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Smart Drip Irrigation System Using Raspberry Pi and Arm7

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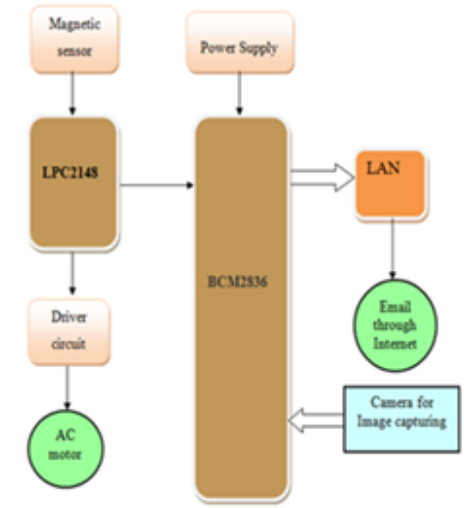
ABSTARCT:

Low-cost and energy efficient drip irrigation system serves as a proof of concept. The design can be used in big agriculture fields as well as in small gardens. The use of magnetic sensors and AC submersible motor make a smart drip irrigation system. Here we are employing a LPC2148 as our controller to know the level of water in a tank using magnetic sensors and accordingly the motor can be switched on/off depending on the water level. Raspberry pi is also used to capture the image and forward through E-mail. So that owner can have a glance about their farm/garden. 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 BCM2836 system on a chip. It does not include a built-in hard disk or solid-state drive, but Uses an SD card for booting and long-term storage. This project uses regulated 5V, 500mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.

Block Diagram

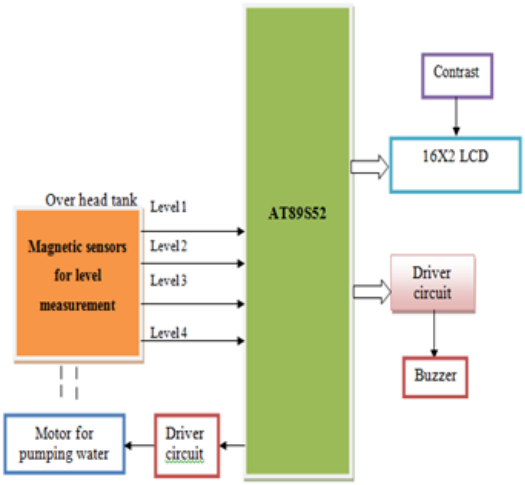


INTRODUCTION:

In our daily life we use water for many purposes and in some cases wastage will be done to avoid that this project is very helpful. If a system is developed for automation of pump for filling the container or tank, no operator is required for supervising the system. Automatic water level controllers is the main concept involved here.

Existing system:

This project is specially designed for household, Industries. Magnetic sensors / Reed switches are used as level sensors. The level of the water is monitored by the microcontroller and displayed on LCD. Here a buzzer alert will be given whenever the water reaches extreme low / high levels. A water pump is also connected to the controller to switch on/off the motor automatically when ever required.



Drawback:

There is no live monitoring from remote place

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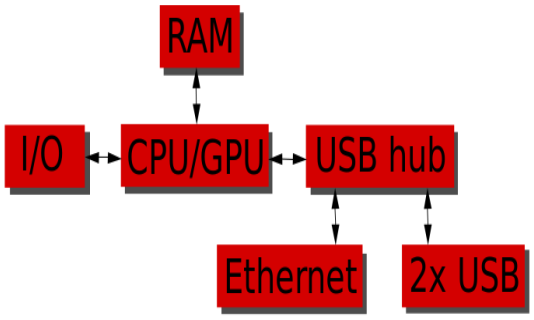
RASPBERRY-PI

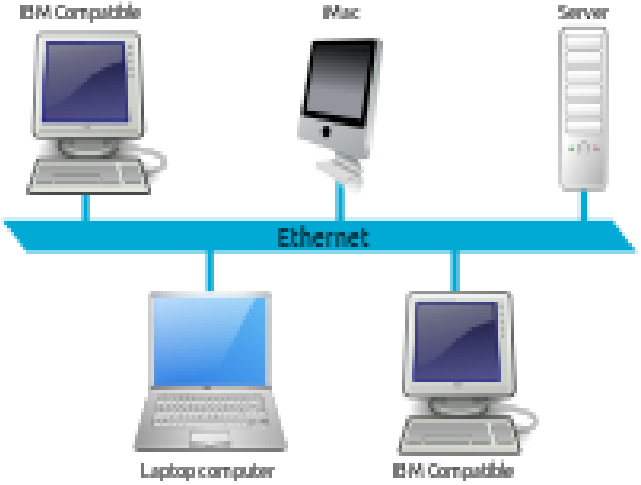
The Raspberry Pi has a Broadcom BCM2836 system on a chip (SoC), which includes an a quad-core Cortex-A7 cluster. The Cortex-A7 MP Core processor is a high-performance, low-power processor that implements the ARMv7-A architecture. The Cortex-A7 MPCore processor has one to four processors in a single multiprocessor device with a L1 cache subsystem, an optional integrated GIC, and an optional L2 cache controller. The Raspberry Pi foundation has finally released an upgraded version of the Raspberry Pi. Raspberry Pi 2 model B features much of the same ports and form factor as Raspberry Pi Model B+, by replaces Broadcom BCM2835 ARM11 processor @ 700 MHz with a much faster Broadcom BCM2836 quad core ARMv7 processor @ 900 MHz, and with an upgrade to 1GB RAM.



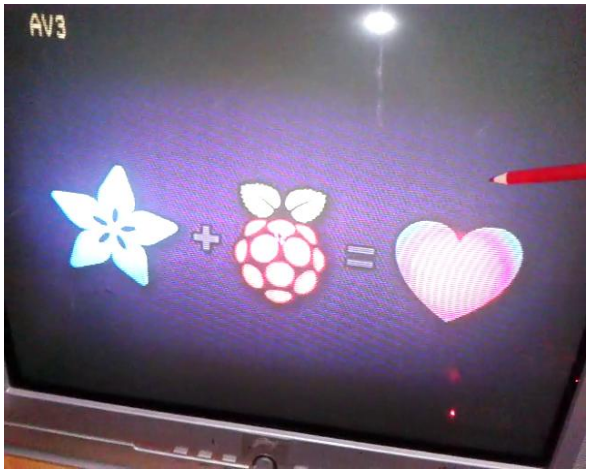
Basic Hardware of Raspberry-PI

LAN

A local area network (LAN) is a computer network that interconnects computers within a limited area such as a home, school, computer laboratory, or office building, using network media. The defining characteristics of LANs, in contrast to wide area networks (WANs), include their smaller geographic area, and non-inclusion of leased telecommunication lines. ARCNET, Token Ring and other technology standards have been used in the past, but Ethernet over twisted pair cabling, and Wi-Fi are the two most common technologies currently used to build LANs.



OS used in Raspberry pi is Linux



Coding will be done in python language

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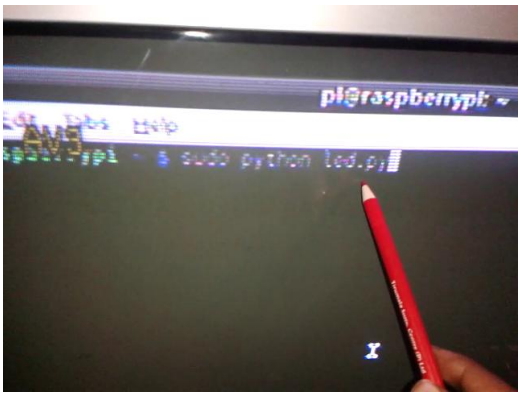
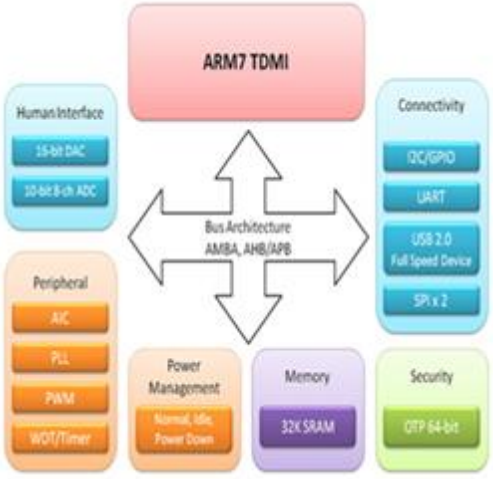


LPC2148 controller:

The LPC2148 are based on a 16/32 bit ARM7TDMI-S™ CPU with real-time emulation and embedded trace support, together with 128/512 kilobytes of embedded high speed flash memory. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at maximum clock rate. For critical code size applications, the alternative 16-bit Thumb Mode reduces code by more than 30% with minimal performance penalty. With their compact 64 pin package, low power consumption, various 32-bit timers, 4- channel 10-bit ADC, USB PORT,PWM channels and 46 GPIO lines with up to 9 external interrupt pins these microcontrollers are particularly suitable for industrial control, medical systems, access control and point-of-sale. With a wide range of serial communications interfaces, they are also very well suited for communication gateways, protocol converters and embedded soft modems as well as many other general-purpose applications.



Architecture:

Advantages:

- Highly-flexible
- Fit & Forget System
- No need of human effort
- High security is provided

CONCLUSION:

This project presents a high sensitive sensors based automotive device control. The tracking controller based on the closed loop algorithm is designed and implemented with MCU in embedded system domain.

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