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Smart Security Camera Based Human Tracking

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***Abstract*: The aim of this project is to automate a common security camera which rotates according to the human motion. The objective of this project is to construct a human tracking rotating platform that supports a security camera to control the rotation of a camera using microcontroller. The control system rotates the platform of camera in either direction to whatever position a person moves in the sensing field of camera. Sensing field consist of a pair of infrared sensors, once the person lefts the camera's sensing field control system automatically lefts and camera stop its motion. For mechanical operation of the camera platform dc motors are employed. Here we are using embedded controller built around the 8051 family (AT89C52) for the control according to the data pattern produced at the input port of the microcontroller, the appropriate selected action will be taken. The logic is produced by the program written in assembly language. The program code is written by using KEIL micro vision environment. The program is then converted in HEX code after simulation and burned into microcontroller. The basic idea behind this project is an automatic smart security camera which moves on human detection basis which increases the security efficiency.**

Key Word: Microcontrol, Sensor, Motor Drive

I. INTRODUCTION:

Security camera systems have always played a crucial role. The security camera system has gained prominence because they secure the shop, office premises, and enables the owner to monitor all the events and activities taking place in the company during his absence. A security camera system also helps to track theft, the function of the employees, and other office-based problems. Though installing a number of security cameras all over the office premises can be expensive it is money well spent.Generally these security camera systems are placed in specific areas such as the accountant's desk, sales counters, throughout warehouses where products are stored, and perhaps, even on the outside to facilitate tracking of activities outdoors. Most businesses spend a lot on having these surveillance devices as it helps prevent crime. A security camera system can be of various types used together. The cameras used by the business are mostly wireless hidden cameras that help in secret recordings as no one suspects the presence of such devices.

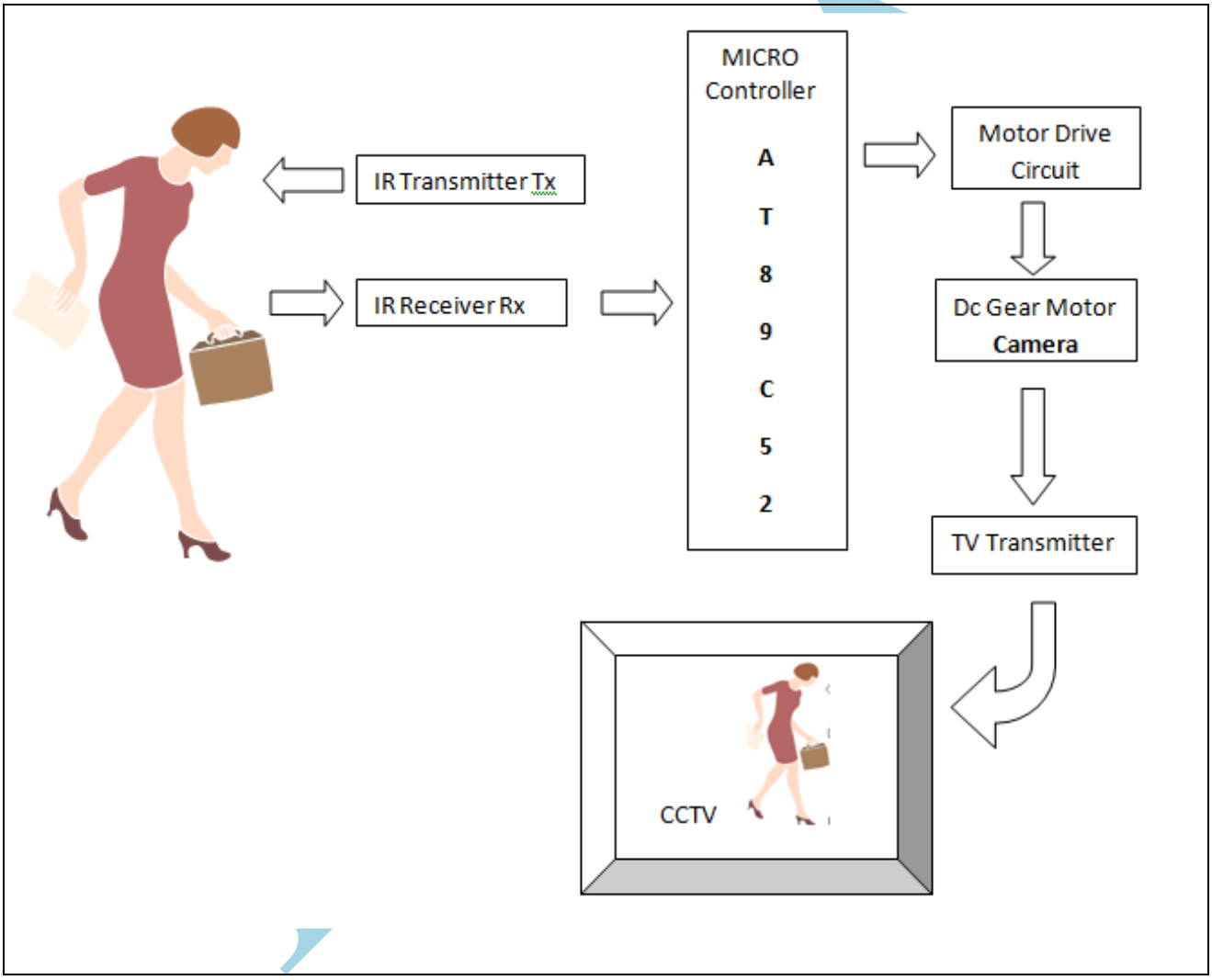
The cameras may vary from being high resolution, expensive custom-made ones to the fake security camera systems. The fake ones are not generally used. However their advantage is that they help deter crime or unwanted activities as people are not generally conscious that there are fake cameras in the office. Security camera systems from the employer's point of view help them to keep track of employee activities within the office. From the employees' point of view, business security camera systems help to protect and keep them safe.

II. METHODOLOGY:

A pair of two infrared sensors that one is transmitter sensor Tx and other is receiver sensor Rx is used. The transmitter sensors transmits signal whenever an object comes in the field of the sensor the transmitted signal contact with object and reflect back where two receiver sensors Rx receives the reflected signal.When a sensor detects the right amount of infrared light that is reflected back from an object a comparator output goes high. Further we use a microcontroller to generate an interrupt on the comparator's rising edge. The interrupt then signals a task according to Command (written in assembly language using Keil micro vision software) burned in microcontroller to the Camera motor drive circuit that begins rotating the platform. The rotation is

clockwise if the left sensor has detected a person or counter clockwise if the right sensor has detected a person.Once the camera platform is directed at the person's location, there is just enough infrared light in the second sensor's field of view to trigger its comparator this generates an interrupt that signals a task to either stop or redirect the motor, depending on the setting At this point the human is detected.When there is no body in the field of the camera sensor the camera will act as a static camera, In case the motion sensor doesn't sense anything the camera will not rotates and will be on its original position and whenever the sensor senses the presence of a person can interrupt will be immediately sent by the microcontroller and process will continues and the audio and video moments captured by camera are wirelessly transmitted using a television transmitter.

III. THE BLOCK DIAGRAM:



IV. FUNCTIONALITY OF EACH CIRCUIT:

The total Circuitry of our hardware is divided into following sub circuits.

1. Sensor (transmitter and receiver) Circuit
2. Microcontroller Circuit
3. Motor Drive Circuit
4. Camera Cooling Fan Circuit
5. TV Transmitter Circuit

Simulation Software Used:

The Software that we used for Simulation of the Circuit is

1. Live wire

2. Proteus Design Professional 7

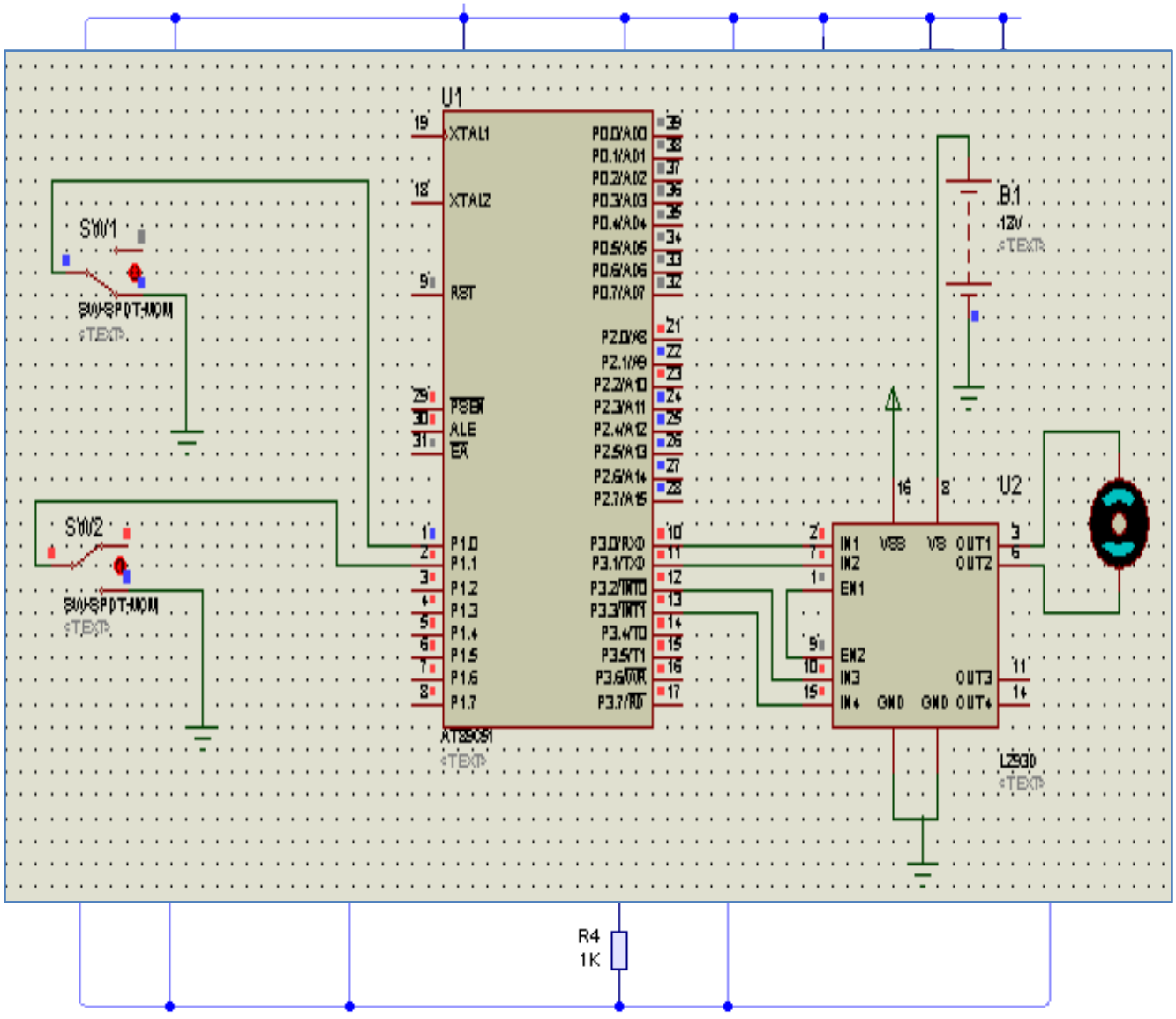
In Live wire we simulate the following Circuit

i. Sensor circuit
ii. Motor Driver
iii. Camera Cooling FAN
iv. TV transmitter

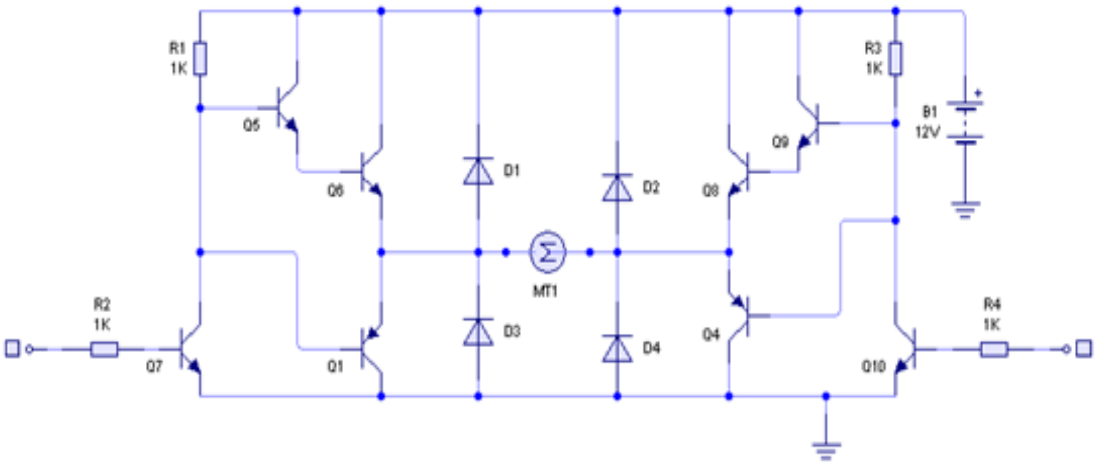
And In Proteus we simulate the Microcontroller circuitry

Sensor Circuit:

Microcontroller Circuit:



Motor Drive Circuit:



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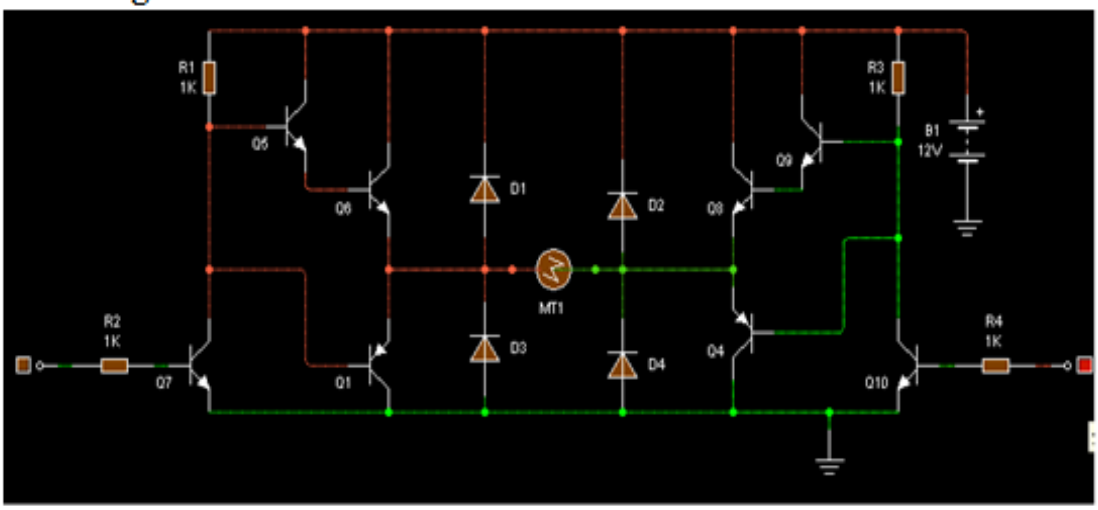
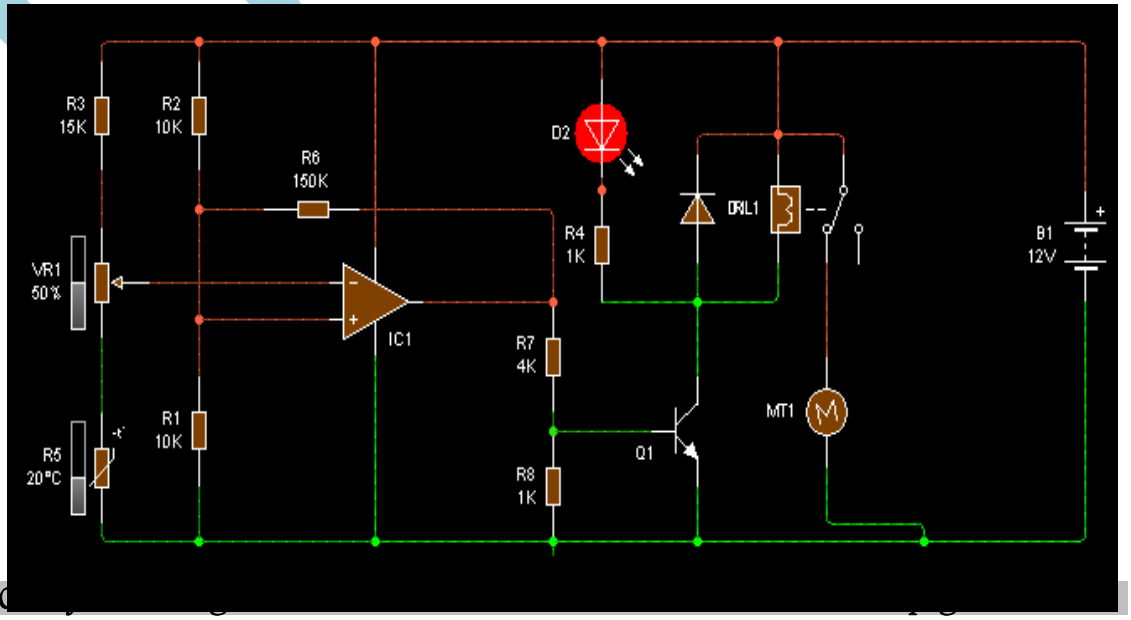
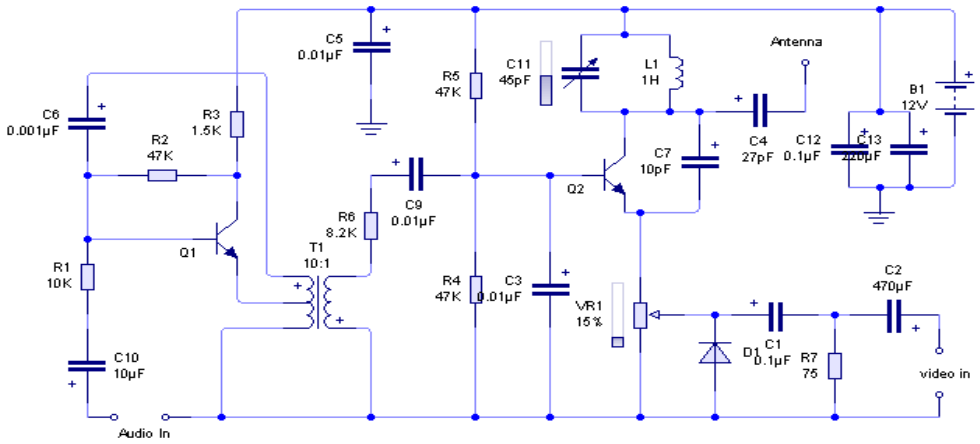


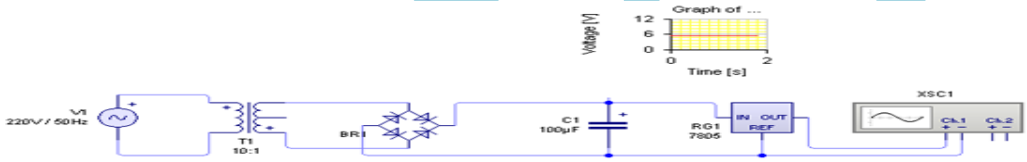


Camera Cooling Fan Circuit:



TV Transmitter Circuit:

Power Supply Circuit:



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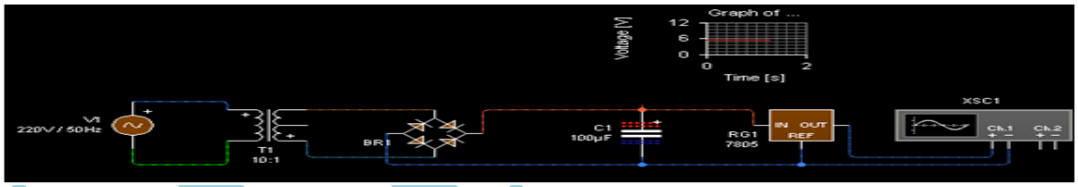

V. ADVANTAGES AND DISADVANTAGES SECURITY CAMERA SYSTEM

Advantages:

Deters Crime

The presence of CCTV camera system for surveillance will reduce petty thefts and vandalism in shops, malls and other public places. Since the activities are being monitored, fewer nuisances are likely to be created. It also reduces the losses due to shoplifting.

Helps Maintain Records

The images and videos captured by a CCTV camera system are often recorded and stored into a database. These are helpful in maintaining records so that they can be easily retrieved later, when needed.

Protects Employees

This is particularly helpful in customer service centres. The employees providing customer service may sometimes be subjected to verbal abuse or physical attacks. CCTV camera system helps to identify such instances and act immediately. It is also helpful to keep a tab on the activities of the employees.

For Evidence in Lawsuits

In legal cases of thefts and other forms of crime, videos and images provided by the CCTV camera system can serve as a valid proof and evidence against the defaulter. This assists in making legal claims as well.

Disadvantages:

Do Not Work Always

CCTV camera system cannot monitor every area of your office or home at all times. Hence it cannot be considered as a fool proof method for crime prevention.

Privacy Concerns

Invasion of privacy is the major issue when it comes to any security system device like the security

camera system. It lowers the employee morale and hampers productivity at times. Constant monitoring of every activity might put the workers ill at ease.

Initial Costs

The initial costs incurred per camera are high. The installation may also increase the initial expenditure. It depends upon the complexity of the security camera system as well.

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