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Beagle Bone Black Based Security Robot

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ABSTRACT

The security guard is very important in industries, factories, in public places, mall and apartments. The beagle bone black is used here as a processor due to its processing speeds and features like email clients are useful in tracking. The robot is connected to the Wi-Fi. It has a camera in it. This processor works using python. Trespassers cross our borders unknowingly. It is not possible for our soldiers to watch the borders at each and every moment. The key use of autonomous intelligent robotic systems is to provide remote surveillance using a security robot. An essential requirement in security is the capability to automatically detect trespasser in borders, to inform nearby control unit and to empower security personnel to track the trespasser.

Keywords:- Beagle Bone Black, sensor, IP camera, Ultrasonic sensor

I.   INTRODUCTION

Beagle Bone is a credit-card sized expandable Linux **computer that connects with the Internet and runs** software such as Android 4.0It uses Sitara AM335x ARM® Cortex™-A8 processors with a single cable and 10-second Linux boot enabling development in less than five minutes.Now a day's robotics research focused mainly on design and development of autonomous and compliant movable robots for unstructured and natural environments such as planet surfaces rather than for structured industrial environments. These robots can be used to accomplish tasks like rescue, security, surveillance in unstructured. and natural environments. This class of robots can be utilized for tasks in the hazardous environments where human is not capable of doing it. [1]

Beagle Bone's capabilities with LCD screens, motor control and battery power as well as the ability to create their own circuits ,the first thing you'll notice is that there is no cable that fits the 5V DC connector. An essential requirement in security is the capability to automatically detect trespasser in borders, to inform nearby control unit and to empower security personnel to track the trespasser [6]-[7].

What's with that? Am I already hung up without ever powering on the board? Well, fortunately no, but you do need to talk about power for a moment. There are two ways to power the board [2]. The first is through the USB client connection.Connecting the micro-USB connector end of the

cable to the board ofconnecting the standard sized USB connector to either a PC or a compatible DC power source that has such a connection there is another option to power the board: simply supply 5V DC to the connector. Make sure that the plug is 5.5 x 2.1 mm (center positive) and that the unit can supply at least one ampere. As mentioned earlier, this is not optional.Today's smart phones provide better processing power as PCs with numerous rich applications [5].

Even if you are going to choose a DC power source for your board, initially let's connect the board via the provided USB cable. Almost all of the different projects you work on here will need to supply power from a battery In case of BeagleBone, Users have a control of services accessed by BeagleBone application so they regulate their security and privacy [4]. Pack anyway, and if you supply the board through the USB port and micro-USB connector, you can use your external computer to communicate with the board and ensure that it is up and working. . In this paper we propose an autonomous BeagleBone robot which identifies trespasser using PIR motion sensor, alerts security personnel by sms using GSM and captures image of trespasser using camera in BeagleBone device and mail this image to specified e-mail id using BeagleBone based application[8].
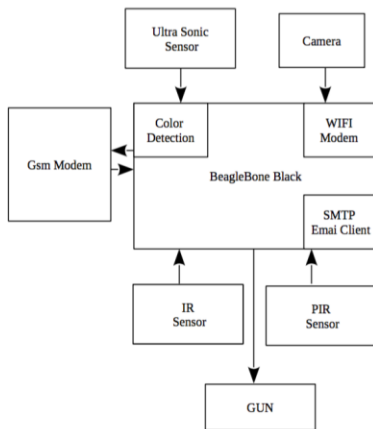
II. PROPOSED METHOD

Fig 1: Block digram of the proposed system

The Beagle Bone one is a low-cost, high expansion board from the Beagle Board product line. It uses the TI AM3358/9 SoC based on an ARM Cortex-A8 processor core using the ARMv7-A.It uses 1GHz AM3359 ARM cortex A8 processor. It has storage capacity of 4GB on board and external sd card can be added. It has 512 MB DDR RAM. It can manage android, UBUNTU, minix, risc os etc. It has 65 pins of GPIO capability.

1) Ultrasonic

Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to 3mm.The modules includes ultrasonic transmitters, receiver and control circuit. The basic principle of work. Using IO trigger for at least 10us high level signal. The Module automatically sends eight 40 kHz and detect whether there is a pulse signal back.

2) PIR Motion Sensor

PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range. They are small, inexpensive, low-power, easy to use and don't wear out. They are often referred to as PIR, "Passive Infrared", "Pyro electric", or "IR motion"PIRs are basically made of a pyro electric sensor which can detect levels of infrared radiation. Everything emits some low level radiation, and the hotter something is, the more radiation is emitted.

3) IP Camera

All existing IP cameras must meet the technical specifications here in within one fiscal year of approval of this policy. Exceptions would require ISO approval. All new IP camera deployments must adhere to the technical specifications of this policy. Minimum resolution of 640x480, mpeg 4 or h.264 compression format; multi-stream capability   ability to provide more than one video stream; minimum of 15 frames/second recording capability; Power Over Ethernet (POE) preferred. Cameras installed in exterior locations shall have the ability to switch from Day to Night mode automatically. Infra-Red (I/R) auto illuminators are recommended
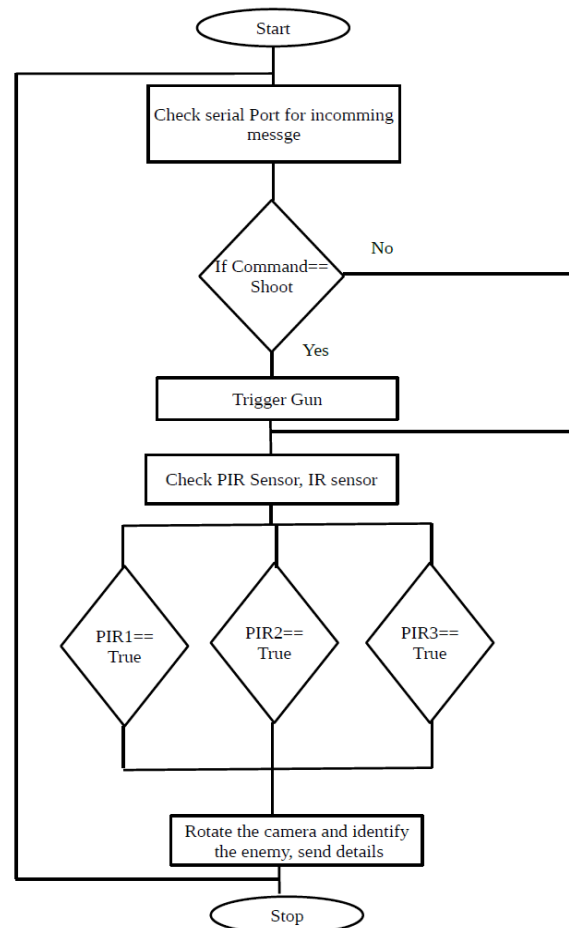
III. FLOW CHART

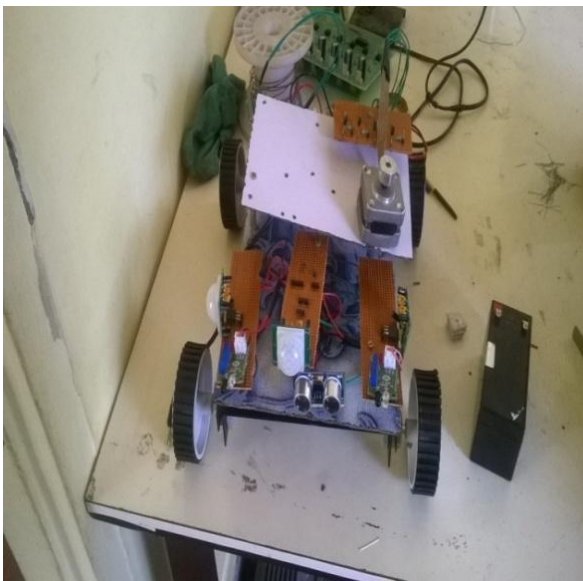Fig 2: Flow chart of the proposed system

IV. EXPERIMENTAL RESULTS

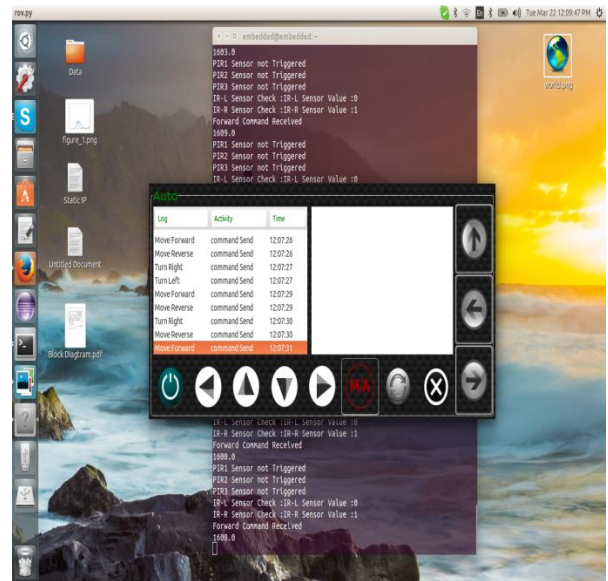
Fig 3: Beagle Bone processor based Robot

Fig 4: Auto and manual control of robot

Fig 5: when IR sensor is detected towards Right
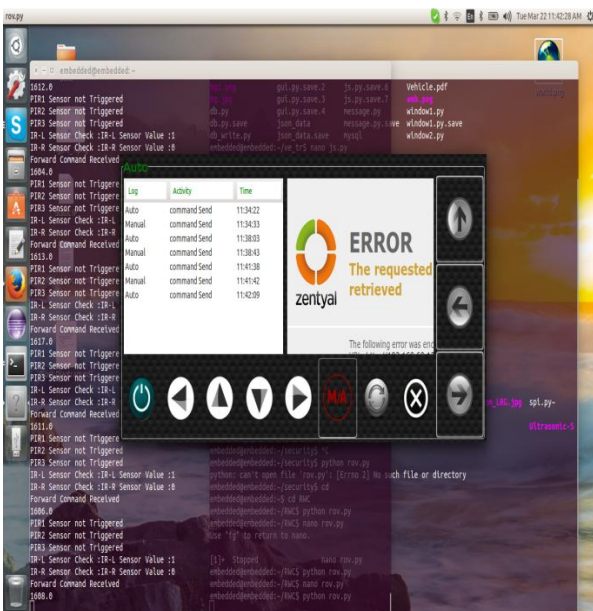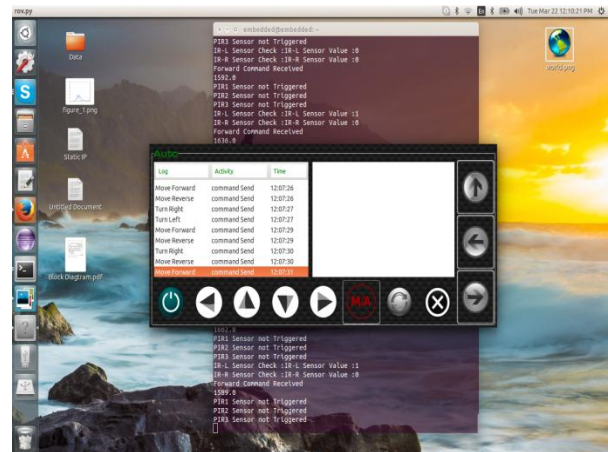

Fig 6: when IR sensor is detected towards Left

V. CONCLUSION

In this paper we have developed a robot based on the Beagle bone processor. Our Goal- to provide a low cost rescue robot for solider replacement in the battle field..The sensors used in this project are easily available and cost effective. The movement of Robot is Automatic or may be controlled manually.

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