



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

ARMY SOLDIERS HEALTH AND WELLNESS OBSERVING SENSORS EMBED SAFEGUARD HELMET USING IOT/IN HOUSE PROJECT

P. LATHA¹, G. GOKULAKRISHNAN², R. BALAMURUGAN³, R. ARUNKUMAR⁴

1 ASSISTANT PROFESSOR, 2,3,4 UG STUDENT
COMPUTER SCIENCE AND ENGINEERING

VSB ENGINEERING COLLEGE, KARUR, TAMILNADU, INDIA

ABSTRACT

The article describes a method for tracking and monitoring troops' health that is based on the Internet of Things (IoT). The proposed system can be installed on the soldier's body to use GPS to track their whereabouts and health status. These details will be relayed by IoT to the control room, and a soldier's health, including their body temperature and heart rate, will also be monitored. A further component of the system allows soldiers to manually request assistance or to alert the military if they require assistance. Small wearable physiological devices, sensors, and transmission modules make up the proposed system. It is conceivable to construct a low cost technique to defend the priceless human life on the battlefield by using the recommended equipment. The method is particularly useful for gathering information about a soldier's health status and giving them with immediate assistance. They are better protected by a thermal jacket when operating in adverse weather conditions.

Keywords: Soldier, GPS, Sensors and Transmission modules.

1. INTRODUCTION

The infantry soldier of tomorrow promises to be one of the most technologically superior present day war has ever visible. Around the world, numerous research packages are presently being performed, consisting of america's Future Force Warrior (FFW) and the UK's Future Infantry Soldier Technology (FIST), with the purpose of creating completely incorporated fight structures. Alongside large improvements in protecting and weaponry subsystems, some other important element of this technology could be the potential to offer information superiority on the operational edge of navy networks via equipping the dismounted soldier with advanced visual, voice, and facts communications. Helmet established visors, capable of displaying maps and actual-time video from different squad individuals, degrees of physiological sensors tracking coronary heart rate, middle body temperature and so on. These gadgets will improve situational consciousness, now not only for the host, but also for collocated military employees who will trade statistics using wireless networks. The assignment became to combine these piecemeal additives into a light-weight bundle that might obtain the preferred end result without being too cumbersome and bulky or requiring too much power. One of the essential challenges in navy operations lies that the infantrymen aren't able to speak with manipulate room station. In addition, the right navigation between soldier's companies plays

important position for cautious making plans and co-ordination. So in this article we attention on monitoring the vicinity of soldier from GPS, that's beneficial for control room station to realize the exact place of soldier and accordingly they'll guide them. Also High-speed, quick-range, soldier-to-soldier Wi-Fi communications to relay information on situational awareness. Ng, GPS navigation, Bio-clinical sensors, Wireless verbal exchange.

2. LITERATURE SURVEY

Chao Lvet al proposed “Research on Individual Soldier Energy Efficiency Assessment Systems” IEEE Conference on- 2018

The obstacles of the human body, various strength performance signs which includes frame function and fatigue degree have come to be a critical embodiment of man or woman soldier fight capability. In this article, a feasible system for comparing the power efficiency of man or woman soldiers was proposed. Wavelet analysis is done at the amassed electroencephalogram (EEG) signals, cluster analysis and label processing are performed for the filtered data, after which characteristic extraction. After the system became finished schooling, the new facts may be mechanically labeled. Monitoring and evaluating the physical function, fatigue stage, pressure degree, tolerance of individual infantrymen, provide accurate information to trainers and squaddies, and maximize the training of soldiers.

Nikhil B. Gaikwadet al proposed “FPGA Implementation of Real-Time Soldier Activity Detection based on Neural Network Classifier in Smart Military Suit” IEEE Conference on- 2019

The proposed work makes a specialty of real-time soldier pastime detection, that's critical for the operation of the clever military fit. The customized Artificial Neural Network (ANN) IP middle is evolved for the soldier pastime class, that is an indispensable aspect of match gateway design. The multilayer perceptron (7-5-four) type set of rules is applied at the low-cost (ninety-nine\$) FPGA assessment platform through the use of Xilinx vivado and system generator improvement gear. The training (70%) and checking out (30%) of this ANN design is executed on the UCI human activity dataset. The LabVIEW GUI and IP check design finished the hardware checking out of this IP. The provided ANN IP is able to acquire ninety-eight.5%

category accuracy by using minimal FPGA (Artix-7 xc7a35t) sources. The carried out ANN design requires best 285 nanoseconds for a type and consumes 103 milliwatts of dynamic electricity. The device's accuracy at one-of-a-kind development ranges is likewise studied in this paintings.

Foster Dittmeret al proposed “A Cut Above the Rest: Team Performance as a Function of Team Cohesion, Team Familiarity, Team Effectiveness, and Soldier Lethality” IEEE Conference on- 2020

Psychometric gadgets and linear regression fashions are used to determine the significance of the theoretical constructs and the Soldier Lethality degree on Team Performance effects. Results: A overall of 194 cadets out of the 456 cadets that participated inside the Sandhurst Competition completed the survey. Our findings display that the theoretical constructs had been no longer statistically massive whilst evaluating Team Performance. However, the Soldier Lethality measure yields a full-size end result ($p\text{-fee} = \text{zero.002}$; $\beta = \text{zero. Five}$; $R^2 = 0.22$). Conclusions: In this have a look at, raw bodily facts (denoted right here as secondary information) is more powerful in predicting Team Performance consequences in a combat like putting rather than using psychometric units because of non-reaction errors (failure to reply to 1, or all the survey questions) and response bias (untruthfully or misleadingly responses). Application: This examine indicates how goal, detailed statistics on teamwork can be used to offer insights into questions of the overall performance of groups.

AntoineAbiZeidDaouet al proposed “Design and Implementation of a Smart Soldier Uniform” IEEE Conference on- 2021

The mission includes a Uniform whose number one objective is to music the important symptoms and health of the soldiers by detecting bullet impacts and transmitting to a navy information center the whereabouts of the injured soldier, i.e. their accurate place, the hit zone as well as injured organs. The clever Uniform may even make use of a machine so one can follow an adequate stress at the bullet impact vicinity to lessen as a lot as viable the bleeding. This machine has been fully applied and was truly tested to make certain that all functions inside the vest are working

properly. Although a few minor changes could give it higher usability, the results had been very fulfilling.

R. Kabilanet al proposed Soldier Friendly Smart and Intelligent Robot On War Field” IEEE Conference on- 2022

The robot is built like a tank circuit, with the potential to pivot at any perspective on its axis, pass forward in reverse, turn left and proper, and opposite course right now. The robotics’ pinnacle is prepared with a wireless camera that transmits pictures and audio from the battlefield to the monitoring area. When an assault is needed, the robot is prepared with a laser gun that can be used to fire at the adversary. It will perform all of its features on the field of war in response to orders from the monitoring station. An employee within the monitoring station is offering the robot instructions through live video feed from the robotic. The robot vehicle is geared up with a PIR sensor that detects the soldier’s warmth and sends a sign to the monitoring station as to whether or not the person is alive or lifeless, in addition to an emergency call. Check the character ID with the RFID reader at the robot to peer if the individual is a soldier or an unauthorized person. The robotic is geared up with a bomb detector, which permits it to traverse through the secure sector. If the robot is captured with the aid of the adversaries, we are able to use the self-attacking technique to utterly destroy it.

3. EXISTING SYSTEM

This article gives the design, fabrication, and manipulate of a quadruped wall-mountain climbing robot. The robotics’ kinematics is stimulated by using lizards, which use trot-gait for the locomotion. The key functions of this robot are its stress-sensitive adhesive (PSA) enabled adhesion and peeling mechanism and the locomotion controller capable of instantly and turning movement. We obtained a median vertical mountain climbing velocity of 1.35 cm/s without payload and 1.25 cm/s with a payload of 20 gm. Rapid prototyping strategies namely 3-d-printing and 2D-LASER slicing are used to fabricate the entire shape of the robot, permitting clean replication of the complete robot in case a swarm of such robots is needed. This article also reports mountain climbing balance criteria for the advanced robot expressed in

phrases of the pitching moment. We envisage that the advanced robot can be deployed in surveillance, reconnaissance, cleaning, and repairing programs.

4. PROPOSED SYSTEM

It consists of unit’s viz., “Solider unit” and “Server unit”. The Wi-Fi technology (IoT) is utilized in our challenge for the communication. We are the usage of a programmable IC (PIC16F877A), with a RAM memory 368bytes and ROM 8K that is of Flash type, to control the operations. GPS is interfaced with the Solider Unit (shifting unit) which sends the modern-day location of the soldier inside the struggle subject, to the server unit, thru IoT module. The receiver in the server unit gets the sign and tracks the area. Heart beat sensor and temperature sensor are connected with the soldier unit, to test if the soldier is alive or useless, and sends the statistics to the server unit. In any emergency state of affairs soldier can contact the server by means of giving a request via keypad interfaced with the unit. To prevent inactive, the body element for examples finger, heart, leg& hand due to heavy snow. Thermoelectric cooling uses the peltier effect to create a warmness flux between the junctions of two extraordinary sorts of substances that's wearied by soldier for trojan horse up. LCD show indicates the popularity. The server unit video display units thru Cloud (PC or Mobile telephone). LCD show suggests the status.

5. BLOCK DIAGRAM

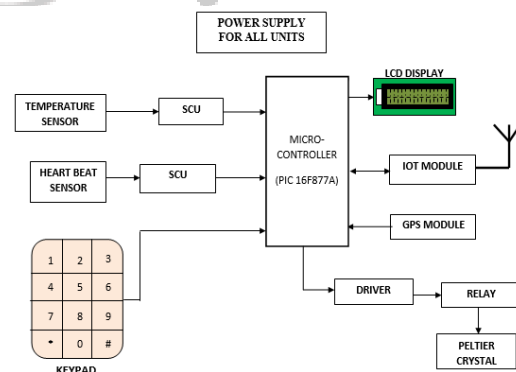


Fig :1 Solider unit

6. COMPONENTS DESCRIPTION

Power Supply
Transformer
Rectifier
Bridge Rectifier
Smoothing
Regulator
Heart Beat Sensor
Temperature Sensor (Lm35)

7. CONSTRUCTION

Construction of a keypad is certainly easy. As in step with the outline shown inside the figure underneath we've got 4 rows and four columns. In among every overlapping row and column line there may be a key. So keeping this outline we can assemble a keypad using simple SPST Switches.

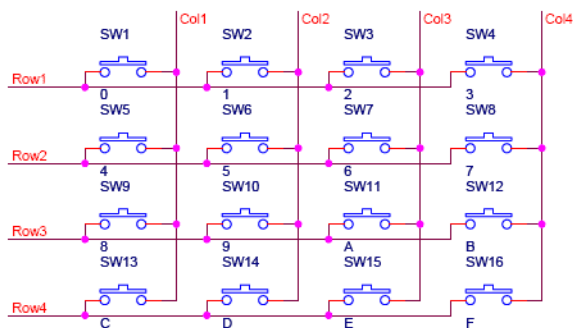


Fig : 2 Keyboard Circuit

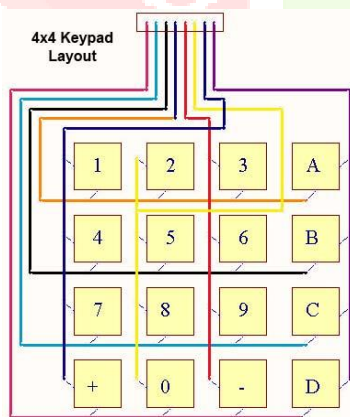


Fig :3 Electric Layout

8. INTERNET OF THINGS (IOT)

The Internet of things (IoT) is the network of bodily devices, automobiles, domestic appliances and different items embedded with electronics, software, sensors, actuators, and connectivity which permits those items to connect and change statistics.

Each element is uniquely identifiable thru its embedded computing device but is able to inter-function in the present Internet infrastructure. From 2016 to 2017, the value of successful online gadgets increased 31% to \$8.4 billion. Experts estimate that the IoT will consist of about 30 billion items by means of 2020. It is also envisioned that the global market fee of IoT will attain \$7.1 trillion through 2020. The Internet of Things enables objects to be sensed or managed remotely via existing network infrastructure, allowing for greater direct integration of the physical world into computer-primarily based structures and resulting in improved performance, accuracy, and monetary advantage while reducing human intervention. When IoT is augmented with sensors and actuators, the technology will become an example of the greater widespread magnificence of cyber-bodily structures, which also encompasses technologies such as clever grids, virtual energy vegetation, clever houses, sensible transportation and smart towns. "Things", inside the IoT experience, can consult with a wide kind of gadgets such as coronary heart monitoring implants, biochip transponders on farm animals in coastal waters, motors with integrated sensors, DNA evaluation gadgets for environmental/meals/pathogen monitoring, or subject operation gadgets that assist firefighters in search and rescue operations.

Legal scholars define "matters" as an "inseparable collection of hardware, software, facts, and provider. "These gadgets acquire beneficial information with the assist of numerous present technology and then autonomously float the records between different devices. As of 2016, the vision of the Internet of factors has evolved due to a convergence of multiple technology, including ubiquitous Wi-Fi communique, actual-time analytics, gadget learning, commodity sensors, and embedded structures. This means that the traditional fields of embedded structures, Wi-Fi sensor networks, manipulate systems, automation (which include home and building automation), and others all make a contribution to permitting the Internet of things. The concept of a network of smart devices became discussed as early as 1982, with a modified Coke gadget at Carnegie Mellon University turning into the primary Internet-related equipment, able to document its inventory and whether newly loaded drinks have been cold. Mark Weiser's seminal 1991 article on ubiquitous computing,

"The Computer of the 21st Century", in addition to educational venues along with UbiComp and PerCom produced the current imaginative and prescient of IoT. In 1994 Reza Raji described the idea in IEEE Spectrum as "[moving] small packets of information to a huge set of nodes, so one can integrate and automate the whole lot from domestic home equipment to whole factories". Between 1993 and 1996 numerous agencies proposed answers like Microsoft's at Work or Novell's NEST. However, simplest in 1999 did the sector start collecting momentum. Bill Joy envisioned Device to Device (D2D) communicate as a part of his "Six Webs" framework, supplied on the World Economic Forum at Davos in 1999. The idea of the Internet of factors became popular in 1999, via the Auto-ID Center at MIT and associated market-evaluation publications. Radio-frequency identification (RFID) become visible by means of Kevin Ashton (one of the founders of the unique Auto-ID Center) as a prerequisite for the Internet of things at that factor. Ashton prefers the phrase "Internet forthings." If all gadgets and those in day by day existence were ready with identifiers, computers may want to manage and save them. Besides the use of RFID, the tagging of factors can be completed via such technology as close to discipline verbal exchange, barcodes, QR codes and digital watermarking.

According to its own interpretation, one of the primary outcomes of imposing the Internet of Things by equipping all gadgets on the planet with minuscule figuring-out gadgets or gadget-readable identifiers would be to transform daily life. For example, on the spot and ceaseless inventory manipulate would turn out to be ubiquitous. A man or woman's potential to engage with items will be altered remotely based totally on the spot or gift needs, in accordance with current give up-person agreements. For example, such technology should give motion-picture publishers a lot more control over quit-person private devices by remotely implementing copyright restrictions and virtual rights control, so the ability of a purchaser who is provided a Blu-ray disc to view the movie may want to become dependent on the copyright holder's choice, similar to Circuit City's failed DIVX.

8.1 AGRICULTURE

The IoT contributes extensively in the direction of innovating farming methods. Farming challenges as a result of populace boom and climate change have made it one of the first industries to make use of the IoT. The integration of wireless sensors with agricultural mobile apps and cloud systems helps in amassing essential facts pertaining to the environmental situations – temperature, rainfall, humidity, wind speed, pest infestation, soil humus content material or nutrients, besides others – connected with a farmland, can be used to enhance and automate farming strategies, take knowledgeable selections to enhance nice and quantity, and minimize risks and wastes. The app-based totally area or crop tracking additionally lowers the hassles of dealing with crops at a couple of places. For instance, farmers can now discover which areas had been fertilised (or mistakenly overlooked), if the land is just too dry and are expecting future yields.

8.2 MEDICAL AND HEALTHCARE

IoT gadgets may be used to allow far flung fitness tracking and emergency notification systems. These health monitoring gadgets can variety from blood strain and heart fee monitors to advanced devices capable of monitoring specialized implants, such as pacemakers, Fitbit electronic wristbands, or superior hearing aids. Some hospitals have began imposing "clever beds" that can hit upon while they may be occupied and whilst a patient is making an attempt to rise up. It also can regulate itself to make sure suitable stress and assist is implemented to the affected person without the manual interplay of nurses. According to the trendy studies, US Department of Health plans to save up to USD three hundred billion from the countrywide budget because of scientific innovations. Specialized sensors also can be equipped inside residing spaces to monitor the health and trendy properly-being of senior residents, while additionally ensuring that right treatment is being administered and helping human beings regain lost mobility via remedy as well. Other consumer devices to encourage wholesome dwelling, which includes, linked scales or wearable coronary heart video display units, are also an opportunity with the IoT. More and extra stop-to-quit health tracking IoT structures are arising for antenatal and chronic sufferers, supporting one control health vitals and habitual medicinal drug necessities

11. REFERNECES

- [1] Gun Violence Archive. Accessed: Apr. 15, 2021. [Online]. Available: <https://www.gunviolencearchive.org/>
- [2] G. F. Shidik, E. Noersasongko, A. Nugraha, P. N. Andono, J. Jumanto, and E. J. and Kusuma, “A systematic review of intelligence video surveillance: Trends, techniques, frameworks, and datasets,” *IEEE Access*, vol. 7, pp. 457–473, 2019.
- [3] A. Abdelmoamen, “A modular approach to programming multi-modal sensing applications,” in *Proc. IEEE Int. Conf. Cogn. Comput. (ICCC)*, 2018, pp. 91–98, doi: 10.1109/ICCC.2018.00021.
- [4] K. He, G. Gkioxari, P. Dollár, and R. Girshick, “Mask R-CNN,” in *Proc. IEEE Int. Conf. Comput. Vis.*, Apr. 2017, pp. 2980–2988.
- [5] S.-C. Huang, “An advanced motion detection algorithm with video quality analysis for video surveillance systems,” *IEEE Trans. Circuits Syst. Video Technol.*, vol. 21, no. 1, pp. 1–14, Jan. 2011.
- [6] A. A. Moamen and N. Jamali, “Opportunistic sharing of continuous mobile sensing data for energy and power conservation,” *IEEE Trans. Services Comput.*, vol. 13, no. 3, pp. 503–514, May/Jun. 2020, doi: 10.1109/TSC.2017.2705685.
- [7] J. Lim, M. I. Al Jobayer, V. M. Baskaran, J. M. Lim, K. Wong, and J. See, “Gun detection in surveillance videos using deep neural networks,” in *Proc. Asia-Pacific Signal Inf. Process. Assoc. Annu. Summit Conf. (APSIPA ASC)*, Nov. 2019, pp. 1998–2002.
- [8] M. Grega, S. Lach, and R. Sieradzki, “Automated recognition of firearms in surveillance video,” in *Proc. IEEE Int. Multi-Disciplinary Conf. Cognit. Methods Situation Awareness Decis. Support (CogSIMA)*, Feb. 2013, pp. 45–50.
- [9] U. V. Navalgund and P. K., “Crime intention detection system using deep learning,” in *Proc. Int. Conf. Circuits Syst. Digit. Enterprise Technol. (ICCSDET)*, Dec. 2018, pp. 1–6.
- [10] Y. Zhou, L. Liu, L. Shao, and M. Mellor, “Fast automatic vehicle annotation for urban traffic surveillance,” *IEEE Trans. Intell. Transp. Syst.*, vol. 19, no. 6, pp. 1973–1984, Jun. 2018.

