

# **Embedded Web server using TCP/IP protocol**

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Abstract- This paper presents for comfort and security low purpose having low cost Industrial Control & Monitoring system using Raspberry Pi programming based Website. This system requires Microcontroller based web server. This proposed system easy to handle industrial appliances such as fan, sprinkler etc. Industrial control and monitoring system we using the sensors, humidity temperature, and current. Industrial automation allow to increasing work efficiency, comfort and security To control real time parameters using internet we used a Raspberry Pi to configure and set up a web server with an IP address and port forwarding, which would allow access from another source connected to a network .Here we are using TCP/IP a very famous protocol to transmit data through internet.

#### Keywords: Web server, Raspberry pi

#### I. INTRODUCTION

Raspberry Pi is almost a micro-computer. It was invented by Eben Upton. This tiny computer is just \$35 and is sparking a revolution. There is a large user community of Raspberry Pi, although, it was launched just recently on February, 29th 2012. To control real time parameters from a distance using internet We planned to use a Raspberry Pi to configure and set up a web server with an IP address and port forwarding, which would allow access from another source connected to a network. The web server will have minimal features; We planned to build such a network system that can be used by small scale industries to control real time parameters such as temperature, humidity, etc. We are going to use HTML programming to develop a web page and python programming language to program raspberry pi.

A website developed using HTML language going to be burnt in Raspberry Pi. For programming the Raspberry Pi and controlling parameter We have used Python programming Language. Hence embedded web server is a cost efficient solution for the Real web server and is very useful for small scale industries.

#### II. PROBLEM DEFINATION

An embedded web server should use the HTTP protocol to transmit Web pages from the embedded system to the web browser and to transmit form data back to the embedded system attached to the appliance. The embedded system requires a network interface, such as Ethernet, a TCP/IP protocol stack, embedded web server software and static and dynamic web pages that form the user interface for that specific device. Because the embedded systems have limited CPU and memory resources and these resources are mostly used by real-time applications, endusers may have to wait up to few seconds for an HTTP response. Multi-threading should be employed in the embedded systems to avoid slow response. Moreover



# Fig1- System architecture of the proposed embedded web server.

#### III. CONCEPTUAL ARCHITECTURE

This proposed architecture is divided into 3 parts: Remote environment; Raspberry pi gateway & home internet connectivity shown in figure.



fig2. Conceptual Architecture

We collected real time sensor information using sensors. Temperature sensor (MCP9700), Humidity sensor(SY-HS-220), PIR sensor(GH-718-human INDI) senses real tome information of temperature, humidity and motion of human being These signals are sent to raspberry Pi using analog to digital converter ADC. Raspberry Pi manipulates this information and according to given program and conditions it switches relays using ULN2803. These relays are connected to parameters output respectively sprinkler, artificial cooler and door Lock driver.

The website is burnt into Raspberry Pi, information collected by the sensors is sent on website. Also from website we can control the output parameters by switching relays off and on.

## IV. DESIGN IMPLEMENTATION FLOW CHART FOR WEBSERVER



#### V. SETTING UP RASPBERRY PI AS A WEBSERVER

To begin the process of configuring a Raspberry Pi to work as web server, an Operating System of a Linux Distribution, called RASBIAN, specifically created for the Raspberry Pi, was downloaded onto an SD memory card with at least 4 GB of memory, via another computer, and inserted into the Raspberry PI . Details of the completed installation can be viewed by opening the website [1] and logging in with the correct user credentials. A Windows Distribution or a Mac OS X can be installed instead, Linux was a personal preference. And now RASBIAN is the official operating system for Raspberry Pi.

There are many different methods to finish the configuration and installations of vour Raspberry Pi to make it work as a web server, we will stick to the methods we used to accomplish this, if you are interested in other methods they are easily found all over the internet. The rest can be accomplished through following simple instructions or tutorials online. Since we enabled SSH we were then able to use to finish the setup and installations from a laptop [7]. We used the CMD console to access the pi with SSH and used SUDO and Linux bash commands. As mentioned earlier, we used port forwarding to access the Raspberry PI from another source; another computer, phone, etc. To do this, the source would have to attempt to gain access through the router where the Raspberry Pi is connected This can be accomplished by typing in the Public IP address 75.142.152.19 and either port 80, 21, 22, or 23 into the URL bar as so: 75.142.152.19:80. This will forward any traffic attempting to access the Public IP address towards the Local/Private IP address 192.168.1.6 of Raspberry PI, thus granting us remote access to the Raspberry Pi and its contents.



## Fig3. Setting up raspberry pi

## VI. ADVANTAGES

Circuit is portable and could be used anywhere. The size of a raspberry pi is of credit card size. Also automatic controlling of circuit reduce manpower. Cost is less to create a embedded web server hence rather than buying a real costly web server a embedded web server is a cost efficient solution.

# VII.CONCLUSION

We were to setup a web server in very small budget. So we planned to use a Raspberry Pi to configure and set up web server with an IP address and port forwarding, which would allow access from another source connected to a network. In this case the given web server has minimal features. The main focus is more on the development and configuration process with a very fundamental format that makes it easy to understand and simple to teach to someone who has little to no experience setting up and configuring a web server with a Raspberry Pi. We used very basic Python commands, some Linux fundamental commands, and some HTML language basics

#### **VII.FUTURE SCOPE**

This System can be used as a cloud storage. A download and upload link can be provided to the website and this server can also be used as a cloud storage. We can interface more sensors and control processes. We have use to two sensors. Also to make it very simple it can be used just as just a monitoring system

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