Microprocessor Project Proposal

Professor: Dr. Hosseini Monazzah

Group 1

Students:

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Project Title:

Smart Water Tap

Project Area of Work

Multiple Industries (Mechanical…),

Production, Homes, Workplaces…

Project Target

Digital taps have become more and more popular in public buildings, such as airports thanks to their hygiene benefits. There are also a few companies that do them for domestic use too meaning you could have one in your own kitchen or bathroom. They help save water and keep your taps shiny, all while looking very aesthetically pleasing!

These digital taps have many pros besides their good hygiene and beautiful features, they also help us save water and protect the environment; and in general provide us a better experience while we are washing our hands or getting water.

There are also some cons to smart taps, they might not detect the user's hands or cut the water out too soon, but by using more powerful and precise sensors , these cons are in their way of getting fixed.

 In this project, we are going to create a smart valve/tap system based on DC motors and Infrared sensors; that is going to be used in homes and workplaces, in order to provide a better experience for people who want to easily wash their hands or get water.

Project Explanation

Modules:
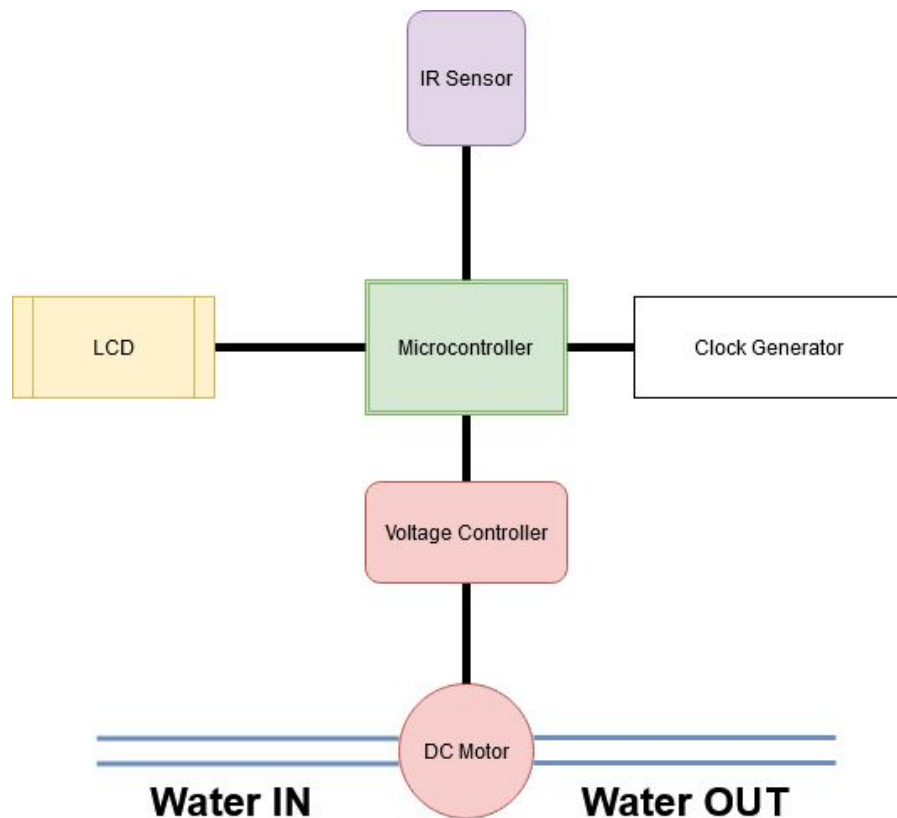
We will receive the input by an IR sensor, and then program them in the microcontroller to provide proper signals for the controller to provide enough voltage for the motor to let water to pass and also display useful information like volume of water usages in the last 24 hours on a LCD screen.

Inputs:

- Proper Signals from IR sensor

Outputs:

- Current State on LCD
- Time and Volume used in last 24 hours on LCD
- Proper Pulses for DC Motor

Notes:

Why an IR sensor-based design? IR sensors are **small**, **inexpensive**, consume low levels of power, are easy to interact with, and are easy to use. Also, They are better than motion sensors, Because motion sensors are suitable for large distances but IR sensors are used for short distances. When motion is detected; the IR sensor outputs a high signal on its output pin.

How do IR Sensors work?:

Reflecting medium
(Kodak neutral test card)

d

Detector

Emitter

A   C   E   C

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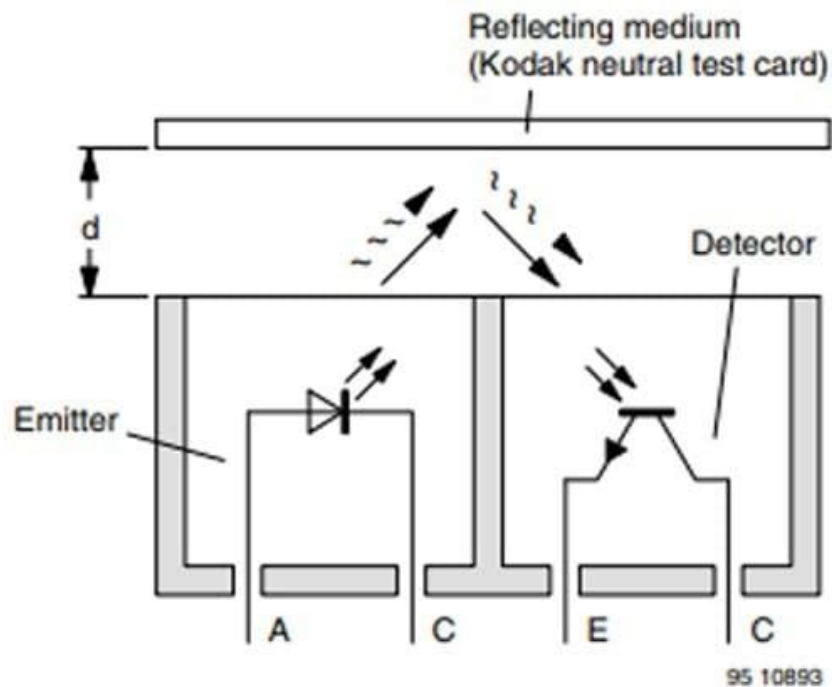
Implementation Progress:

First, we place the microcontroller in the circuit and connect its related components, including capacitors , related resistors, transistors and other parts. Then, we have to mount the AVR code onto our microcontroller using a programmer device.

Then, using the interface wires, we connect the water valve to the microcontroller and then, we connect the LCD to the microcontroller.

Now, we need to implement our sensor, so that when the user brings their hand under the valve, it starts working (rotates to our desired degree) and then when the user removes their hand, the valve gets closed again. Finally, we have to connect the whole circuit to GND and VCC signals. Now, our product is ready to be used!

Project Type

Implementation

Tasks and Works

Mina Tahaei: Proteus Simulation + Code: Valve Opening System

Danial Bazmandeh: Code: Sensor Detection

Seyyed Ali Ayati: Physical Implementation

Timing

25 Aban - 10 Day: Coding + Simulation in Proteus

10 Day - 10 Bahman: Physical Implementation

Electronic Parts

DC Motor	~ 140,000
Microcontroller - ATmega16	~ 60,000
Diode	~ 7,000
Capacitor	~ 3,000
Jumper Wires	~ 20,000
Breadboard	~ 40,000
USBASP	~ 50,000
Transistor	~2000
Resistor	~4000
LCD	~50,000
IR Sensor	~6000

Relay	~10,000
On/Off Switch	~5000
Male Header	~10,000
Push Button	~5500
15 Pieces	~412,500