

# Design of Android and ARM-11 Based Robot Control using Wireless Wi-Fi with Monitoring of Temperature

Amit B. Deshmukh, P. V. Kathole

Dr. D. Y. Patil College of Engineering, Pune, Maharashtra, India

## ABSTRACT

The Robot can be moved in all the four directions (front, back, left and right) through predefined keys assigned in the android application. This robot system facilitates the owners to monitor their surroundings remotely from wireless camera mounted on a motor using which the camera directions can be controlled. This system comprises of an Arm-11 processor, wireless camera monitoring system, and Wi-Fi receiver for wireless communication from android mobile. The robot also alerts the user about the monitoring temperature using temperature sensor.

**Keywords:** Wi-Fi technology, Interfacing Wi-Fi module to Raspberry Pi processor, DC motor working and need for motor driver, Temperature sensor interfacing with Raspberry pi processor, Linux programming

## I. INTRODUCTION

The project aims at designing a Robot which is controlled through Android phone over Wi-Fi technology. The Robot can be moved in all the four directions (front, back, left and right) through predefined keys assigned in the android application. The proposed robot vehicle has an USB camera interfaced with ARM 11 processor for video surveillance.

The advent of new high-speed technology and the growing computer Capacity provided realistic opportunity for new robot controls and realization of new methods of control theory. This technical improvement together with the need for high performance robots created faster, more accurate and more intelligent robots using new robots control devices, new drivers and advanced control algorithms. This project describes a new economical solution of robot control systems. The presented robot arm control system can be used for different sophisticated robotic applications.

Automation is the most frequently spelled term in the field of electronics. The hunger for automation brought many revolutions in the existing technologies. This project makes use of an onboard computer, which is commonly termed as Raspberry Pi processor. It acts as

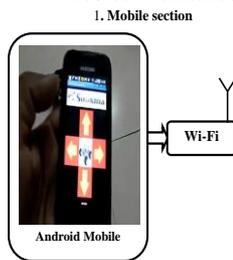
heart of the project. This onboard computer can efficiently communicate with the output and input modules which are being used. The Raspberry Pi is a credit-card-sized single-board computer developed in the UK by the Raspberry Pi Foundation. The Raspberry Pi has a Broadcom BCM2835 system on a chip (SoC), which includes an ARM1176JZF-S 700 MHz processor, Video Core IV GPU, and was originally shipped with 256 megabytes of RAM, later upgraded to 512 MB. It does not include a built-in hard disk or solid-state drive, but uses an SD card for booting and long-term storage.

## II. METHODS AND MATERIAL

### A. Hardware Description

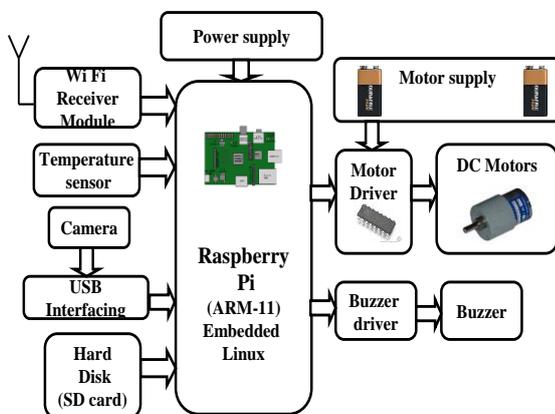
The block diagram of the project and design aspect of independent modules is considered. Block diagram is shown below.

## Fabrication of Robot using Raspberry Pi with Android Wifi controlled for video surveillance



**Figure 1:** shows Block diagram of transmitter section of Design of android and ARM 11 based robot control using wireless WI-FI with monitoring of temperature.

Design of android and ARM 11based robot control using wireless WI-FI with monitoring of temperature



**Figure 2:** Block diagram of Design of android and ARM 11 based robot control using wireless WI-FI with monitoring of temperature.

### The main blocks of this project are:

1. Microprocessor (ARM-11)
2. LED Indicator.
3. Camera
4. DC Motor With Driver
5. Wi-Fi Module
6. Android

### B. Raspberry Pi

The Raspberry Pi is a credit-card-sized single-board computer developed in the UK by the Raspberry Pi Foundation with the intention of promoting the teaching of basic computer science in schools.

The Raspberry Pi is manufactured through licensed manufacturing deals with Newark element14 (Premier Farnell), RS Components and Egoman. All of these companies sell the Raspberry Pi online. Egoman produces a version for distribution solely in China and Taiwan, which can be distinguished from other Pis by their red coloring and lack of FCC/CE marks. The hardware is the same across all manufacturers.

The Raspberry Pi has a Broadcom BCM2835 system on a chip (SoC), which includes an ARM1176JZF-S 700 MHz processor (The firmware includes a number of "Turbo" modes so that the user can attempt over clocking, up to 1 GHz, without affecting the warranty), VideoCore IV GPU, and was originally shipped with 256 megabytes of RAM, later upgraded to 512 MB. It does not include a built-in hard disk or solid-state drive, but uses an SD card for booting and long-term storage. The Foundation's goal was to offer two versions, priced at US\$25 and US\$35. They started accepting orders for the higher priced model B on 29 February 2012, and the lower cost model an on 4 February 2013.

In addition to the familiar USB, Ethernet and HDMI ports, the R-Pi offers lower-level interfaces intended to connect more directly with chips and subsystem modules. These GPIO (general purpose I/O) signals on the 2x13 header pins include SPI, I2C, serial UART, 3V3 and 5V power. These interfaces are not "plug and play" and require care to avoid miswiring. The pins use a 3V3 logic level and are not tolerant of 5V levels, such as you might find on a 5V powered Arduino. CSI (camera serial interface) can be used to connect the 5 MP camera available. Not yet software-enabled is the flex cable connectors with DSI (display serial interface) and a serial link inside the HDMI connector called CEC. (Consumer electronics control) The Foundation provides Debian and Arch Linux ARM distributions for download. Tools are available for Python as the main programming language, with support for BBC BASIC (via the RISC OS image or the "Brandy Basic" clone for Linux), C, and Perl.

On 17 December 2012 the Raspberry Pi Foundation, in collaboration with IndieCity and Velocix, opened the "Pi Store", as a "one-stop shop for all your Raspberry Pi (software) needs". Using an application included in Raspbian, users can browse through several categories

and download what they want. Software can also be uploaded for moderation and release In October 2013 the Foundation announced that the one millionth Pi had been manufactured in the United Kingdom.

### III. CONCLUSION

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested.

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