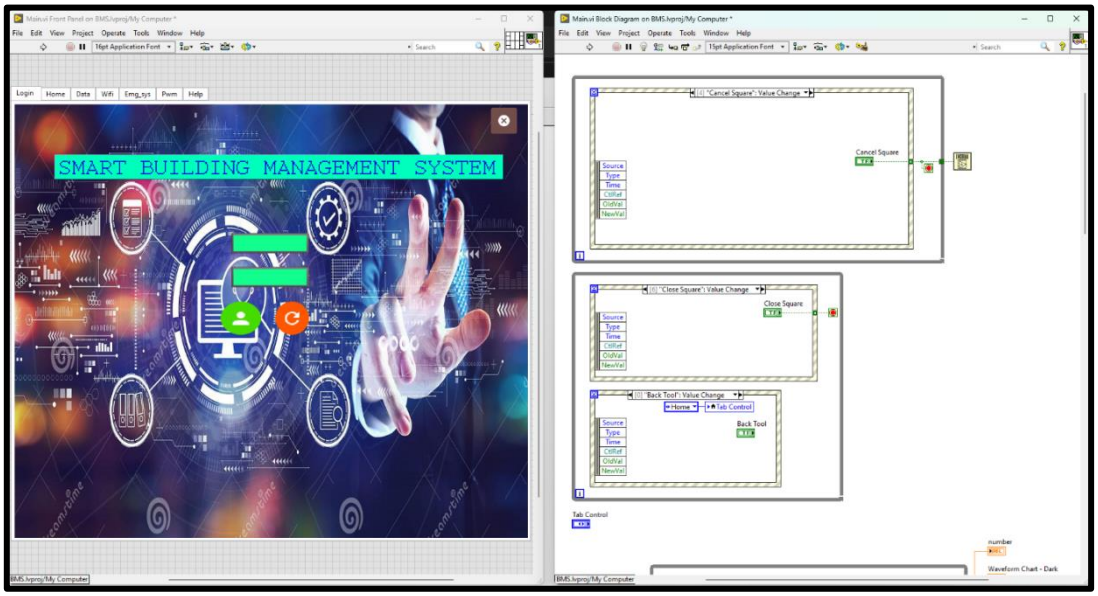

Figure 2: GUI Front panal

The design incorporates central servers for- (ii) Camera, (iii) Graphical User Interfaces (GUIs) and A local or remote workstation working as a client can access all functionalities using intranet or internet respectively. Network is used for the time critical process-alarm data exchange, and Ethernet backbone is used for high-speed Client-Server communication. Various functionalities of the BMS have been validated through hub implementation

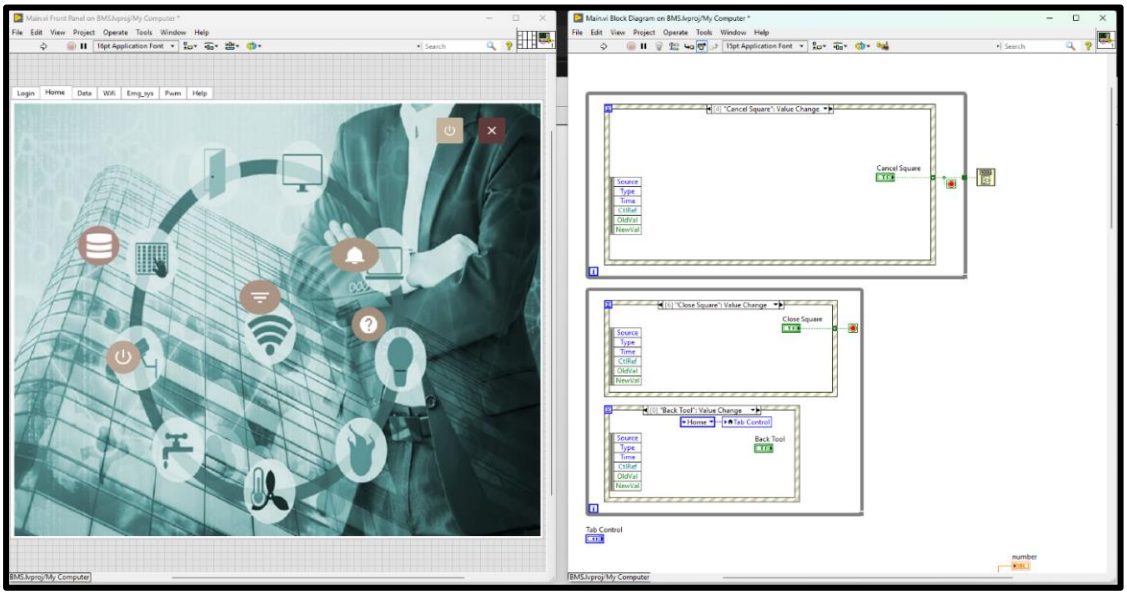

Figure 3: GUI Dashboard

D. Energy Module

Sustainable BMS design and operation need a holistic way of thinking to explore multiple layers of interconnections between energy flows, air flows, and water flows, also to ensure use and reuse of resources flowing through a building and its systems. Each building services system has its purpose-designed functionality, specific control mechanism responding to stimuli for defined performance criteria. Typical system schematics of a building automation or energy management system for smart building electric power management system of custom power device.

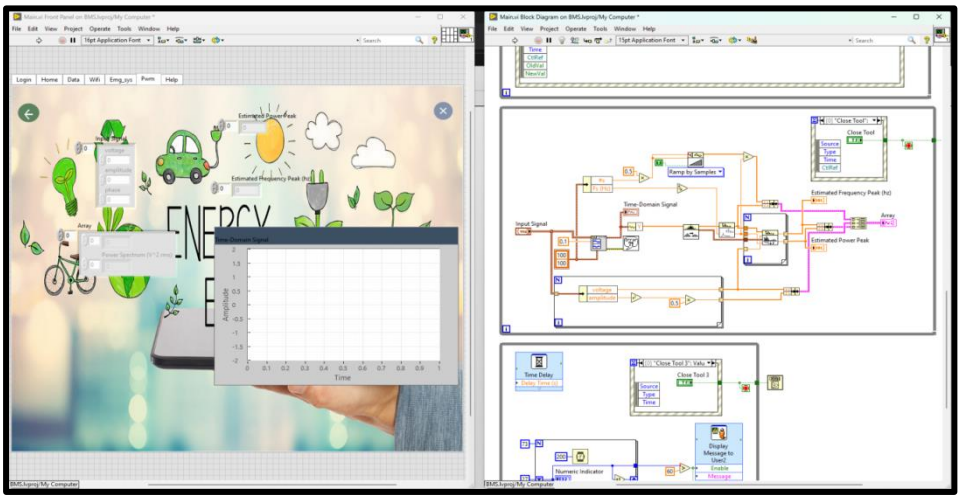

Figure 4: Energy database collection

E. Alert Module

The system can monitor the temperature, human motion, fire alert and guarantees the security by intimating the user when there's theft, data acquisition and power management. This article presents the hardware implementation of a multiplatform system for building automation. Such system belongs to a domain usually named smart building system combines with hardware and software technological approach. Test statistics of the system have shown that it can be easily used for the smart building automation applications

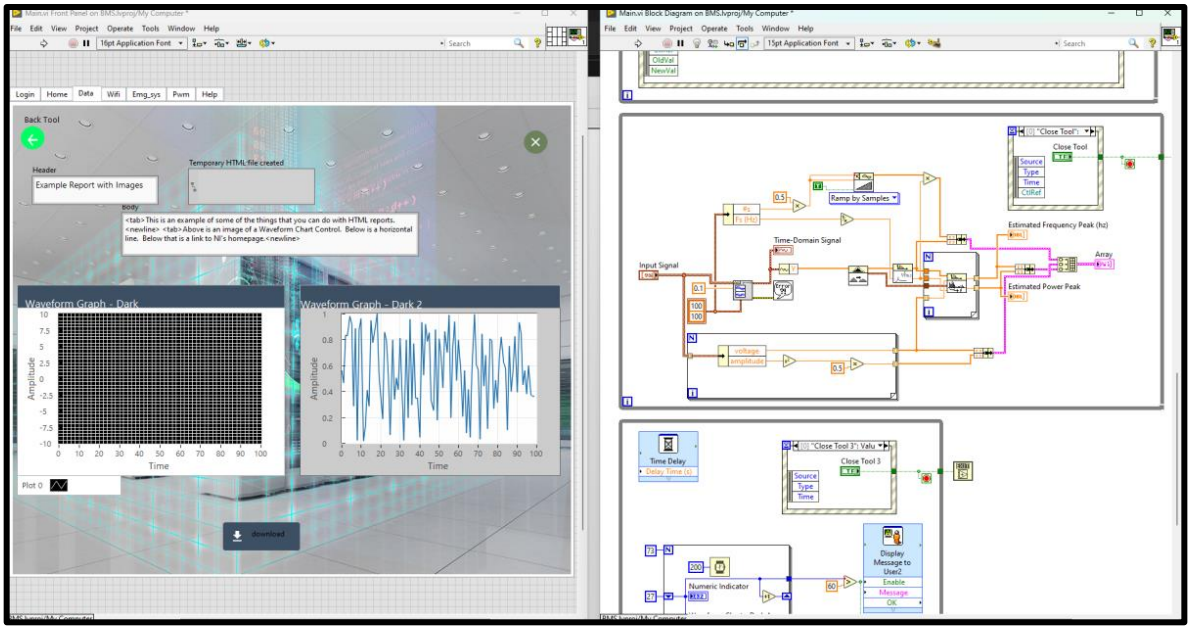

Figure 5: UI of BMA alert system

F. Help Desk

At their most basic, help desks are locations where users can request and receive assistance with technical-related problems, particularly in regard to services, and tech hub tools, platforms, and devices. In help desk it may be as simple as a single experienced employee with a deep understanding of relevant technologies and the solutions to commonly-encountered problems. In larger, more-established businesses, help desks may consist of teams of experts backed by dedicated software tools designed to help track and analyse technical issues as they arise.

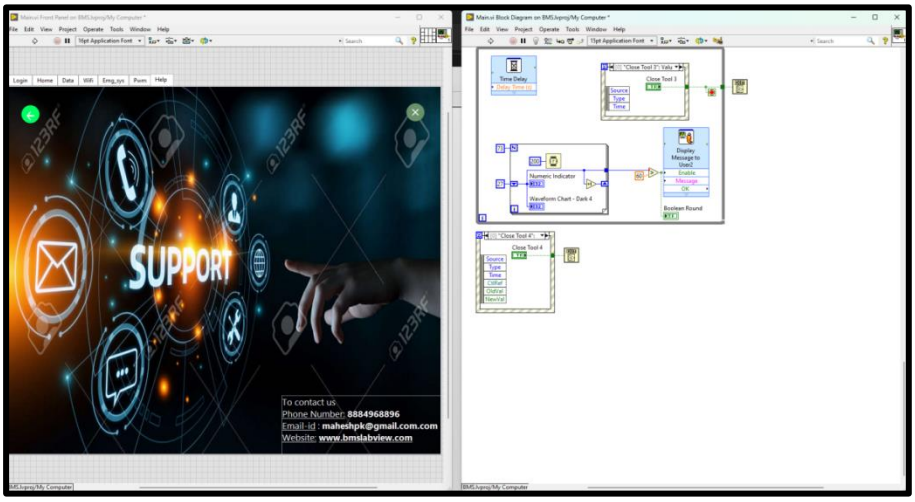

Figure 6: UI of Support desk

4. Conclusion And Future Work

Thus, by the end of this work could successfully collect the data regarding power management, human intrusion, seat occupancy and alert systems. thus enables the database to be easily managed through GUI application. Here the data of single system or multiple systems can be acquired and secured by database administrator. The future work is to build it as mobile application.

Reference:

[1] Dhawan Singh1, Amanpreet Sandhu1, Aditi Thakur2 and Nikhil Priyank3 “An Overview of IoT Hardware Development Platforms “International Journal on Emerging Technologies” 11(5): 155-163(2020),ISSN No. (Print): 0975-8364.

[2] Lee, C.K.M., Zhang, S.Z. & Ng, K.K.H. Development of an industrial Internet of things suite for smart factory towards re-industrialization. Adv. Manuf. 5, 335–343 (2017). https://doi.org/10.1007/s40436-017-0197-2”

[3] Swarup Deshmukh" and Dr. C. N. Deshmukh. “A Study Of Internet Of Things And Development Tools and Technology" International Journal of Advanced Innovative Technology in Engineering (IJAITE), Vol. 4, Issue 3, May -2019. ISSN: 2455-6491.

[4] Van Nguyen, T.; Jin Gook Kim; Deokjai Choi, "ISS: The Interactive Smart home Simulator," Advanced Communication Technology, 2009. ICACT 2009.11th International Conference on, vol.03, no., pp.1828- 1833, 15-18 Feb. 2009.

[5] Lachireddy, M. L. Ravichandra, “ARM Based Energy Management System using Smart Meter an Web Server” International journal of scientific Engineering and Technical Research ISSN 2319-8885 Vol.02, Issue.15, November-2013