

## An IOT Based Smart Home Automation Using LabVIEW

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**Abstract:** Smart home automation provides an excellent automation of different home appliances for monitoring, controlling and security purposes. A prototype of smart home automation system is implemented with various sensors to detect gas leakage, fire mishaps, temperature, soil moisture, theft detection, etc. The coding is done in LabVIEW Software and interfaced all the sensors to its LabVIEW environment by using myRIO hardware. An IOT is implemented where one can monitor and control of appliances from remote distances using internet. An IOT based smart home automation using LabVIEW provides better flexibility and more functionalities than conventional installations and environmental control systems.

**Key words:** Home automation, LabVIEW, myRIO, wireless connection, system, India

### INTRODUCTION

A smart home automation allows users to control and monitor home appliances of varying kind. Many existing, well-established home automation systems are based on wired communication. This will not be any difficulty to implement until the system is planned well in advance and installed during the physical construction of the building (Mohiuddin and Nawrocki, 2001). The implementation cost is very high for already existing buildings.

In contrast, wireless systems can be of great help for automation systems. With the advancement of wireless technologies such as Wi-Fi, wireless systems are used every day and everywhere. Using IOT we can construct a smart home technology in every home. To reduce the complex of home appliances connections and security purpose its benefit using smart technology.

Smart home automation system consists of two interfaces computer interfacing and remote control unit interfacing (Sleman *et al.*, 2009). Computer device that provided with LabVIEW Software is the main controller unit for all systems in the house. It collects data from sensors, process this information and updates data for the different systems and transmit controlling signal to house systems and switching output devices. In addition, LabVIEW has the ability to supervise the complex real-time operations in the system to the users in order to be informed of the changes in the system (Nguyen *et al.*, 2009). Users can also control the different systems abilities and chose the best system that required. In addition to the smart home automation through LabVIEW interface, it has the ability to monitor and control different applications in the home through IOT based remote interfacing.

### MATERIALS AND METHODS

**Block diagram:** The block diagram shows how various modules are connected to LabVIEW environment (Fig. 1).

**LabVIEW:** NI LabVIEW Software is a tool which is used for a wide variety of applications and in many industries which can make it challenging to answer the question: "What is LabVIEW?" LabVIEW is a simple graphical programming language and it is a highly productive development environment for creating custom applications that interacts with real-time data or real time signals in the fields such as science and engineering (Escoffier *et al.*, 2008).

The net result of using this tool such as LabVIEW is that high quality projects can be completed in less time with fewer people involved.

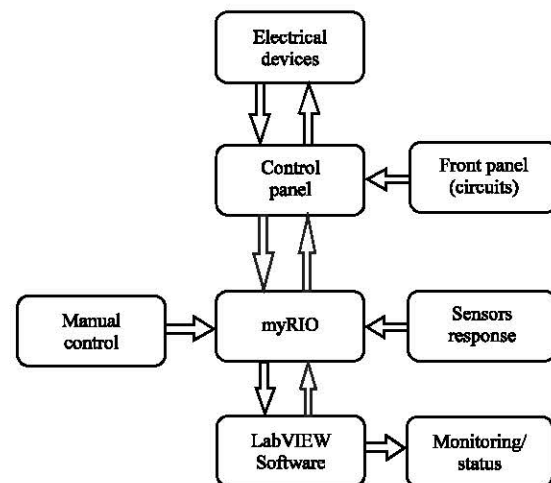


Fig. 1: Smart home block diagram

So, productivity is one of the key benefits but that is a broad and general statement. To understand what this really means, let us consider the reasons that have attracted engineers and scientists to the product, since, 1986. At the end of the day, engineers and scientists have a job to do they have to get something done, they have to show the results of what they did and they need tools that help them do that. Across different industries, the tools and components they need to succeed vary widely and it can be a daunting challenge to find and use all these disparate items together. LabVIEW is unique because it makes this wide variety of tools available in a single environment, ensuring that compatibility is as simple as drawing wires between functions (Fig. 2).

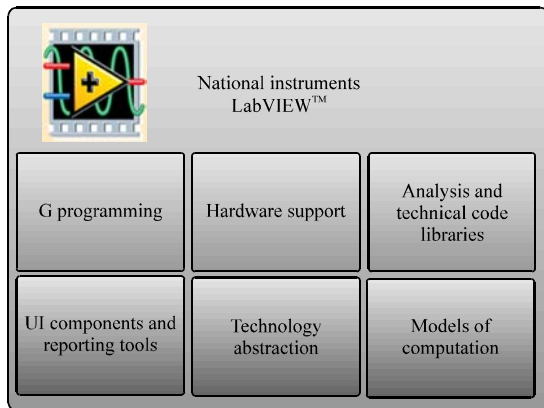


Fig. 2: Different areas of LabVIEW

LabVIEW itself is a software development environment that contains numerous components, several of which are required for any type of test, measurement, or control application (Hamed, 2012).

To quote one of our software developers, “we write low-level code so you don’t have to”. Our global team of developers continually works on the 6 areas called out in Fig. 2 to free you, the LabVIEW user, up to focus on the bigger problems and tasks you are trying to solve.

## RESULTS AND DISCUSSION

**myRIO:** RIO is abbreviated as Reconfigurable I/O which is a powerful FPGA-based technology that can be used for controls, robotics, mechatronics, automotive and other projects. With LabVIEW graphical programming (Sharma *et al.*, 2014; Vanitha *et al.*, 2013; Hamed, 2012) you can take advantage of some of the most cutting-edge technology in the world used by professional engineers every day (Fig. 3).

**Design:** Using LabVIEW Software in block diagram to design the programming coding as per different conditions and based sensors what will do for next step in the LabVIEW block diagram open functional palette and to select different icons like analog inputs/output and digital input/output icons and delay time, gates like different icons which functions is useful for development of home applications for gas sensor, IR sensor, temperature sensor, soil moisture, etc. (Fig. 4).



Fig. 3: LabVIEW graphical programming



Fig. 4: Front panel

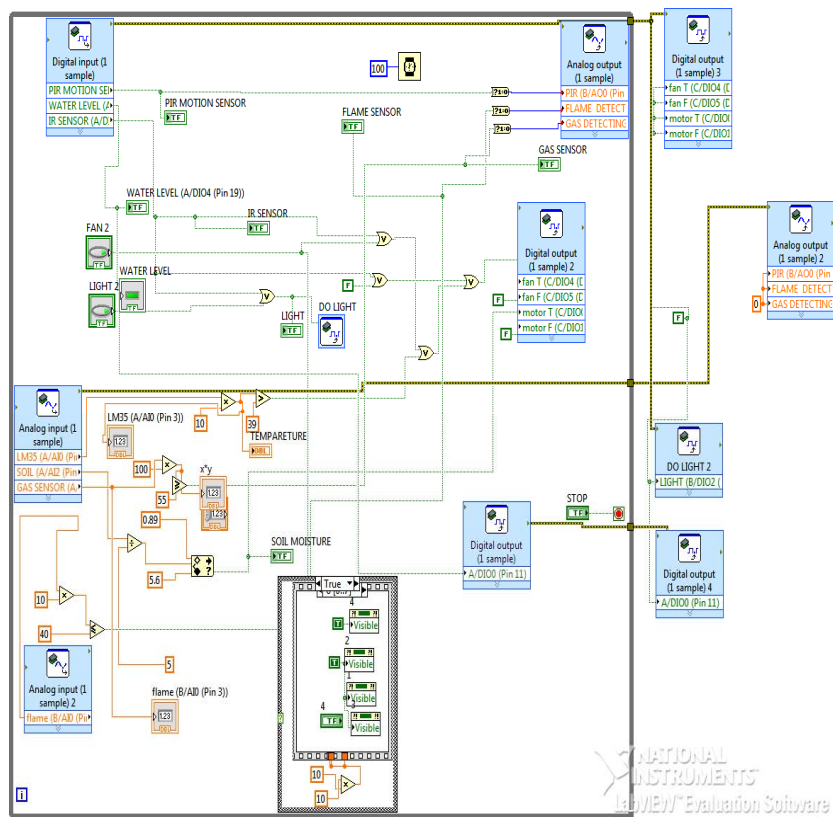


Fig. 5: Program coding

After complete coding, to save the coding as a new file name in local device. For the verification to run the programme at once. If you check on prototype design all components are places at one place at prototype of project. If IR sensors detects the human body or any moving object it will automatically sends information to LabVIEW through myRIO device. It contains true value then input of the internal lighting system will true, so, it will on, otherwise it's false it will be stop. Like different conditions all sensors are working depend on Boolean values also integer values (Fig. 5).

### CONCLUSION

Design and implement a control and monitor system for smart house. Smart house system consists of many systems that controlled by LabVIEW Software as the main controlling system in this project. Also, the smart house system was supported by remote control system as a sub controlling system. The system also is connected to the internet to monitor and control the house equipment's from anywhere in the world using LabVIEW using wireless connection to control home automation from anywhere using web IP address to control.

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