

A Robotic Platform for Indoor Navigation System

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Abstract- Radio Frequency Identification technology was originally invented for military uses. From the 80's, commercial RFID product started to be obtainable and that they were chiefly applied in areas of chains of offer, transportation, manufacturing sector, personnel access, animal tagging, toll tax collection, especially in associate degree indoor atmosphere. The development and implementation of RFID based positioning technology area unit quick, while according to the studies, little comprehensive review and convinced assessment for the newest frequency ID technology are conducted and a few of the most options of the latest RF identification technology have seldom or unclearly been conferred within the literature as an example, the longest reading range of RFID system, the smallest tag size and overall commercial field.

Keywords—Ultrasonic, RFID Reader, DC Motor, mobile service

1. Introduction:-

The advancement in the field of electronics and navigation particularly in automation, various systems based mostly on developed for various applications. There is such kind of robotic systems that they'll be helpful for serving to the physically challenged like automatic wheel chairs. And some other reasonably robots which might be used for defense application to avoid the person power loss. In addition, we have a challenge of fulfilling the target of indoor navigation. The existed outdoor navigation system based mostly on GPS (Global Positioning System) is correct however is kind of restrained, due to limited satellite reception. By achieving the solution for accomplishing the indoor navigation system we will build it a really helpful one particularly for blind and physically challenged individuals. The existing outdoor navigation system exploitation GPS will work supported the placement details received from the satellites. The problem with this outside navigation

system is that they can get the placement details as per object position on the world, but the detail can be same for a unit space. So the existed system won't offer correct values whereas exploitation indoor navigation system. The other technique for navigation supported Wi-Fi is somehow appropriate for indoor navigation system. Even though it's appropriate, Wi-Fi technology can be terribly costlier attributable to its Wi-Fi cards with IP addressing will performed supported the gap go during a vary of one to 10m. So the value is another downside whereas exploitation Wi-Fi tags. In our locating the tags placed in random positions. The RFID technology is short range communication technology which will be appropriate for our indoor navigation purpose by minimizing the world of navigation exploitation RFID tags. The robot can hold associate degree RFID reader and additionally contains unbearable sensing element.

2. Proposed systems:-

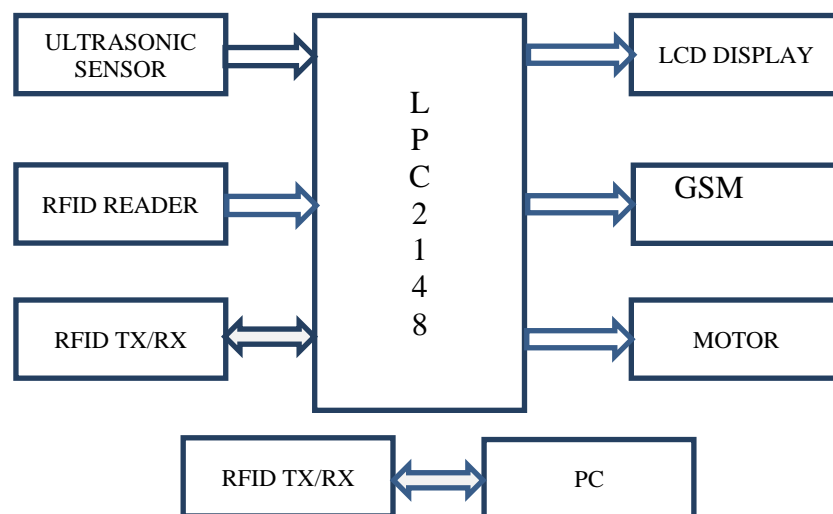


Fig 1.BLOCK DIAGRAM

- **MICROCONTROLLER UNIT:-** The μC is an official choice making body on the framework. The rationale is produced and after that the program is singed inside the microcontroller and alternate peripherals are gotten to utilizing microcontroller as it were. The ARM7 is a broadly useful 32-bit chip, which offers superior and low power utilization. In this framework controller is most imperative part. In the proposed framework we utilized LPC2138 μC . This μC gets RF flag by means of RFID Reader from RFID tag and ultrasonic sensor is utilized by μC identify the snag emerges between his following way. To control the robot development from remote regions, so remote correspondence is utilized to satisfy our application.
- **LIQUID CRYSTAL DISPLAY:-** LCD is utilized as a part of a venture to show the yield of the application. We have utilized 16 X 2 LCD which demonstrates 16 segments and 2 columns. In this way, we can compose 16 characters in every line. Along these lines, add up to 32 characters can be shown on 16x2 LCD. LCD is essentially used to check the yield of various modules interfaced with the microcontroller. LCD demonstrate the all the status of the framework
- **GSM MODULE:** GSM (Global System for Mobile correspondence) is a computerized portable correspondence framework. Utilizing GSM module, we can send short instant messages to the required experts according to the application. GSM module has a SIM space which is utilized for sending SMS to the individual experts. This innovation empowers the framework a remote framework with no predefined extend limits. When the client give the missed call/send the "status" message to GSM. The GSM gather the status and send to the client.
- **ULTRASONIC SENSOR:-** Ultrasonic running module HC - SR04 gives 2cm - 400cm non-contact estimation work, the extending precision can reach to 3mm. The essential guideline of work Using IO trigger for no less than 10us abnormal state flag. The Module naturally sends eight 40 kHz and recognize whether there is a heartbeat motion back. On the off chance that the flag back, Test separate = (abnormal state time speed of sound (340M/S)/2).
- **MOTOR:-** A DC engine is a mechanically commutated electric engine fueled from direct present (DC). The stator is stationary in space by definition and in this way the current in the rotor is exchanged by the reporter to likewise be stationary in space. This is the means by which the relative edge between the stator and rotor attractive flux is kept up close to 90 degrees, which produces the greatest torque.
- **RFID TRANSREICEIVER:-** The CC2500 is a 2.4 GHz handset intended for low-control remote applications with ease. The circuit is expected for the 2400-2483.5 MHz ISM (Industrial, Scientific and Medical) and SRD (Short Range Device) recurrence band. The RF handset is arranged with a very configurable baseband modem. The modem underpins different adjustment designs and has a configurable information rate up to 500 kBaud. CC2500 gives broad equipment support to bundle taking care of, information buffering, burst transmissions, clear channel appraisal, interface quality sign, and wake-on-radio. The principle working parameters and the 64-byte transmit/get FIFOs of CC2500 can be controlled by means of a SPI interface. In an average framework, the CC2500 will be utilized together with a microcontroller and a couple of extra detached segments.
- **RFID READER:-** RFID works as a system of microchip "savvy labels" and beneficiaries. Every keen tag is inserted with a one of a kind electronic item code or EPC and a miniaturized scale reception apparatus. Once appointed, the EPC turns into a DNA-like marker for the thing, distinguishing it from each other thing on the planet. At the point when a labeled the thing goes inside the range, the peruser recovers the EPC of the thing through radio waves, distinguishes the thing and its correct area, and transfers this continuous data to a focal PC. Together, this arrangement of exchanges involves exhaustive record of the labeled thing's development from purpose of inception to purpose of offer.

2. Flowchart:-

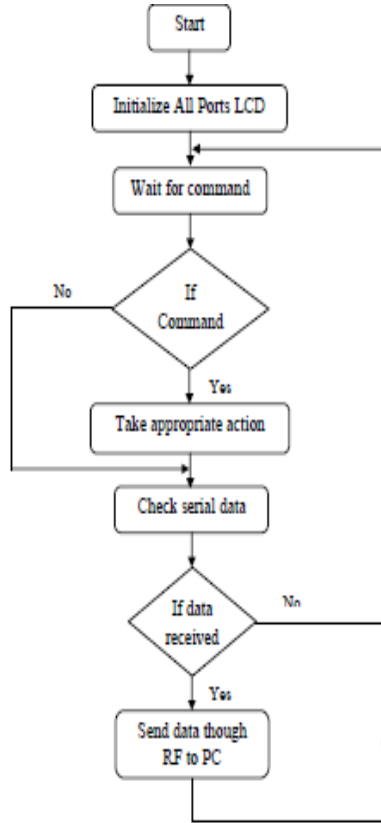


Fig 2:- Flowchart for the system

ADVANTAGES:-

- Simplicity of the system
- Low cost of the device
- High portability
- Ease of maintenance
- Capability of providing both identification and location
- A long effective range (up to 1000m for a single transmitter in free space)
- Flexible in tag size

DISADVANTAGES:-

- One way communication link
- Multiple effects
- Unstable received signal strength

APPLICATON:-

- Agriculture and forestry plant guiding seed quality tracking inventory audit in forestry.
- Airports and aviation baggage handling dolly management aircraft maintenance.
- Automotive and parts smart operation control automation of mixed flow assembly.
- Business services real time visibility of spare parts inventory for improvement of business services.
- Chemicals industry Vapours identification by using an RFID tag coated with a chemically sensitive film.
- Construction inventory location reporting in lay down yards tracking of returnable assets.

PROPOSED RESULTS

The robot carries out the task of the indoor navigation, using 4 RFID tags. The robot is able to move from the source tag to the destination tag smoothly. When the robot reaches the destination with the help of GSM will send the location of the destination on the mobile phone via text message. The robot also successfully detects the obstacle using the ultrasonic sensor and notifies the user. It changes the route that is suitable to move forward in the direction of the destination. Afterward it continues moving in designated direction.

CONCLUSION

The paper portrayed about the RFID indoor route framework. It will be an extreme answer for indoor route as there is now GPS for outside route framework. The proposed mechanical framework will explore the indoor environment effortlessly utilizing RFID labels putting in an arbitrary way. The snag evasion and fall aversion will be more favorable for this robot. The innovation of RFID indoor route is effectively presented by executing a Robot.

FUTURE SCOPE:-

This procedure has colossal extension later on. The patterns in indoor situating framework for the future design are as per the following:-A new or half and half position calculation is required. Few of the work has been begun regarding this procedure are illustrations like the alignment – free area calculation in light of triangulation, triangular interjection and extrapolation

(TIX). A half breed calculation is displayed for situating utilizing WLAN that means to join the advantages of the RF proliferation misfortune model and fingerprinting technique. The particular combination area estimation calculation gathers the client area by specifically intertwining area data from different remote advancements or numerous traditional area calculation in hypothetically ideal way. Internetworking of various remote situating frameworks is an exploration and functional point with a specific end goal to augment the situating range. Wireless consolidated with different innovations Such as optical (e.g., IR), inertial, dc electromagnetic and ultrasonic for indoor area is another pattern. Step by step instructions to consolidate these advancements into a useful framework is a theme of sensor combination. How to convey sensors to enhance the situating exactness, how to get done with sending remote situating framework in a brief timeframe, particularly for crisis responder application is additionally worth considering. Wireless indoor area utilizing UWB (from 3.1 to 10.6 GHz) systems and indoor situating utilizing versatile cell system are other promising examination themes. How to incorporate indoor and open air situating framework in other territory of research. This incorporation may help in growing more effective and strong discovery frameworks for situating of versatile figuring hubs. For this situation, a portable hub will track the indoor or open air utilizing a similar discovery framework.

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