

Automatic Dam Gate Control System with Caution Alarm Using ARM7

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Abstract:

Water level in a dam needs to be maintained effectively to avoid complications., the quantity of water released is hardly ever correct resulting in wastage of water & it is impossible for a man to precisely control the gates without the knowledge of exact water level and water inflow rate. This isa mechatronics based system, which will detect the level of water and estimate the water inflow rate in a dam and thereby control the movement of gates automatically. this a mechanical arrangement is made at minimum and maximum levels of water level,This system consists of a set of sensors connected to a

stepper motor through an 8-bit microcontroller.This microcontroller operates the H-Bridge which in turn control the operation of the DC motor i.e. switches on the DC moving it in a clock wise direction. The water level and rate of inflow is detected based on the feedback from the sensors used. Based on this data, the level of dam gate can be automatically controlled using a DC motor. When the Dam gate is opened i.e. if the water level of the Dam exceeds then automatically Dam gate will be opened; then nearby villages can heard the sound of siren using RF technology. When the siren(which is placed at villages only).

Key words: RF Technology, H Bridge, ARM7 Processor, LPC2148 Microcontroller..

software, and perhaps additional mechanical or other parts, designed to perform a specific function. A good example is the microwave oven. Almost every household as one and tens of millions of them are used every day, but very few people realize that a processor and software are involved in the

I.INTRODUCTION

An embedded system is a combination of computer hardware and

preparation of their food. Given the definition of embedded systems earlier in this chapter the first such systems could not possibly have appeared before 1971. That was the year Intel introduced the world's first microprocessor. This chip, the 4004, was designed for use in line of business calculators produced by the Japanese company Bascom. This hardware also contains memory chips onto which software is loaded. The software residing on the memory chip is also called the 'firmware'. The same architecture is applicable to any computer including a desktop computer. However, there is significant difference. "Embedded Dam manipulates approach". For industrial functions, house automation, and supervisory control purposes, individual computer established electrical appliances control is most often priceless. This manage method gives detailed inspiration of interfacing a high voltage electrical device or DC motor or DC / AC motor to personal computer procedure. This method facilitates us to control the gates of a dam depending on the water stage robotically. It contains a set of sensors related to a DC motor by means of an 32-bit Processor [1]. The water

stage is detected based on the feedback from the mechanism used. Relying on the water degree of the dam gate can also be managed utilizing a DC motor and a individual pc. Due to this mechanism the water wastage may also be diminished and effective utilization of water assets can be accomplished. Additionally we are able to hold the document of the water utilization and signals can also take delivery of to the persons at quite a lot of circumstances

A. Water degree Indicator

For water stage indication unit we are able to use some LED gentle so we can work for water stage indication. Via touching extraordinary water levels by way of water level sensor, LED should be indicated as on/off (i.e. On: sure sensor senses water).

B. Water stage Sensor:

The sensor circuit in which five sensors are used at various levels (verylow, 1/4, 1/2, 3/4, full). Except the very low level sensor all others are connected to the transistors and whenever water level increases or decreases and comes in contact with each sensor the corresponding transistor conducts and amplify the sensor output .

Special arrangement is made to indicate the various water levels using an LCD display at the operator control panel.

II. RF TECHNOLOGY

Radio frequency [RF] has a frequency [1, 2] range about 3Hz to 300GHz. This range corresponds to frequency of alternating current electrical signals used to produce and detect radio waves. Since most of this range is beyond the vibration rate that most mechanical systems can respond to RF usually refers to oscillations in electrical circuits or electromagnetic radiation. When an RF current is supplied to an antenna, it gives rise to an electromagnetic field that propagates through space. One such property is the ease with which it can ionize air creates a conductive path through air. Another property is the ability to appear to flow through paths that contain insulating material, like the dielectric insulator of a

capacitor. Here in this RF system, we are using the frequency of 433MHz which is in the Frequency range. The distance of this radio frequency range is up to 100m in general.

The main requirements for the communication in RF:

- RF transmitter.
- RF receiver.
- Encoder and decoder.

RF Transmitter:

The STT-433 is ideal for remote control applications where low cost and longer range is required. The RF Transmitter is shown in Fig1. The transmitter operates from a 1.5-12v supply, making it ideal for battery powered applications. The [3] transmitter employs a SAW-stabilized oscillator, ensuring accurate frequency control for best range performance. The manufacturing friendly SIP style package and low-cost make the STT-433 suitable for high volume applications.

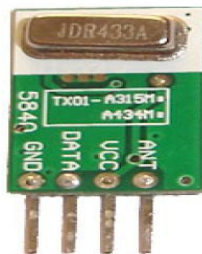


Fig1: RF Transmitter STT-433Mhz.

Features:

- 433.92Hz Frequency
- Low cost
- 1.5-12V operation
- Small size.

RF Receiver:

The data is received by the RF receiver from the antenna pin and this data is available on the data pins. Two data pins are provided in the receiver module. Thus data can be used for further application. RF Receiver is shown in Fig.

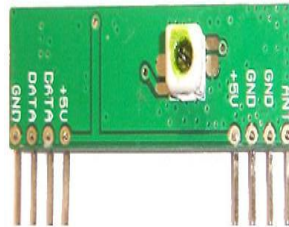


Fig 2: RF Receiver ST-433MHz.

Features:

- *Low current (max.100ma).
- *Low Voltage(max.65).

Applications:

General purpose switching and amplification.

Encoder and Decoder:

The encoder and decoder used here is HT12E and HT12D respectively from HOLTEK SEMICONDUCTORS INC. The HT12E encoder ICs are series of CMOS LSIs for remote control system applications. They are capable of encoding 12 bit of information which consists of N address bits and 12-N data bits.

Features:

- *Operating voltage 2.4V~12V.
- *Low power and high noise immunity CMOS Technology.

*Low standby current.

III.ARM PROCESSOR

The ARM (Acorn RISC machine) structure is developed at Acorn computer limited of Cambridge, England between 1983-1985. ARM constrained situated in 1990. ARM became because the evolved RISC desktop is a 32-bit RISC processor architecture that's generally utilized in embedded designs. ARM cores licensed to semiconductor companions who fabricate and promote to their consumers. ARM does not fabricate silicon itself due to the fact of their vigour saving features, ARM CPUs are dominant within the mobile electronics market, the place low vigor consumption is a valuable design purpose. As of 2007, about ninety eight percentage of the greater than a thousand million cellular phones sold each 12 months use as a minimum one ARM CPU. At present, the ARM household bills for approximately seventy five% of all embedded 32-bit RISC CPUs, making it the most generally used 32-bit structure. ARM CPUs are found in most corners of consumer electronics, from portable contraptions (PDAs, cell phones, iPods and other digital media and track gamers, handheld gaming items, and calculators) to pc peripherals (difficult drives, computer routers). ARM does now not manufacture the CPU itself, but licenses it to different manufacturers to combine them into their own system.

IV.Control unit performs following movements &

Working Results:

1) Off operation:

2) When the microcontroller sends 0 volt to the base of the transistor then it turns into off and its emitter and collector becomes open. Then no floor sign (0v) is accumulated in the relay circuit. So, the negative part within the cable of motor pumps getting positive signal (+5v). For that reason, the motor pump might be OFF due to getting constructive sign (+5v) at one aspect and 220v ac at the other finish.

2)On operation: Transistor becomes on when the microcontroller sends confident sign (+5v)and its emitter and collector end up quick. Relay circuit and motor pump will get floor sign (0v) and for this motive the motor pump can be ON because of getting floor at bad aspect and 220v ac to the other aspect. Additionally, the current is transformed as much as optimistic signal (+5v) to floor or its reverse then the inductor can tolerate some resistance. Hence we will have touse a diode. An on/off switch is used to control the motor driver circuit manually

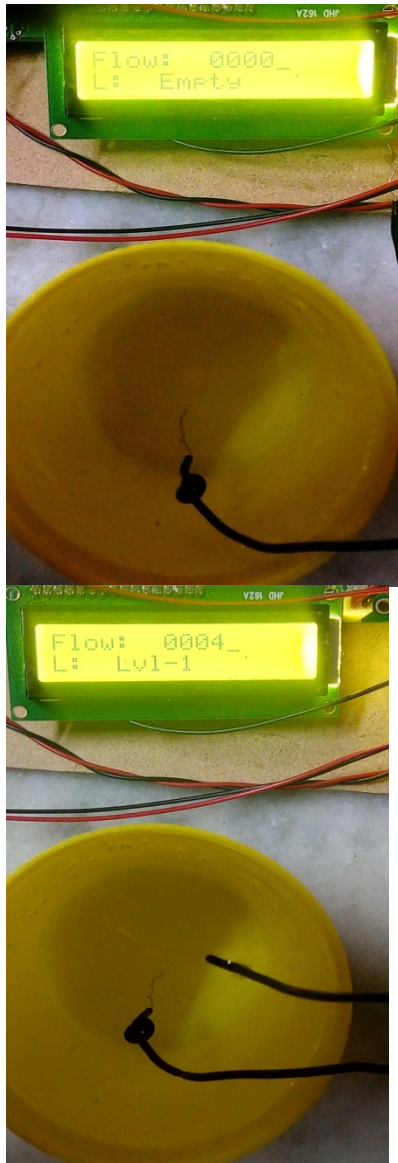


Fig: Empty level operation

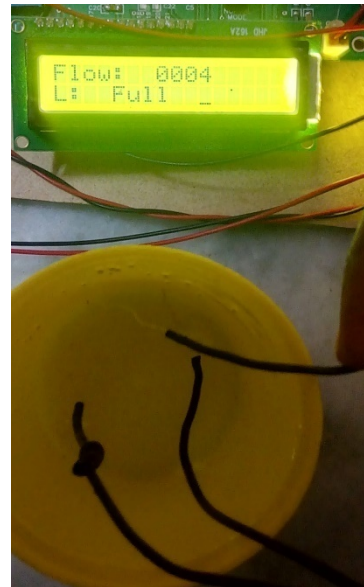


Fig:level1 operation

Fig:full level operation

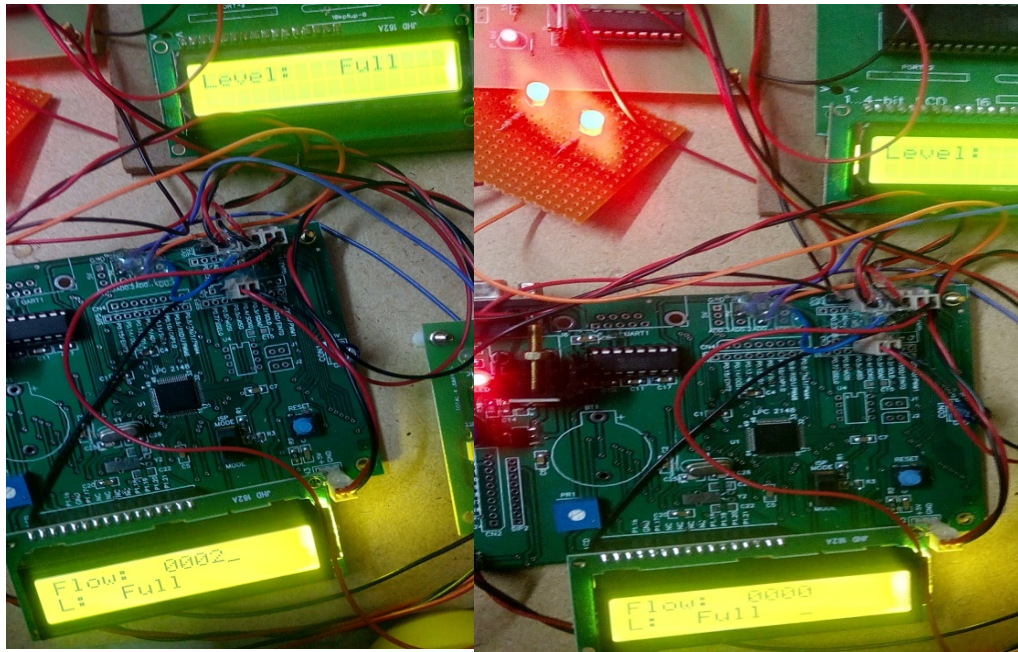


Fig: Transmitter and receiver ON operation

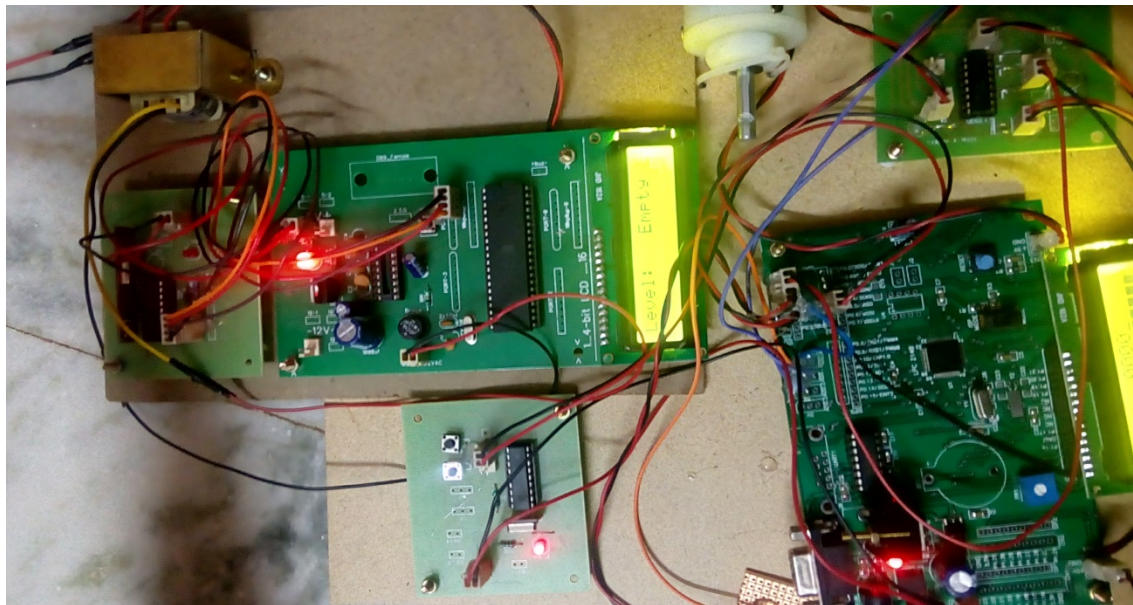


Fig: complete operation of the dam gate control system

CONCLUSION:

The proposed mechanism of dam gate manipulate reduces the water wastage, ensures effective use of available water assets and generates more certain and accurate outcome. There is no requirement of human labourers for monitoring the extent, only one operator is enough for opening and shutting the gate according to sensor output. Due to the quantity of sensors being extra we will open or close the dam gate every time critical knowing the correct level of water. Additionally operation execution time is much less. Also there are heavy load shedding problems in the villages in nearly all states of India. So this dam gate manage procedure operation can also be combined with the operation of the geothermal and nuclear vigour crops for generation of electricity.

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