INTELLIGENT SECURITY FOR INDIAN ARMY

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Abstract: *Asset has to be secured with advanced technology to avoid the unauthorized entry of terrorist in borders of India. Due to the proclivity of India's neighbors to exploit India's nation building difficulties, the country's internal security challenges are inextricably linked with border management. Also, the challenge of coping with long-standing territorial and boundary disputes with China and Pakistan, combined with porous borders along some of the most difficult terrain in the world, has made extremely effective and efficient border management mandatory. However, in practice this has Infrequently been the case due to the lack of understanding of such military issues among the decision-making elite and inadequate interest in national security, particularly during the early years after independence. Despite several border wars and conflicts, India's borders continue to be manned by a large number of military, para-military and police forces, each of which has its own ideology.*

Index Terms: *RFID Tags, RFID Reader, Fingerprint Scanner ARM7 LPC2148, Gas Sensor, Heartbeat Sensor, Wireless Camera.*

I. INTRODUCTION

Asset has to be secured with advanced technology to avoid the unauthorized entry of terrorist in borders of India. Due to the proclivity of India's neighbours to exploit India's nation building difficulties, the country's internal security challenges are inextricably linked with border management. Also, the challenge of coping with long-standing territorial and boundary disputes with China and Pakistan, combined with porous borders along some of the most difficult terrain in the world, has made extremely effective and efficient border management mandatory. However, in practice this has seldom been the case due to the lack of understanding of such military issues among the decision-making elite and inadequate interest in national security, particularly during the early years after independence. Despite several border wars and conflicts, India's borders continue to be manned by a large number of military, para-military and police forces, each of which has its own ethos, and each of which reports to a different central ministry at New Delhi, with almost no real co-ordination in managing the borders.

II. LITERATURE SURVEY

Critically ill new born babies admitted at the Neonatal Intensive Care Unit (NICU) are extremely tiny and vulnerable to external disturbance. Smart Jacket proposed in this paper is the vision of a wearable unobtrusive continuous monitoring system realized by body sensor networks (BSN) and wireless communication. The smart jacket aims for providing reliable health monitoring as well as a comfortable clinical environment for neonatal care and parent-child interaction. We present the first version of the neonatal jacket that enables ECG measurement by textile electrodes. We also explore a new solution for skin-contact challenges that textile electrodes pose. The jacket is expandable with new wearable technologies and has aesthetics that appeal to parents and medical staff. An iterative design process in close contact with the users and experts lead to a balanced integration of technology, user focus and aesthetics. We demonstrate the prototype and the experimental results obtained in clinical setting.[3]

In this paper, we developed a smart jacket using a drop & play interface to control media devices by using a touchpad embedded in the jacket. The inner circuit of the system is made by using transfer printing circuit technique to increase the durability of the system.[4]

Health monitoring is crucial for the survival of the ill and fragile infants admitted at the neonatal intensive care unit (NICU) in a hospital. However, the adhesive electrodes and wires cause discomfort to the patients and hamper the parent-child interaction. In this paper, we propose the application of wireless transmission technology for neonatal monitoring at NICU. To demonstrate the design concept, a prototype wireless transmission system is built using Blue SMiRF and Arduino pro mini. Software is developed for ensure the correct data transmission, detection and display. The system is designed to be suitable for integration into a non-invasive monitoring platform such as a smart neonatal jacket. Experimental results show that the prototype system successfully transmits and receives data from multiple sensors within the range of 20 m.[5]

The military forces always tried to use new gadgets and weapons for reducing the risk of their casualties and to defeat their enemies. With the development of sophisticated technology, it mostly relies on the high tech weapons or machinery being used. Robotics is one of the hot fields of modern age in which the nations are concentrating upon for military purposes in the state of war and peace. They have been in use for some time for demining and rescue operations but now they are under research for combat or spy missions. Today's modern military forces are using different kinds of robots for different applications ranging from mine detection, surveillance, logistics and rescue operations. In the future they will be used for reconnaissance and surveillance, logistics and support, communications infrastructure, forward-deployed offensive operations, and as tactical decoys to conceal maneuver by manned assets. In order to make robots for the unpredicted cluttered environment of the battlefield, research on different aspects of robots is under investigation in laboratories to be able to do its job autonomously, as efficiently as a human operated machine can do. Latest techniques are being investigated to have advanced and intelligent robots for different operations. This

paper presents different kinds of robotic technologies being used in all the three main forces, Navy, Army and Air. Some of the robots discussed are also being used in the wars of Afghanistan and Iraq, also, the robots that are under investigation in laboratories for future military operations. These robots are under investigation for autonomous and cooperative environment. We focus our attention on the uses of robots in war and peace as well as their impact on society.[6]

Information and Communication Technology (ICT) has been a part of military activities since the invention and massive used of electronic-based systems. Military plays an important role in the emergence of Smart Society today. Using advanced ICT for accomplishing military tasks in advanced countries is a common, but that matter is not the same in military society in developing countries such as Indonesia. Therefore there is a need to define the proper characteristics for a military service so that it can be declared as Smart Military Society. On the other hand, the characteristics of Smart Society itself are not unified yet. In this paper, the characteristics of Smart Military Society are proposed by adopting, in some respects, a method used to score Smart City. Because of its unique nature and tasks, one new characteristic called Smart Defense which consists of four factors namely intelligence, weapon system, decision-making cycle, and interoperability, is added. Based on the comprehensive assessment, it is proposed seven characteristics with 26 factors that can be used to score and rank military services, and show if they are eligible to be called as Smart Military Society. This method is called as Smart Military method.[7]

Engineer is the person who is always keen interested in providing best alternative solution to any social problem to meet the scarcity. Keeping this mindset and visualizing social problems in Pakistan and other several countries; it is observed that annually several people die working inside coal
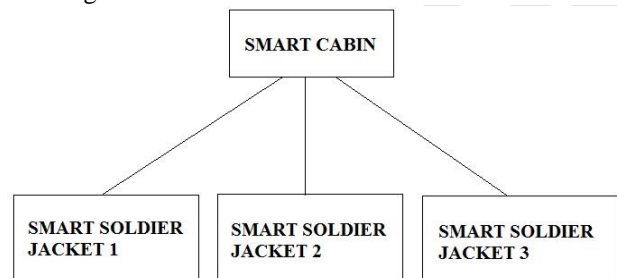
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Fig.1 Overview of Intelligent Security For Indian Army

mines. By identifying this problem, this paper suggests a wearable smart jacket design for securing the life of coal miners in Pakistan. This Prototype senses the various health related parameters i.e. the presence of hazardous gas, pulse rate of miner, updated temperature/humidity, exact depth location & global positioning of miner. These all parameters will be then transmitted through a Wi-Fi shield to a dynamic internet protocol. In this way, one may monitor all labors working inside the mines and moreover in case of disaster the life of miner can be secured immediately. This proposed wearable embedded system will not only send the last GPS location to a specific IP but will also send continuous update of pulse rate of miner which is sensed by pulse sensor; to base camp hence if someone dig the coal mine in case of disaster,

they may set the priority to retain maximum life back from a coal mine.[9]

III. METHODOLOGY

In today's world enemy warfare is an important factor in any nation's security. The national security mainly depends on army (ground), navy (sea), air-force (air). The important and vital role is played by the army soldier's. There are many concerns regarding the safety of these soldiers. As soon as any soldier enters the enemy lines it is very vital for the army base station to know the location as well as the health status of all soldiers. In our project we have come up with an idea of tracking the soldier as well as to give the health status of the soldier during the war, which enables the army personnel to plan the war strategies. By using the location sent by the GPS modem, the base station can understand the position of soldier. We have implemented two main smart systems. They are Smart cabin and Smart Soldier Jacket. Figure 1 represents the overview of Intelligent Security For Indian Army.

SMART SOLDIER JACKET:

Fig.2 Smart view of Soldier Jacket

It has Gas sensor to sense poisonous gasses, Heart-beat sensor to detect the health and the camera to catch live video. This system is also interfaced with a GPS navigation system so as to track the position of soldiers. In order to send the information the system is having a Zigbee module. An alarm is interfaced so as to intimate any information to the surrounding people.

The whole electronic setup will be mounted in the jacket so as top continuously monitor any fluctuations like poisonous gas detection or health up set. At any kind of fluctuation the GPS will track the location of soldier and send the information to control room using Zigbee. Security will be alerted immediately so as to take care of soldier. Figure 2 represents the expected model of the Smart Soldier Jacket [1].

SMART CABIN:

Fig 3 View of Smart Cabin

It is the only place to enter inside the country. This Cabin acts as a check post. It checks the Identity of the person entering through the Cabin. This identification is done through the RFID and Fingerprint Detection.

It also receives the information from Smart Soldier Jackets. Based on the information received the Chief Commander takes the respective actions. Figure 3 represents the expected view of the Smart Cabin [2].
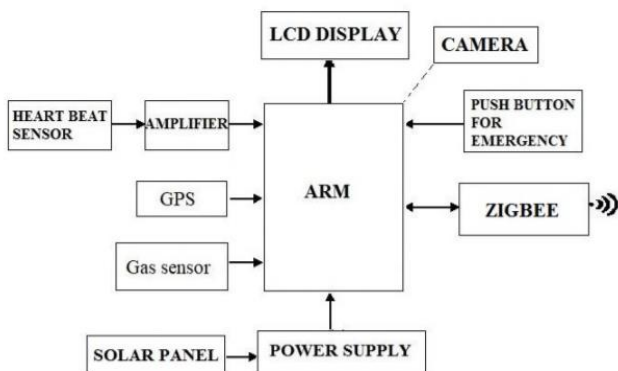
IV. IMPLEMENTATION

Fig.4 Smart Jacket

ARM: Here ARM LPC2148 Controller is used where the actual data is processed. The inputs are heart beat sensor, gas sensor, GPS, camera and push button. The outputs are LCD display and zigbee. The controller acts as the heart of our project.

Heart Beat Sensor: The heart beat sensor provides us with the heart rate of a soldier per minute. With this it is possible to monitor the health conditions of the soldier by fixing a threshold value.

GPS: This is used to watch the movements of the soldier in the battlefield. This module basically uses geostationary satellite. With this it is possible to know the location of the soldier.

GAS SENSOR: It is used to sense the poisonous gas present around the soldier.
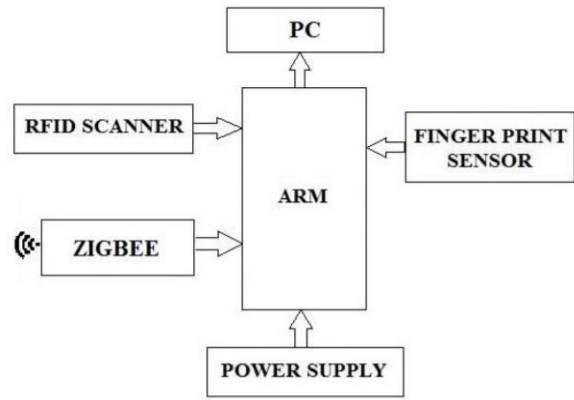
CAMERA: To view the live status of the soldier.

LCD DISPLAY: It displays the output of the sensors.

ZIGBEE: It acts as the transmission path between jacket and cabin.

PUSH BUTTON: This button is used to alert the chief present in the cabin whether soldier is in emergency situation.

Figure 4 shows the block diagram of smart jacket, the subsections of the blocks are explained above.

Fig.5 Smart Cabin

ARM: Here ARM LPC2148 Controller is used where the actual data is processed. The inputs are RFID and Fingerprint sensor. The outputs are LCD display and zigbee. The controller acts as the heart of our project.

ZIGBEE: It acts as the transmission path between jacket and cabin.

LCD DISPLAY: It displays the output of the sensors.

RFID: It is used to authenticate the ID of the solider.

FINGERPRINT SENSOR: After the verification of the RFID, fingerprint authentication is done.

PC: The data from the jacket and the cabin is updated here.

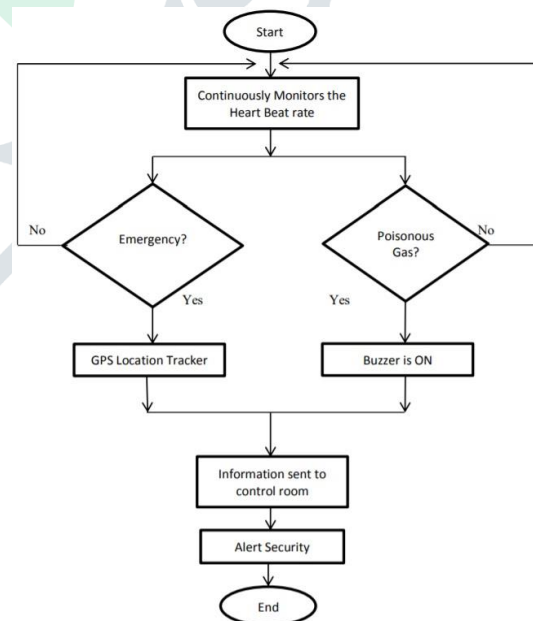Figure 5 shows the block diagram of smart cabin, the subsections of the blocks are explained above.

Fig.6 Flowchart of Smart Soldier Jacket

Smart Soldier Jacket obtains the heart beat rate of the soldier continuously and sends the information to cabin through ZigBee. If poisonous gas is detected around the soldier the buzzer is on. If push button is pressed by soldier, The Emergency signal is Start Continuously Monitors the Heart Beat rate Emergency? and Poisonous Gas? and GPS Location Tracker Information sent to control room Alert Security End

Buzzer is generated and intimates the chief in the cabin by sending the condition of the Gas Sensor, Location and heart beat rate of the soldier. The Working of Smart Soldier Jacket is represented in the flowchart i.e., in figure 6.
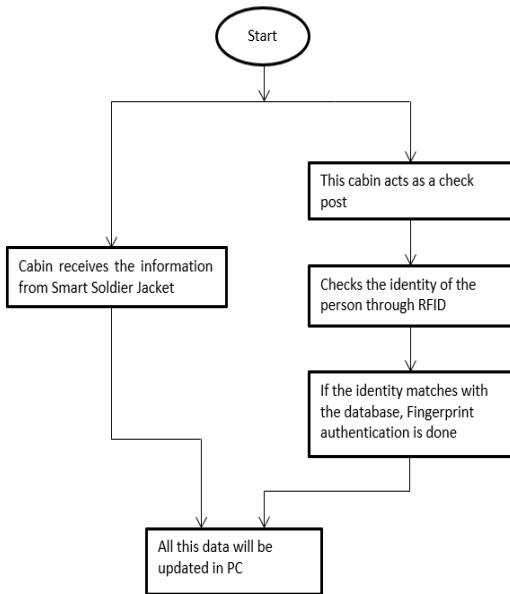

Fig.7 Flowchart of Smart Cabin

Smart Cabin receives the information from Smart Soldier Jacket and updates it to PC. This cabin acts as a check post. It checks the identity of the person entering into the cabin. This identification is done through RFID and Fingerprint detection. If the RFID is matched successfully with the database. Fingerprint authentication is done. All this data will be updated in PC. The Working of Smart Cabin is represented in the flowchart i.e., in figure 7.

V. RESULTS AND DISCUSSION

Fig.8 Welcome Screen

When the Smart Jacket Module is Turned ON, the welcome screen is displayed on the LCD. Figure 8 represents the Welcome Screen.
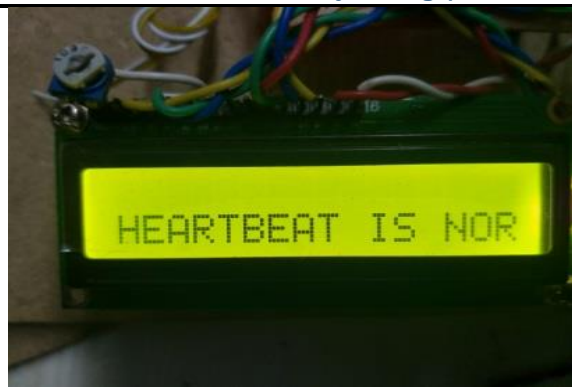

Fig.9(a) Low Heart Beat

Fig.9(b) Normal Heart Beat

Fig.9(c) High Heart Beat
Fig.9 Heartbeat output

The Smart Jacket module continuously monitors the heartbeat rate of the soldier. The output is displayed on LCD as shown in figure 9.

Fig.10 Gas Detection

If any poisonous gas is present around the soldier, it is detected and displayed as LCD as shown in figure 10.

Fig.11 Emergency

When push button is pressed, the Emergency message is displayed on LCD as shown in figure 11.

Fig.12(a) RFID Checking

Fig.12(b) RFID output

Smart Cabin checks for the identification of RFID. The output is shown in figure 12(a) and figure 12(b).

Fig.13 Fingerprint scanning

Also Smart Cabin checks for Fingerprint Authentication. The output is shown in figure 13.

VI. CONCLUSION

The project can be taken forward in which we are developing a Smart Soldier Jacket and Smart Cabin. In which Smart Soldier Jacket incorporates health monitoring, location status, power subsystem helping all devices with sufficient energy and much more which shall help the soldier in all dangers.

And Smart Cabin incorporates the verification of persons entering to the cabin through parameters like RFID and Fingerprint. It also incorporates the Information received from the Smart Soldier Jacket.

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