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# Life Jacket for Army Soldier in Harsh Condition

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**Abstract:** *The purpose behind developing the "Electronic Jacket using Arduino for a person working in extreme weather condition" is the people who are staying or living in extreme weather conditions. The climatic change that is hot and cold temperature conditions are dangerous to the health of those people. Excessive exposure of heat causes serious problem like heat stroke. At very cold temperature, the most serious problem is the risk of hypothermia or overcooling body So, we have designed a jacket named as "Safety purpose jacket using Arduino" which gives better protection to the people who living in such tough weather conditions and the main objective behind developing this jacket is for safety of military people because they have a huge risk on their lives while working in such extreme weather conditions. The cold and hot climate conditions in the high north represents, Threat of safety and work performance of soldier or a common person. The jacket will provide better protection to them and it will help to reduce loss of human life. In addition to that if the person is not feeling well that person can press switch so that the concerned person will get a message so threat of safety will reduced. By using this jacket, the user can control and monitor the internal temperature inside the jacket by using fan and heater mounted within jacket. It consist of temperature sensor to detect the temperature, panic switch, battery and GSM modules are also used in this jacket to send message by soldier or a common man to concerned one . All this devices are controlled by Arduino. We are using heating pad for heating purpose. This information of temperature sensor can be used in enhanced safety and as an improved tool to advice outdoor work control for soldier or a common man in climate conditions. So that the specially designed "Safety purpose Jacket using Arduino" will give better protectionto the person who is working in extreme weather conditions*

**Keywords:** Atmega328 microcontroller, GPS, LM35 temperature sensor, Heartbeat sensor, battery.
Forest, Boosting, Multilayer Perceptron (MLP), Voting Algorithm, Browser Extension, Web Security, Online Threat Detection, Real-time Classification, Feature Extraction, Accuracy Assessment, Cybersecurity, Threat Intelligence, Online Safety. Forest, Boosting, Multilayer Perceptron (MLP), Voting Algorithm, Browser Extension, Web Security, Online Threat Detection, Real-time Classification, Feature Extraction, Accuracy Assessment, Cybersecurity, Threat Intelligence, Online Safety

## I. INTRODUCTION

Many other jackets existing in the market can provide both cooling and hot service with the jacket. The different climatic conditions such as very cold and very hot temperatures could be dangerous to health. Since in very cold temperatures, the most serious concern is the risk of hypothermia or dangerous overcooling of the body. Henceforth we have developed a smart army jacket as an important resource for the army soldiers as soldiers play a very important role to protect our country in extreme cold conditions. The smart army jacket is proposed in such a way that it could monitor the health, internal temperature as well as emergency notification in the form of short message service for the soldier The jacket will be developed in three phases. In the first stage, the fibre of the jacket is been developed as according to the military standards keeping in note the weight, the colour, the finishing, stitching, concerning 20 meters (65 feet) inside and a bigger vary outdoors.

Warriors are the Army's most imperative asset. Warriors assume an important part to make sure one's nation. The term warriors incorporate administration men and ladies from the military, Air Force, Navy, and Marine. While giving security to the country, they could challenge inconveniences in hot/frosty climate conditions. Both exceptionally hot and icy temperatures might be unsafe for well-being. This venture may be a solution for this circumstance. During this venture, an E-Uniform is planned which provides better security to the officers who are working in great climate

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conditions. A temperature sensor is employed to see the temperature whenever. The DHT11 is a circuit temperature sensor, whose yield voltage is directly relative to the Celsius (Centigrade) temperature.

Solar-based E-Uniform furnished with better protection to the soldiers who are working in extreme weather. Solar Panels are wont to power up the interior circuitry of the E-uniform. A 12 V DC lead-acid rechargeable battery is employed for storing the energy

## II. LITERATURE SURVEY

Karthiketal, "An Experimental Investigation to Create Human Comfort Jacket", (2016) - Thermo Electric air conditioner which make 5 degree higher or lower than ambient using Peltier effect. Attempted to design and fabricate an economical and reliable unit known as "Thermo Electric air conditioner". This paper aims on conditioning the thermal environment lower or higher than the ambient so as to produce comfort to human body according to the ambient conditions. The paper mainly points on the development of a portable air conditioning unit that facilitate the on-sight comfort of workers or two wheeler drivers by cooling the jacket worn by them. The device has two sides, and when DC current flows through the device, it brings heat from one side to the other, so that one side gets cooler while the other gets hotter. The blower attached to the device will blow off the hot or cold air from either of the sides to the pipe attached to the jacket according to the ambient conditions.

Neelamswarnar, "Review of thermoelectric materials and its properties with applications", (2019) - Basics of ZT value, Peltier effect, Factors affecting thermoelectric effect. From several decades, thermoelectric materials have been proved to be potential means of energy conversion due its capability of directly converting heat energy in electricity form. However, due to its complication in construction & fabrication in addition with lower efficiency in performance, thermoelectric devices have limitations when it comes to their 16 application in commercial sector. Electricity from heat or thermoelectricity has been accepted as the means of energy conversion technology which is eco-friendly since it does not harm the environment and carries out the conversion process for long period of time. This paper depicts the studies and investigation performed in introducing the basic principles of thermoelectric materials including thermoelectric properties various applications of thermoelectric material and its construction process.

Stephan A. Konz, Jerry R. Duncan, "Dry ice cooling jacket", (1976) - Cooling jacket, Cold co2 gas, Convection. A personal dryice cooling jacket was evaluated in two industrial and two laboratory environments. When tested in a tire plant and a chemical plant, the jacket significantly reduced sweat loss and permitted unhindered mobility to workers. The laboratory tests were conducted with two men pedaling bicycles at 35 and 45C; water vapor pressure was constant at 33mm Hg. Compared to no cooling, heart rate was 19 beats/min less at 35C and 13 less at 45C; sweat loss was 210 g/hr-m less at 35C and 60 less at 45C; rectal temperature change was 58C less at 35Cand .61C less at 45C; mean skin temperature was 2.59C less at 35C and 2.36 less at 45C. Using a 1C rise in rectal temperature as a limiting criterion, available productive time was increased from 51 to 101 min at 35C and from 37 to 60 min at 45C.

Jihye Lim etal, "Assessment of airflow and microclimate for the running wear jacket with slits using CFD simulation", (2015) - This study was performed to estimate the exchange of air (ventilation) 17 and temperature distribution in the cylinder that simulated human body. Simulation simplified the human body wearing the running wear jacket with slits. Slits were positioned at the shoulder, mid-back and lower-back. For the running wear jacket, non-air permeable material was assumed to eliminate the effect of porosity of the fabrics. Airflow and microclimate temperature were analyzed using computational fluid dynamics (CFD). The results showed that the air tended to rise and drift towards the slits. Air flown out through the slits was in the order of the lower-back.

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## III. AIM & OBJECTIVES

- A Smart jacket is a connectivity of smart sensors.
- Gives protection and safety to the soldiers.
- To avoid health threat of a particular person.
- Real time link security detection.

## IV. MOTIVATION

The motivation behind this project stems from the ever- growing significance of the digital age. As our lives become increasingly interconnected and reliant on online platforms, the risks associated with malicious activities such as phishing, malware, and cyber- attacks have also escalated. The motivation for developing a robust link security detection system using machine learning and ensemble learning algorithms.

### SCOPE

The scope of this project we can further modify by using IOT, gas sensor to avoid death because of poisonous gas, heartbeat sensor to check the heart beats are ok or not , ultrasonic sensor to check the distance and IR sensor to find an obstacles. This study presents the analytical depiction of the heated jacket industry along with the current trends and future estimations to determine the imminent investment pockets. The report presents information related to key drivers, restraints, and opportunities along with detailed analysis of the heated jacket market share.

### PROBLEM DEFINITION

In the digital age, users face an escalating risk of encountering malicious web links that can lead to a range of security threats, including phishing attacks, malware infections, and other cyber-attacks. Traditional methods of link analysis often struggle to keep pace with the evolving tactics employed by cybercriminals, leaving users vulnerable to online threats. The problem addressed by this project is the lack of an efficient and real-time link security detection system that can accurately classify the security status of web links and empower users to make informed decisions during their online activities.

## V. SYSTEM ARCHITECTURE

- The specially designed E-Smart Suit tries to summarize the main smart clothing applications developed in the last decade in the military field. . This system is smaller, lighter and with low power consumption, so it is more convenient. This can help soldiers to work even in extreme climatic applications. The U.S. Army, in the collaboration with MIT, is investing to create the uniform of the future .These jackets can be wearable in all conditions and in all seasons. We can utilize this jacket to shield us from over-heating and over-cooling. We can also place gas detective sensors so that we can detect the gases which are harmful for the human beings. The ensemble learning module combines the predictions of individual machine learning models (SVM, Random Forest, Boosting, MLP) using a Voting algorithm. This collaborative decision-making process aims to improve overall link security detection accuracy.
- The system extracts relevant features from web links, including URL structure, SSL/TLS certificate details, and historical threat intelligence data. These features serve as inputs to the machine learning models, contributing to the accuracy of link security assessments

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- The link security detection module communicates in real-time with the browser extension interface, providing instantaneous feedback to the user as they navigate the web. This ensures timely alerts and empowers users to make informed decisions.

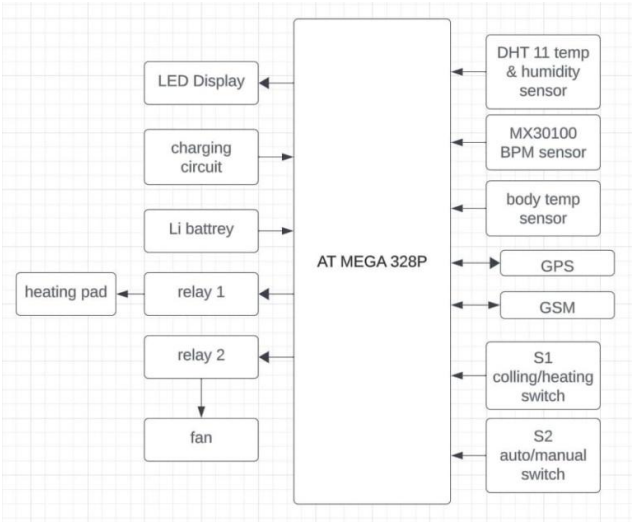
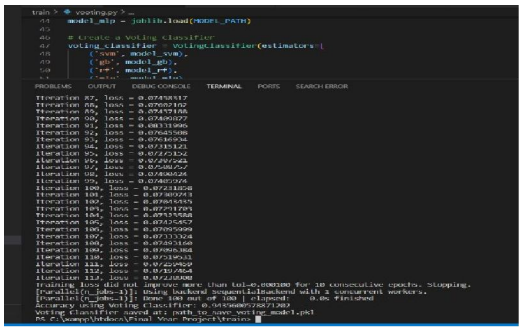



**Fig-1**: System Architecture Diagram

This can help soldiers to work even in extreme climatic applications. The U.S. Army, in the collaboration with MIT, is investing to create the uniform of the future .These jackets can be wearable in all conditions and in all seasons. We can utilize this jacket to shield us from over-heating and over-cooling. We can also place gas detective sensors so that we can detect the gases which are harmful for the human beings.

## VI. RESULT

**Final Output:**



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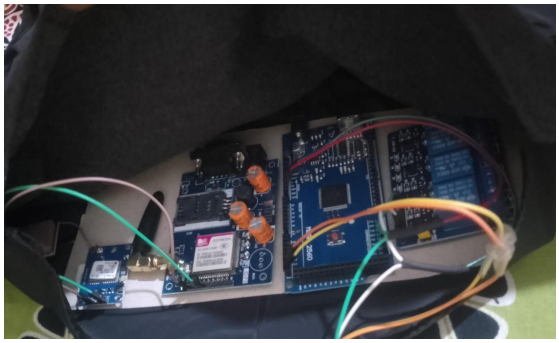

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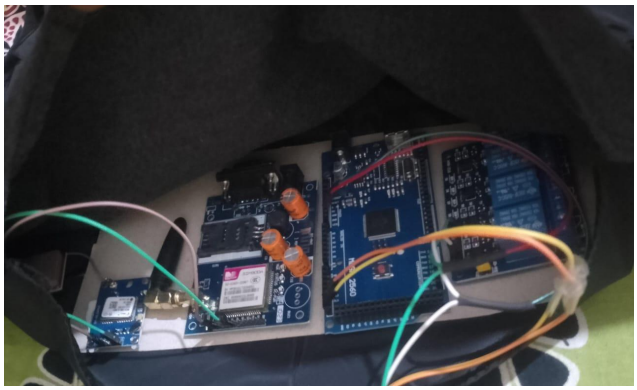

## VII. CONCLUSION

The specially designed E-Smart Suit tries to summarize the main smart clothing applications developed in the last decade in the military field. . This system is smaller, lighter and with low power consumption, so it is more convenient. This can help soldiers to work even in extreme climatic applications. The U.S. Army, in the collaboration with MIT, is investing to create the uniform of the future .These jackets can be wearable in all conditions and in all seasons. We can utilize this jacket to shield us from over-heating and over-cooling. We can also place gas detective sensors so that we can detect the gases which are harmful for the human beings.

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