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Video Interactive Wireless Control Robot

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***Abstract*— A robot task procedure in real time and applying the result to modify its task plan. Robot are required to perform tasks in conformity with user instruction, status or situations, it is intuitive that they should receive necessary information or adhoc decisions from the user during the tasks. The video surveillance unit is designed for the portability and widest possible viewing range. The unit consists of a stepper motor that drives the camera towards reference points automatically by the computer and a transmitter transmits the images collected by the camera to a distant end.**

Index Terms- Robot, Camera, Wireless communication, Antenna, PIC controller, Motor Driver.

I.INTRODUCTION

The principle of remote sensing is utilized in this project, to detect the presence of any person inside the area. A video camera collects the images from the reference points and then converts into electronic signals. The images which are collected are converted from visible light into invisible electronic signals inside a solid-state imager. These electronics signals are transmitted to the monitor. Here for the demonstration purpose three reference points is taken. Each reference point is arranged with two infrared LED's and one lamp. Arrangement is made to detect the presence of a person who is near the reference point. Reference point is nothing but restricted zone. When any person comes near to any reference point i.e. restricted zone, then immediately that particular reference point output, will become high, this high signal is fed to the computer and the computer energizes that particular reference point lamp and rotates the video camera towards that reference point for collecting the images at that particular reference zone. To rotate the video camera towards interrupted reference zone, stepper motor is used [1].

Robot the American Heritage says,"is a mechanical device that sometimes resembles a human being and is capable of performing complex tasks on command or by programmable multifunctional manipulator designed to move materials, parts, tools specialized devices through variable programmed motions for the performance of a verity of tasks. The stress in the above definition lies on the word reprogrammable. The robot derives its versatility and more importantly its adaptability form its 'computer brain'.

A computer controlled mine detecting robot is a robot which operates through RF transmitter with signals from the computer. A metal detector circuit has been placed so that the mine is detected along the path of the travel of the robot. An interface has been developed in the computer such that the robot travels according to the signals from the computer. A robot should be capable of generating meaningful questions regarding the task procedures in real time and applying the results to modify its task plans or behaviors. The approach produces robust, practical, and easy – to-manipulate robot behavior. It generate interaction with highly relative and task-oriented [2].

Wireless controls offer attractive features including flexibility, self-organization, and dynamics networking, especially in mobile control concepts. At the same time, wireless controls give new designs challenges because network and control performance affect each other. The system is modeled and evaluated on a platform for integrated control and communication co-simulator. The performance of the control system is evaluated not only at the network layer, but also from the application layer, in the mobile robot control system. Wireless, mobile, multihop robot control represents a complex, distributed system that is formed b a group of wireless, mobile robots without any fixed network infrastructure. In addition to the communication design, the control architecture and tuning also determines the performance of the overall system [3].

Several electrically small resonant antennas employing the composite right/left handed transmission line are presented for integration with portable RF modules. The present antenna designs are based on the unique property of anti parallel phase and group velocity of the CRLH-TL at its fundamental mode. In this mode, the propagation constant is increases as the frequency is decreases, therefore, a small guided wavelength can be obtained at a lower frequency to provide the small g/2 resonant length used to realize a compact antenna design. The proposed active phased array antenna realizes multi-frequency and multi-modulation beam forming simultaneously by generating an RF signal independently in each module and sharing them among the antenna array [4].

A digital still camera system processing image is combination of hardware and software to meet the demand of both high speed and flexibility. The system is capable of processing most of the CCDs with image size from VGA to SXGA scan type of progressive and interlaced, and color filter of primary RGB and complementary MGCY. The still image processing time for YUV conversion completes approximately in one frame for the progressive scan type CCD [5].

II.WIRELESS CONTROL ROBOT

In wireless control robot, robot generated a high-level plan and asked the user to confirm or correct it. In interactive planning of task procedures. The robot exhibited accurate and natural behaviors. A script-based reasoning system was developed, which enabled the robot to generate task-oriented interactions that dynamically resolve plan ambiguities cooperatively. Robots were capable of generating meaningful behaviors and interactions in a user-friendly and intuitive manner, and applying the results of interaction to adjust subsequent procedures. Moreover, the robots could flexibly change their behavior according to user commands or responses. Through accumulated experience of interaction with users, the robots successfully developed trained fluency to generate sounder behavior flows [6].

The video surveillance unit is designed for the portability and widest possible viewing range. The unit consists of a stepper motor, which drives the camera towards specific area automatically by the computer and a transmitter transmits the images collected by the camera to a distant end. Thus an automatic controlled wireless camera is very useful for surveillance of places where the particular location makes it inconvenient or impractical for a wired operation of the system [1].

The robotic action performed by the stepper motor which is attached to the camera allows surveillance of maximum area with one single camera [1].

III.LITERATURE REVIEW

We were Referred papers From “Institute of Electrical & Electronics Engineering” (IEEE papers).From this paper we give different control system information and also give operational working of robot.

This paper [1],[10],[11] provide principle of remote sensing. This system can be used as an efficient surveillance system with minimum cost. This paper presented a system design for wireless video surveillance, including video capture with automatic camera control & data transmission. . In this paper [2],[6] they provides technical progress, now permits control of the interaction between a robot & its environment by using a visual sensor directly inside a closed loop control scheme. This paper [3, [8],[9] give us the evaluation of the network and control design of wireless robot using robot-squad scenario. Resonant antenna [4], [16] which is operating in the left-handed region are designed and built. It provides novel approach for the radiation of compact antennas. The idea about a flexible digital still camera system gives [5] that cover a wide range of image size. This system is capable of processing real-time monitoring by hardware and generating still images by combining hardware and software. These papers [7], [12], give a new approach to integrating human robot integrating with robot task management. This paper [14], presents a new concept of an active phased array antenna system with RF modules including an RF signal generator. It provide [15], circularly twisted loop antenna to achieve circularly-polarized radiation, the radiated field must be orthogonal in space. This paper [17], proposes a VHF/UHF double whip antenna with two lossless matching methods. It has very small size, which is convenient for vehicular concealment.

IV.SYSTEM ARCHITECTURE

The block diagram of transmitter section is shown in figure 1. The RF transmitter is used to transmit signals wirelessly. The transmitter will convert the given signals to equivalent RF before transmission. Power supply includes rectifiers, filters & voltage regulator IC LM7805. In the circuit rectifier converts AC supply into DC. So, we get the pulsating DC in order to obtain pure DC filter is used. The requirement of the circuit is 5volt is full field by voltage regulator.

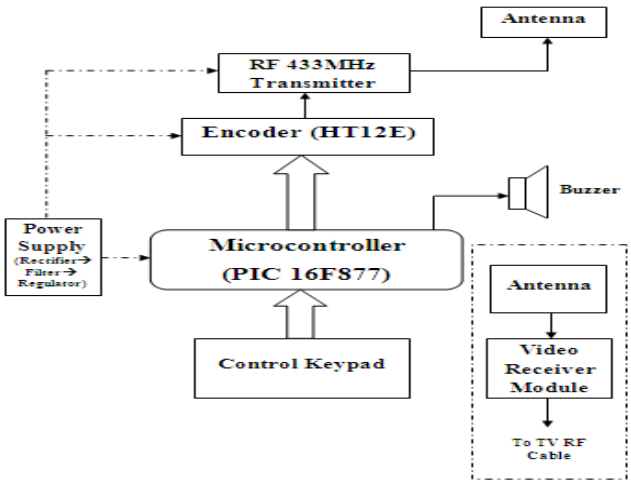

Figure1. Block diagram of transmitter section

The main purpose of PIC microcontroller is to access the process parameter, according to the set value to trigger the gun & to transmit the data on specified port. The EEPROM is used here to store the program.

The PIC series of microcontrollers are RISC-based processors with an accumulator (also called the working register, W), which use the Harvard architecture; therefore the microcontroller has a program memory data bus and a data memory data bus. Separate buses mean that simultaneous access of program and data , which gives a greater bandwidth over the traditional von Neumann architecture. Separating the program and data memory, allows instructions sized to be differently than the 8-bit wide data word. The separation of instruction words can be ideally sized for the specific CPU/application. RISC

architectures require the instructions that have the source and destination operands be encoded within the instruction. The PIC opcodes for the mid-range processors are 14-bits wide, and this program bus fetches an instruction in a single cycle.

There are 35 single word instructions. Two-stage pipeline overlaps fetch and execution of instructions. All instructions execute in a single cycle except for program branches.

The 2^{12} encoders are a series of CMOS LSIs for remote control system applications. They capable of encoding information which consists of N address bits and 12N data bits. Each address/data input it can set to one of the two logic states. The programmed addresses and data are transmitted together with the header bits via an RF transmission medium upon receipt of a trigger signal. The capability of select a TE trigger on the HT12E or a DATA trigger on the HT12A further enhances the application flexibility of the 2^{12} series of encoders. The HT12A provides a 38 kHz carrier for infrared systems.

A loop antenna is composed of a single loop of wire, greater than a half wavelength long. The loop does not have to be any particular shape. RF power can be fed anywhere on the loop. Electrical length - the overall length of the dipole in wavelengths at the frequency of interest.

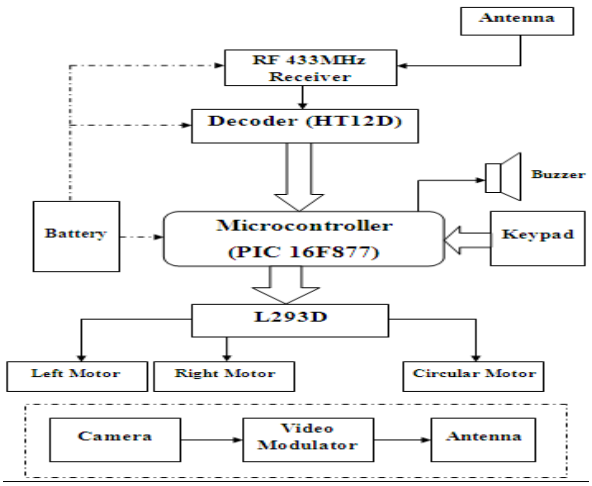

Figure2. block diagram of receiver section.

The receiver is mounted on the robot. It receives the signal which is given to pc for display purpose. It is used for the driving of motor. It needs a high power to drive the motor. It stabilizes & increases the power needed for the motor. We use the L293D IC as a motor drive.

The 2^{12} decoders are a series of CMOS LSIs for remote control system applications. They are paired with 2^{12} series of encoders. A pair of encoder/decoder with the same number of addresses and data format should be chosen for proper operation. The decoder are receive serial addresses and data from a programmed 2^{12} series of encoders. Using an RF transmission medium they are transmitted by a carrier. They are compare the serial input data three times continuously with their local addresses. If there no error or unmatched codes are found, then the input data codes are decoded and then transferred to the output pins. The 2^{12} series of decoders are capable of decoding information's that consist of N bits of address and 12-N bits of data. Here the HT12D decoder is arranged to provide 8 address bits and 4 data bits.

V.FLOW CHART

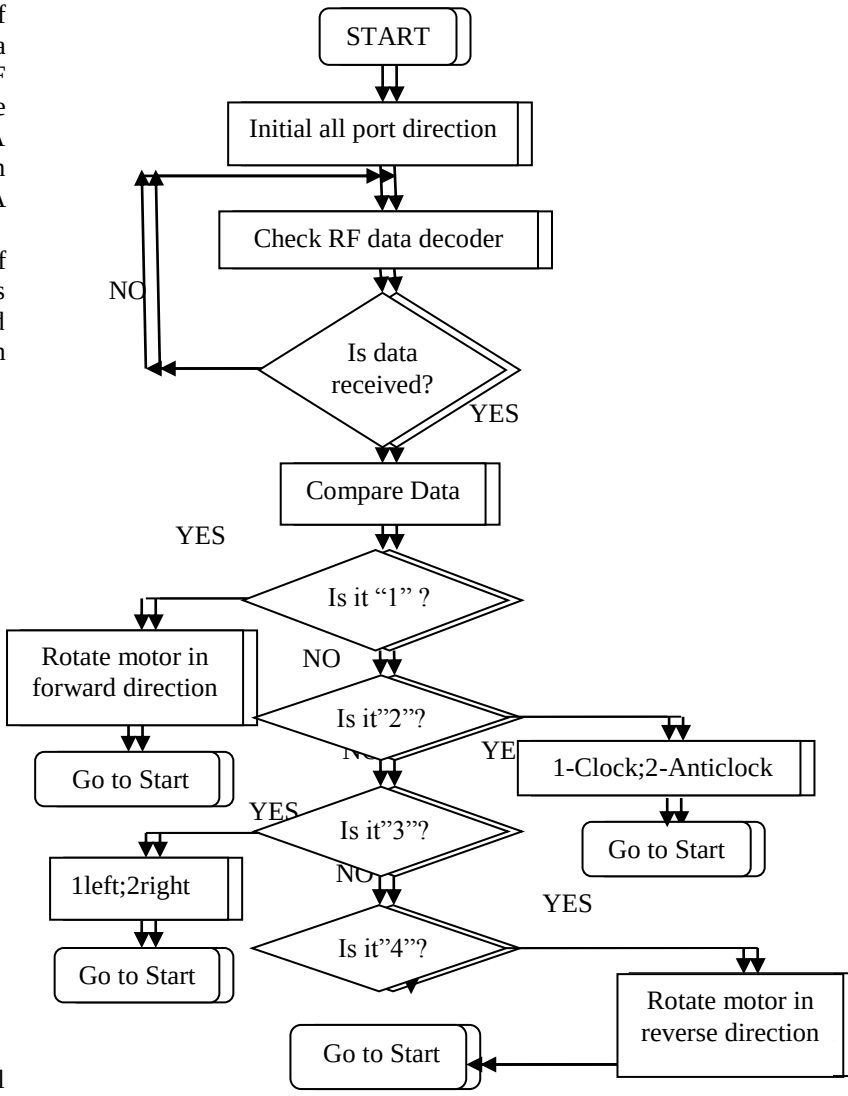

Figure3. Flow chart of system

VI.WIRELESS COMMUNICATION

Wireless communication involves the transmission of information without use of wires, cables any other forms of electrical conductors over a long distance. The transmitted distance is a few meters at anywhere for example; a television's remote control system

used in television system for small range and thousands of kilometers at large distance for example, radio communication. Cordless telephones, mobiles, GPS units, and satellite television are the some of devices used for wireless communication systems. There are different wireless techniques available for communication over large distance; they are shown in following TABLE I.

TABLE I
Wireless communication techniques

Sr.no.	Techniques	Frequency band	Coverage area
1.	Bluetooth	2.4GHz	100meters
2.	Wi-Fi	2.4GHz	50 to 150 m
3.	Zigbee	2.4GHz	10 to 20m
4.	RF module	433.MHz	100meters
5.	Infrared	300GHz	1 mm

There are various wireless techniques used for communication purpose in different area. Out of these techniques we use RF module technology for this project. An RF module (radio frequency module) is a usually small electronic device used to transmit and receive radio signals between two devices. It is desirable in embedded system to communicate with another device wirelessly. This wireless communication is completed through radio frequency (RF) communication. RF is the medium of choice for many applications since it does require line of sight. RF communication incorporates a transmitter and receiver. RF modules may comply with a defined protocol for RF communications such as Zigbee, Bluetooth, WI-FI or they may implement a proprietary protocol. In this project we use RF module to control and monitor the robot through wirelessly. RF modules have 433MHz frequency bandwidth and its coverage area range is about 100 meters with unlicensed band.

VII.RESULT

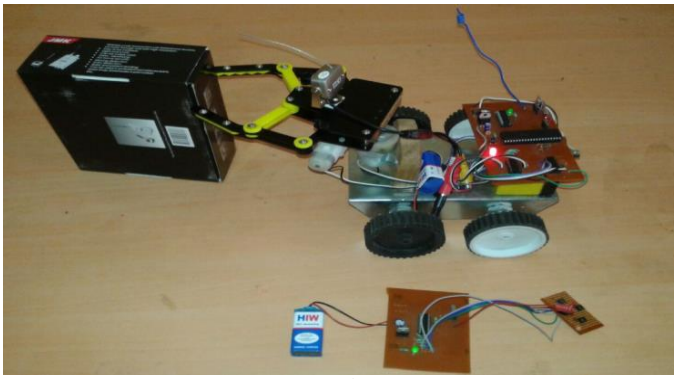

Figure 4. Set up of the system

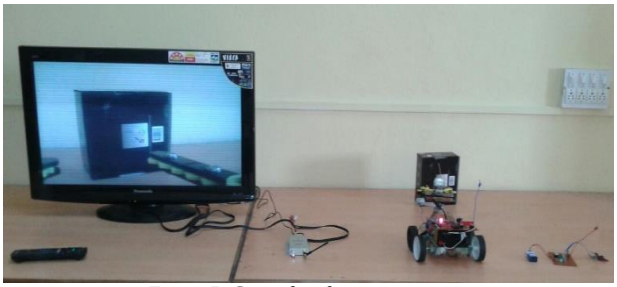

Figure 5. Control and monitoring system

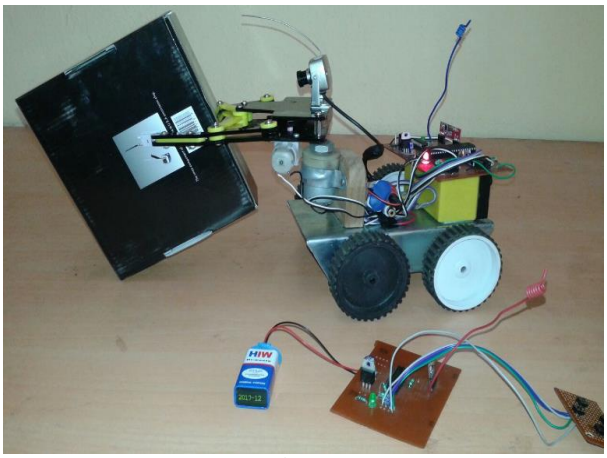

Figure 6. After getting instruction

VIII.CONCLUSION

The objective of this paper was to show that technical progress which permits control of the interaction between a robot and its environment by using data provided by a visual sensor directly inside a closed –loop control unit. Since robots are required to perform tasks in conformity with user instructions, status, or situations, it is intuitive that they should receive necessary information.

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