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A REVIEW ON MINIMIZING MOVEMENT FOR TARGET COVERAGE AND NETWORK CONNECTIVITY IN MOBILE SENSOR NETWORKS

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ABSTRACT: A rooftop antenna tracking system is designed to track the signal. Roof top antenna better suits in all the areas for tracking signals from a distant place.

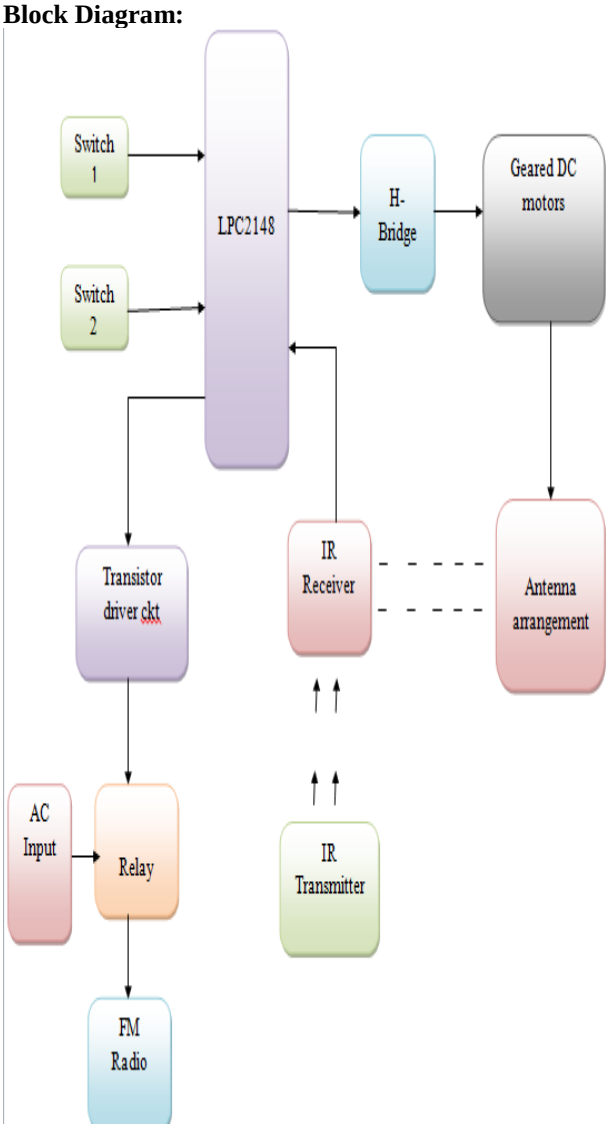
Here in this project the antenna is fitted with DC geared motor and to control its operation we are using ARM7 LPC2148 as controller. In this project we are using ARM7 LPC2148, DC Geared motors, IR sensors, FM radio is used to track Radio signal. In this project, L293D H-Bridge is used to drive the geared DC motor.

In this project antenna is placed at an altitude to track various frequencies emitted by radio stations. The system is provided with control switches. If user presses one switch, antenna tracks for corresponding radio signal. The rotation of antenna is based on the signal tracked by a pair of infrared sensor. Once the signal is matched antenna bowl will stop in that particular direction it indirectly turns ON the relay to switch ON the particular FM radio. In this way we can track the signal and can switch ON the particular desired frequency channel.

INTRODUCTION:

Coverage of interest points and network connectivity are two main challenging and practically important issues of Wireless Sensor Networks (WSNs). Although many studies have exploited the mobility of sensors to improve the quality of coverage and connectivity, little attention has been paid to the minimization of sensors' movement, which often consumes the majority of the limited energy of sensors and thus shortens the network lifetime significantly. To fill in this gap, this paper addresses the challenges of the Mobile Sensor Deployment (MSD) problem and investigates how to deploy mobile sensors with minimum movement to form a WSN that provides both target coverage and network connectivity. To this end, the MSD problem is decomposed into two sub-problems: the Target COVerage (TCOV) problem and the Network Connectivity (NCON) problem.

Block Diagram:



Advantages:

- highly-flexible
- Fit & Forget System
- No need of human effort

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- Easily locate different radio frequencies.
- Path Tracking
- Direction Identification

Applications:

- Detection and search radar
- Missile guidance systems **are radar used to locate the target of a missile. This is often present in military aircraft.**
- Radar for biological research
- Air traffic control and navigation radar
- Weather-sensing radar systems

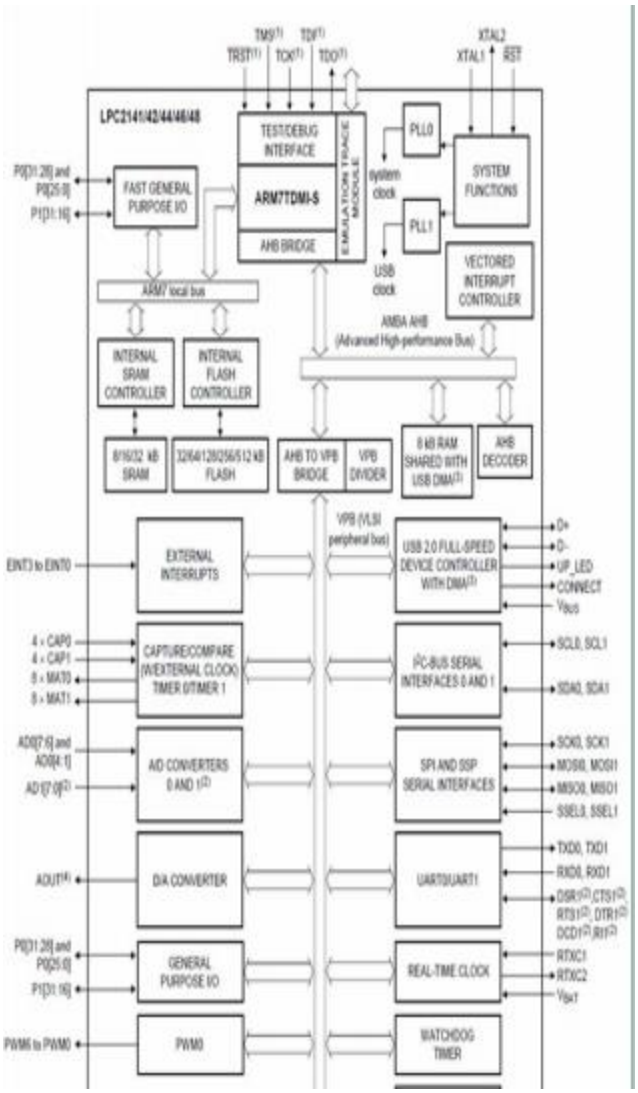
A. Modules and Description

1. LPC2148 Microcontroller

LPC2148 microcontroller board is based on a 16-bit/32-bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combine microcontrollers with embedded high-speed flash memory ranging from 32 KB to 512 KB. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode reduces code by more than 30% with minimal performance penalty. The meaning of LPC is Low Power Low Cost microcontroller. This is 32-bit microcontroller manufactured by Philips semiconductors (NXP). Due to their tiny size and low power consumption, LPC2148 is ideal for applications where miniaturization is a key requirement, such as access control and point-of-sale.

2. Features of LPC2148 Microcontroller

- 16-bit/32-bit ARM7TDMI-S microcontroller in a tinyLQFP64 package.
- 8 KB to 40 KB of on-chip static RAM and 32 KB to 512 KB of on-chip flash memory; 128-bit wide interface/accelerator enables high-speed 60 MHz operation. USB 2.0 Full-speed compliant device controller with 2 KB of endpoint RAM. In addition, the LPC2148 provides 8 KB of on-chip RAM accessible to USB by DMA. One or two (LPC2141/42 Vs, LPC2144/46/48) 10-bit
- ADCs provide a total of 6/14 analog inputs, with conversion times as low as 2.44 ms per channel. Single 10-bit DAC provides variable analog output
- (LPC2148 only) Two 32-bit timers/external event counters (with four
- capture and four compare channels each), PWM unit (six outputs) and watchdog. Low power Real-Time Clock (RTC) with independent
- power and 32 kHz clock input



3. Power Supply

All electronic circuits works only in low DC voltage, so we need a power supply unit to provide the appropriate voltage supply for their proper functioning .This unit consists of transformer, rectifier, filter & regulator. AC voltage of typically 230volts rms is connected to a transformer voltage down to the level to the desired ac voltage. A diode rectifier that provides the full wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation. A regulator circuit can use this dc input to provide dc voltage that not only has much less ripple voltage but also remains the same dc value even the dc voltage varies somewhat, or the load connected to the output dc voltages changes.

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4. Transformer

A transformer is a static piece of which electric power in one circuit is transformed into electric power of same frequency in another circuit. It can raise or lower the voltage in the circuit, but with a corresponding decrease or increase in current. It works with the principle of mutual induction. In our project we are using a step down transformer to providing a necessary supply for the electronic circuits. Here we step down a 230volts ac into 12volts ac.

5. Rectifier

A dc level obtained from a sinusoidal input can be improved 100% using a process called full wave rectification. Here in our project for full wave rectification we use bridge rectifier. From the basic bridge configuration we see that two diodes(say D2 & D3) are conducting while the other two diodes (D1 & D4) are in off state during the period t = 0 to T/2.Accordingly for the negative cycle of the input the conducting diodes are D1 & D4 .Thus the polarity across the load is the same. In the bridge rectifier the diodes may be of variable types like 1N4001, 1N4003, 1N4004, 1N4005, IN4007 etc… can be used. But here we use 1N4007, because it can withstand up to 1000v.

Fig.2. Block Diagram

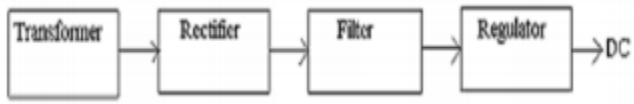

Fig.3. General Block of Power Supply Unit

6. Filters In order to obtain a dc voltage of 0 Hz, we have to use a low pass filter. So that a capacitive filter circuit is used where a capacitor is connected at the rectifier output& a dc is obtained across it. The filtered waveform is essentially a dc voltage with negligible ripples & it is ultimately fed to the load.

7. Regulators The output voltage from the capacitor is more filtered & finally regulated. The voltage regulator is a device, which maintains the output voltage constant irrespective of the change in supply variations, load variations & temperature changes. Here we use fixed voltage regulator namely LM7805.The IC LM7805 is a +5v regulator which is used for microcontroller.

D. Voltage Sensor

1. Description

This module is based on resistance point‟s pressure principle, and it can make the input voltage of red terminal reduce 5 times of original voltage. The max Arduino analog input voltage is 5V, so the input voltage of this module should be not more than 5Vx5 = 25V (if for 3.3V system, the input voltage should be not more than 3.3Vx5 = 16.5V). Because the Arduino AVR chip have 10 bit AD, so this module simulation resolution is 0.00489 V (5V/1023), and the input voltage of this module should be more than 0.00489 Vx5 = 0.02445V.

2. Gas Leakage Sensor MQ-6

Sensitive material of MQ-6 gas sensor is SnO2, which with lower conductivity in clean air. When the target combustible gas exist, the sensor‟s conductivity is higher along with the gas concentration rising. Please use simple electro circuit, Convert change of conductivity to correspond output signal of gas concentration. MQ-6 gas sensor has high senility to Propane, Butane and LPG, also response to Natural gas. The sensor could be used to detect different combustible gas; it is with low cost and suitable for different application.

Fig.6. Voltage Sensor

3. Electronic Buzzer

Fig.7. Electronic Buzzer

4. Features

- The PS series are high-performance buzzers that employ uni morph piezoelectric elements and are designed for easy incorporation into various circuits.
- They feature extremely low power consumption in comparison to electromagnetic units.
- Because these buzzers are designed for external excitation, the same part can serve

as both a musical tone oscillator and a buzzer.

- They can be used with automated inserters. Moistureresistant models are also available.
- The lead wire type (PS1550L40N) with both-sided adhesive tape installed easily is prepared.

5. Application

Electric ranges, washing machines, computer terminals, various devices that require speech synthesis output.

6. Light-emitting diode (LED)

Fig.8. Red, Pure Green and Blue Leds of the 5mm Diffused Type

7. LCD Display

Liquid crystal displays (LCDs) have materials which combine the properties of both liquids and crystals. Rather than having a melting point, they have a temperature range within which the molecules are almost as mobile as they would be in a liquid, but are grouped together in an ordered form similar to a crystal. An LCD consists of two glass panels, with the liquid crystal material sand witched in between them. The inner surface of the glass plates are coated with transparent electrodes which define the character, symbols or patterns to be displayed polymeric layers are present in between the electrodes and the liquid crystal, which makes the liquid crystal molecules to maintain a defined orientation angle. One each polarisers are pasted outside the two glass panels. This polarizer‟s would rotate the light rays passing through them to a definite angle, in a particular direction. When the LCD is in the off state, light rays are rotated by the two polarisers and the liquid crystal, such that the light rays come out of the LCD without any orientation, and hence the LCD appears transparent. When sufficient voltage is applied to the electrodes, the liquid crystal molecules would be aligned in a specific direction.

The light rays passing through the LCD would be rotated by the polarisers, which would result in activating / highlighting the desired characters. The LCD‟s are lightweight with only a few millimeters thickness. Since the LCD‟s consume less power, they are compatible with low power electronic circuits, and can be powered for long durations. The LCD does don‟t generate light and so light is needed to read the display. By using backlighting, reading is possible in the dark. The LCD‟s have long life and a wide operating temperature range. Changing the display size or the layout size is relatively simple which makes the LCD‟s more customer friendly. The LCDs used exclusively in watches, calculators and measuring instruments are the simple sevensegment displays, having a limited amount of numeric data. The recent advances in technology have resulted in better legibility, more information displaying capability and a wider temperature range. These have resulted in the LCDs being extensively used in telecommunications and entertainment electronics. The LCDs have even started replacing the cathode ray tubes (CRTs) used for the display of text and graphics, and also in small TV applications.

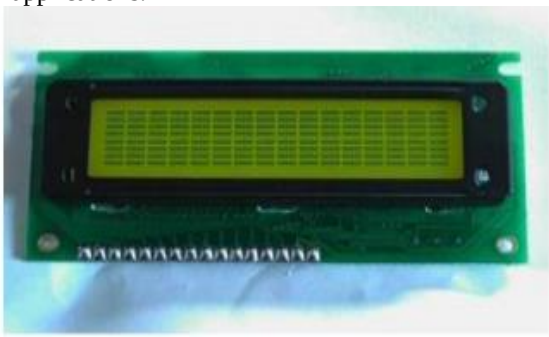

Fig.9.LCD Display

RF TECHNOLOGY:

Radio frequency (**RF**) is any of the electromagnetic wave frequencies that lie in the range extending from around 20 kHz to 300 GHz, roughly the frequencies used in radio communication.[1] The term does not have an official definition, and different sources specify slightly different upper and lower bounds for the frequency range. RF usually refers to electrical rather than mechanical oscillations. However, mechanical RF systems do exist (see mechanical filter and RF MEMS). Although radio *frequency* is a rate of oscillation, the term "radio frequency" or its abbreviation "RF" are used as a synonym for radio – i.e., to describe the use of wireless communication, as opposed to communication via electric wires.

To receive radio signals an antenna must be used. However, since the antenna will pick up thousands of radio signals at a time, a radio tuner is necessary to *tune into* a particular frequency (or frequency range).[5] This is typically done via a resonator – in its simplest form, a circuit with a capacitor and an inductor form a tuned circuit. The resonator amplifies oscillations within a particular frequency band, while reducing oscillations at other frequencies outside the band. Another method to isolate a particular radio frequency is by oversampling (which gets a wide range of frequencies) and picking out the frequencies of interest, as done in software defined radio.

The distance over which radio communications is useful depends significantly on things other than wavelength, such as transmitter power, receiver quality, type, size, and height of antenna, mode of transmission, noise, and interfering signals. Ground waves, tropospheric scatter and skywaves can all achieve greater ranges than line-of-sight propagation. The study of radio propagation allows estimates of useful range to be made.

Conclusion and future scope

In this paper, we have presented a new approach toward the development of a gesture-based human–machine interface. An end-to-end approach is presented which maps arm-scale gesture by a human user to a learned response by a robotic agent through repeated applications of user-provided reward. Between these two end points, the constituent challenges are addressed in the areas of sensor selection, data representation, pattern recognition, and machine learning. As a composite approach, the proposed system overcomes many of the shortcomings of previous efforts. However, it is foreseen that this process would be difficult for an actual human trainer to entertain, since visualization of a robot's configuration as a Cartesian space may be difficult, if not impossible, for higher dimensions. Certainly, a path-planning component would be called for which considers the robot's configuration in light of the geometry of the environment and the social sensibilities of the user (speed, angle of approach, visibility, etc.). As it is implemented here, the proposed approach is seen as practical for mapping of a robot's end effector and, thus, useful for common applications. Segmentation of gestures (gesture spotting) is a typical problem in gesture recognition. Although our future work will address spotting, our focus here has been on validation of a real time learning technique that produces desirable outcomes using a human teacher and a simple, binary reward signal.

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