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An Mobile Wireless Sensor Network Based Military Robot

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Abstract: *In this paper we proposed RTOS based architecture designed for the purpose of mine detection. RTOS is an operating system that intended to serve real time application requests. We are using the mobile communication system to receive the condition of the border level. By using the mobile communication system we are giving the indication to the monitoring section. The semantic time scheduling is done all applications at a time without any time delay. The basic view of this technique is to reduce the damages to the human and gives the information about mine in the border section.*

Keywords: *Robotics, RTOS, GSM, ARM.*

1. INTRODUCTION

The job of the RTOS is to manage the allocation of these resources to users in an orderly and controlled manner. This sensor node is composed of a micro-processors, transceivers, displays and analog to digital converters. Sensor nodes are deployed for military process monitoring and control. If the light intensity is reduced means based on the sensor the lighting system will ON condition. Any sound will come due to mine explored it will detect by the sensor and through mobile communication it will send information to military section. This paper deals with the data receiving from sensor nodes without any delay. In the existing system the person has to take the mine detector in his hand and move, so safety concern is main issue. In the proposed system robot will replace the human to detect the mine and person moving around. With the help of sound sensor it will also detect the sound due to enemy firing. If any bomb blast is occurred around this that information can be obtained by using the MEM sensor. Lighting system can be controlled by using the LDR sensor.

2. BLOCK DIAGRAM

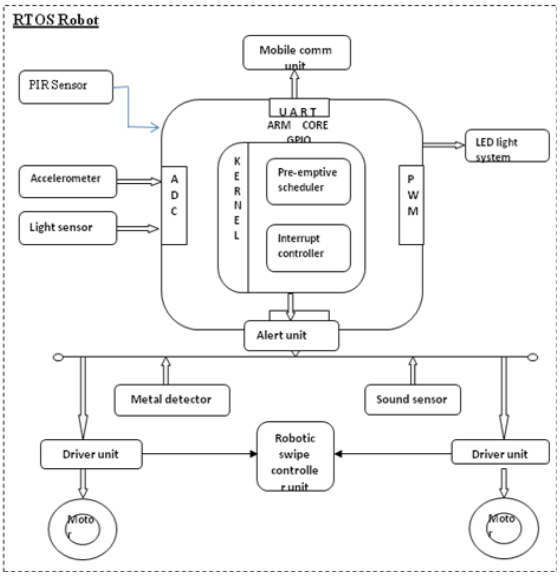

Fig1. *Block diagram of mine detector with other sensor.*

Sound detector which is connected to GPIO pins when sound is detected, the respective GPIO pins go low and the status of the pin becomes low, this read through IOPIN register. And the condition if any sound is to send an information serially through UART1 which is configured with 9600 BR with 8 bit transfer, one stop bit, and no parity. This task is created through OSTASKCREATEEXT () function by specifying the task name, its relative data, stack memory, and PRIORITY etc.

A Metal detector which detects any metal explosives comprise of magnet, if any metal is detected a DC voltage is generated, this sensor is connected to GPIO pins of ARM, if any metal is detected the condition is to forward an information, relating to the metal. This communication is also configured through UART1, using U1LCR and U1LSR; with the baud rate same as 9600 with 8 bit transfer, one stop bit, and no parity. This task is created through OSTASKCREATEEXT () function by specifying the task name, its relative data, stack memory, and PRIORITY etc.

PIR sensor which is connected to GPIO of ARM detects human motions and gives the low signal to the respective pins this is detected by IOPIN register; the function for this is to give buzzer output by making buzzer pin to IOSET.

This task is created through OSTASKCREATEEXT () function by specifying the task name, its relative data, stack memory, and PRIORITY etc.,

The light dependent resistor where the resistance of it changes with the intensity of the light, detects the day/night light intensity, this sensor is connected to ADC0 of ARM to its respective channel and through AD0CR register and for respective value PWM output will be changed.

A metal accelerometer which detects any vibrations (movements in un predictive direction which is caused due to bomb explosion) the incoming sensor values are in analog values, Through on chip ADC0 we convert these signals into digital through AD0CR register by configuring its channel, frequency, resolution and start condition. If the mems value exceeds the threshold value information will be transferred.

3. GSM

Global System for Mobile Communications or GSM (originally from Group Special Mobile) is the world's most popular standard for mobile telephone systems. The GSM Association estimate that 80% of the global mobile market uses the standard.GSM is used by over 1.5 billion people across more than 212 countries and territories. This ubiquity means that subscribers can use their phones throughout the world, enabled by international roaming arrangements between mobile network operators. GSM differs from its predecessor technologies in that both signaling and speech channels are digital, and thus GSM is considered a second generation (2G) mobile phone system. The GSM standard has been an advantage to both consumers, who may benefit from the ability to roam and switch carriers without replacing phones, and also to network operators, who can choose equipment from many GSM equipment vendors.

4. SMS COMMANDS

¬AT+CIMI
Note: scan IMSI
¬AT+CMGS=”+919704040791”
¬AT+CMGR=1
¬AT+CMGD=1,4
Note: Delete it Note: Message

Global system for mobile communication (GSM) is a globally accepted standard for digital cellular Communication.GSM is the name of standardization Group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHz A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. The working of GSM modem is based on commands; the commands always start with AT means (Attention) and finish with a <CR> character. For example, the dialing command is

ATD<number>; ATD3314629080; here the dialing command ends with semicolon. The AT commands are given to the GSM modem with the help of PC or controller. The GSM modem is serially interfaced with the controller with the help of MAX 23

5. FREQUENCIES

Originally it had been intended that GSM would operate on frequencies in the 900 MHz cellular band. In September 1993, the British operator Mercury One-to-One launched a network. Termed DCS 1800 it operated at frequencies in a new 1800 MHz band. By adopting new frequencies new operators and further competition was introduced into the market apart from allowing additional spectrum to be used and further increasing the overall capacity.

This trend was followed in many countries, and soon the term DCS 1800 was dropped in favor of calling it GSM as it was purely the same cellular technology but operating on a different frequency band. In view of the higher frequency used the distances the signals travelled was slightly shorter but this was compensated for by additional base stations.

6. MEMS SENSORS

MEMS accelerometers are one of the simplest but also most applicable micro-electromechanical systems. They became indispensable in automobile industry, computer and audio-video technology. This seminar presents MEMS technology as a highly developing industry. Special attention is given to the capacitor accelerometers, how do they work and their applications. The seminar closes with quite extensively described MEMS fabrication.

An accelerometer is an electromechanical device that measures acceleration forces. These forces may be static, like the constant force of gravity pulling at our feet, or they could be dynamic - caused by moving or vibrating the accelerometer. There are many types of accelerometers developed and reported in the literature. The vast majority is based on piezoelectric crystals, but they are too big and too clumsy. People tried to develop something smaller, that could increase applicability and started searching in the field of microelectronics. They developed MEMS (micro electromechanical systems) accelerometers. The first micro machined accelerometer was designed in 1979 at Stanford University, but it took over 15 years before such devices became accepted mainstream products for large volume applications [1].

In the 1990s MEMS accelerometers revolutionized the automotive-airbag system industry. Since then they have enabled unique features and applications ranging from hard-disk protection on laptops to game controllers. More recently, the same sensor-core technology has become available in fully integrated, full-featured devices suitable for industrial applications. Micro machined accelerometers are a highly enabling technology with a huge commercial potential. They provide lower power, compact and robust sensing. Multiple sensors are often combined to provide multi-axis sensing and more accurate data.

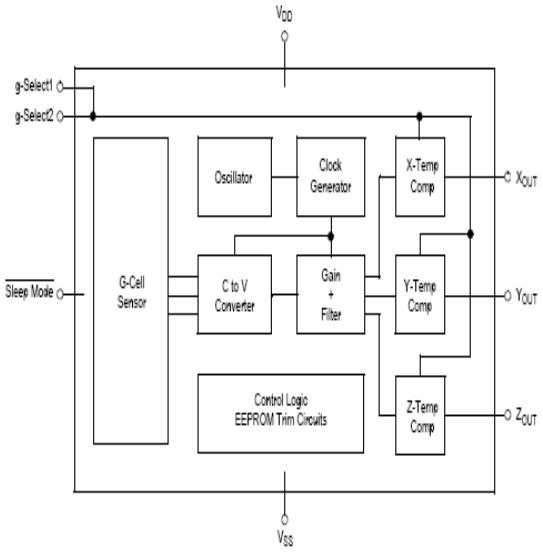

Fig2. *Simplified Accelerometer Functional Block Diagram*

7. RTOS

RTOS is an operating system which is used to perform a task with in a particular time interval i.e. within the specific allocated time. It is a real time operating system. A real-time OS that can usually or *generally* meet a *deadline* is a soft real-time OS, but if it can meet a deadline deterministically it is a hard real-time OS.

Compared with OS and RTOS. RTOS only supports the multitasking operations and time scheduling tasks. Real-time OS is the level of its consistency concerning the amount of time it takes to accept and complete an application's task. If we are implementing any task without RTOS, it is less accuracy and time delay of the specified time and normally it can possible to perform only one task at a time. So in normal operations systems perform a task one by one. So we are implementing our project using real time operating system.

The multitasking is a process to perform a more than one application or task at concurrently, it means possible to perform a so many operations at the same time. In the normal operating systems are not supported this type of multitasking. So in this project we are implementing RTOS concepts.

The main advantage of RTOS is multitasking and time scheduling and rescheduling etc. In RTOS due to the internal minimum time delay of the time scheduling process it will give the output within the specified time.

8. RESULTS AND DISCUSSION

Fig3. *Mine detector with other sensors*

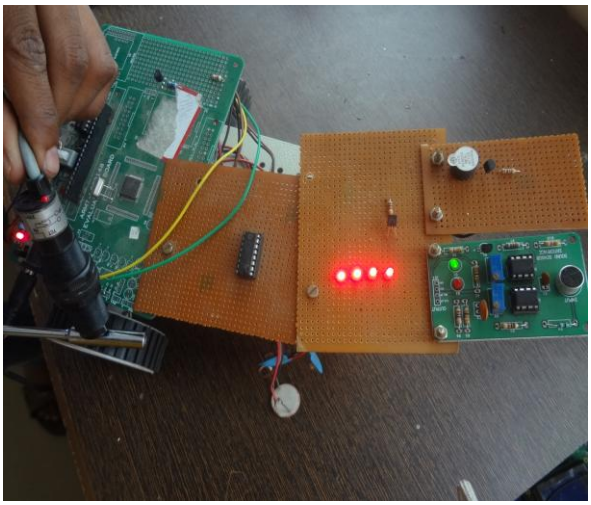

Fig4. *Detecting the mine*

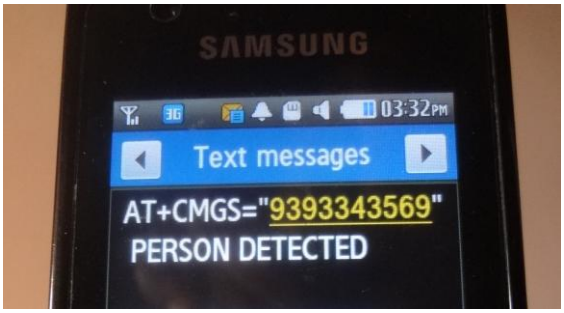

Fig5. *Message received at the monitor section while person is detected*

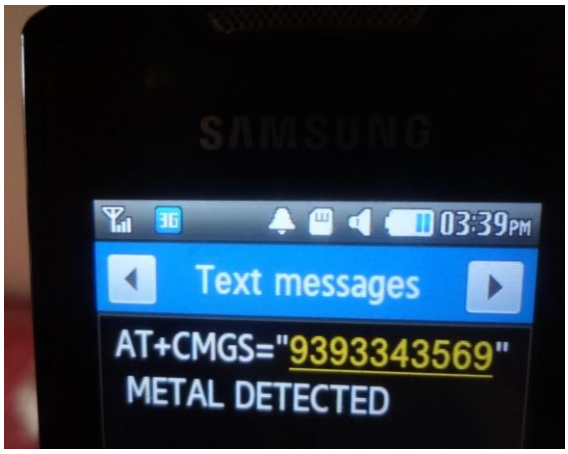

Fig6. *Message received at the monitor section while mine is detected*

9. FUTURE SCOPE

In this paper we implemented the robot for mine detection. This paper can be advanced by including the face recognition technique to find the persons passing near the robot by sending the image of the passerby to monitoring section. This can be implemented even at any high security places.

10. CONCLUSION

This paper introduced UART a framework designed to deal with time period programming and reconfiguration of task sets depending on the present context and on the "semantic content of tasks." this is often a haul that's typically left within the background by researchers within the field of intelligent robotic systems. Here, the matter has been formally outlined, the answer implemented by UART has been delineating intimately, and its theoretical properties are mentioned.

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