# SMART SWEATER

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**ABSTRACT**: Normally, heat will transfer from your body to the air if the ambient temperature is lower than your own. Without clothing, new "cold" air can constantly come into touch with your skin, causing you to lose heat more quickly. By securing a layer of air between your skin and the fabric, clothing keeps you warm. As this layer of air warms up, the pace at which heat is transferred from your body is slowed. Therefore, the freezing sensation you get after removing your clothes is a result of the trapped air layer dispersing and your body responding to the cooler air around you. So normal sweater which are used in the cold area are made up of animal skin which are have more weight .So that the user can not Walk properly and work properly this make a hard time for the user in the cold area So to over come this proble.TheSmartSweater(SS)makes the user to be in normal room temperature .The (SS) is light weight sweater . With the help of Smart Sweater the user can be in the temperature which is comfortable to that user .The (SS) is based on the heating the heat conducting liquid called deionized water Which is contain inside fiberglass is heat with the heater and the heat transfers to all the parts of the body and maintain the temperature . the rise and fall of the temperature inside the (SS) depends on the temperature outside of the sweater and this process is done by the temperature sensor and once the temperature reaches The required amount, then it will stop heating the water so that it will stop the steam which will be created. The application are in medical field and nuclear power plant.

**KEYWORDS:** temperature, sensor, user, room temperature, smart sweater**.**

**INTRODUCTION:** Normally, if the surrounding temperature is lower than your own, heat will escape from your body into the air. Without clothing, fresh, "cool" air may frequently come in contact with your skin, accelerating the rate at which you lose body heat. Clothing keeps you warm by creating a barrier of air between your skin and the fabric. The rate at which heat is transported from your body is slowed as this layer of air warms up. The rate at which heat is transported from your body is slowed as this layer of air warms up.

Therefore, the trapped air layer evaporating and your body reacting to the cooler air around you are the causes of the freezing sensation you experience after taking off your clothes. Therefore, the typical sweaters used in cold climates are constructed of heavier animal skin. This makes it difficult for the user to maneuver around it and complete their tasks in the cold. In order to address this problem. The Smart Sweater (SS) maintains the user's body temperature at typical threshold concentration. A lightweight sweater is the (SS). The user can maintain a comfortable body temperature with the aid of a smart sweater. The basis of the (SS) is hot steam, which is created by boiling water and vaporizing it to create hot steam that is distributed to every section of the body to maintain temperatures The basis of the (SS) is hot steam, which is created by boiling water and vaporizing it to create hot steam that is distributed to all body areas and maintains temperature. The temperature sensor controls this process. Once the temperature reaches the desired level, it will cease heating the water, which will halt the steam that will be produced. The rise and fall of the temperature within the (SS) depends on the temperature outside the sweater. In the medical field and nuclear power plants, heated steam is used.

## LITERATURE SURVEY:

## PROBLEM:

The people who live in cold area or country, people who lives who face a problem when winder season starts or the people who lives in polar region these people will always have to use the heavy clothing or sweater. This heavy clothing will cause many problems to the person

who uses this the problems are the user can move properly, can't walk properly and also there are some workers who works in the winder. These worker may have issues working with heavy clothing by not reaching there full potential and there are sweaters which is made by animal skins and animal skins are best for the user to protect them self from the cold air but this cost more money. And to obtain animal skin it is killed and this also affects the environment and the wild life

## METHOD FOR SOLUTION:

To make the block the cold air which enters the body and make as easy and effective and comfortable sweater with light clothing and light wight and with some technology with is placed in sweater And its called ***smart sweater*(SS)** the (SS) is the sweater which interact with the user which have the heating technology and this technology make (SS) a special sweater and which will not have any use with animal skin so that that will not affect environment and heating technology is based on heating the liquid fluid by this technic then heat inside the fluid will exchange with the cold air in sweater so that the temperature can be maintained . All the process of **Smart Sweater** is controlled by application which is in the mobile.

## PROPOSED METHODS:

At the start when we wear the smart sweater(SS).When we ON the heater the liquid fluid which is contain inside the fiberglass is heated so the liquid fluid is heated upto hundred degree Celcius (100ºC) so the liquid fluid will get heated and produce heat .The heat is allowed to pass through the mini fan and circulates in the (SS) and heat is spread around our body .As the heater which heats the liquid fluid ,passes through the whole fiberglass tube which will cover the upper and lower part of body , mini fan which is placed above fiberglass .Once the required temperature is reached then the heater will stop heating the liquid fluid and this process is done by the sensor which is placed inside the sweater and outside the sweater so it can detect the temperature.

**Temperature sensors:** Temperature sensors are tools that monitor temperature and detect converting the information into an electrical output. And sent to the processor with is the cpu of the smart sweater according to the result of the temperature sensor the processor will follow the instruction this will make the sweater user friendly and the processor is controlled by the user with help of software application which is downloaded in smart phones

## ARCHITECTURE:

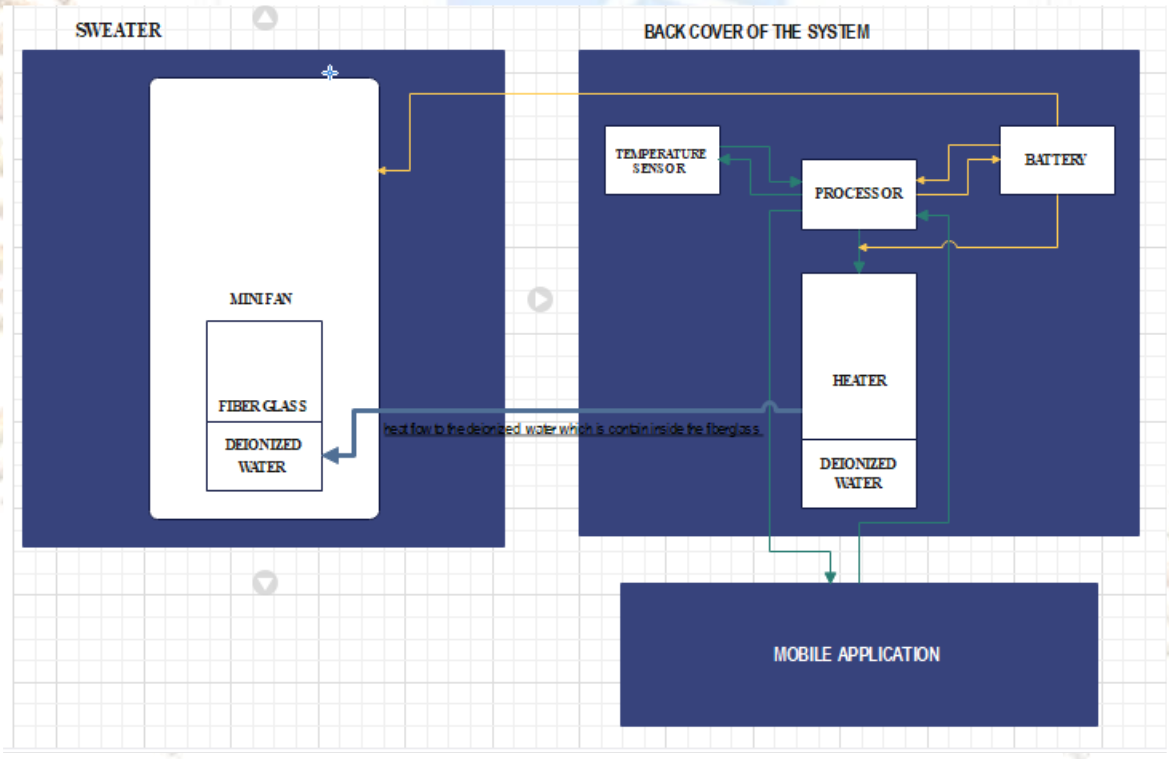


Fig.1: Architecture of smart sweater (block diagram)

## MATERIAL:

## FIBERGLASS:

An example of a fiber-reinforced plastic is fiberglass, where the reinforced plastic is made of glass fiber. The other names for fiberglass, glass reinforced plastic and glass fiber reinforced plastic, may result from this. The glass fiber is often dispersed, flattened into a sheet, or woven into a cloth. Depending on the intended usage, various glass kinds can be combined to create the glass fibers used in fiber glass. Fiberglass is more resilient, light, and less brittle. Fiberglass's versatility in complex shape molding is its best quality. This largely explains the widespread use of fiberglass in things like roofing, boats, cars, and restrooms

## FIBERGLASS'S CHARACTERISTICS:

Mechanical toughness: Steel is more susceptible to corrosion than fiberglass. In order to create high-performance
Electrical properties: Fiberglass is an excellent electrical insulator, even at moderate thicknesses. Because it is made of minerals, fiberglass is naturally incombustible. A flame cannot persist or expand as a result. It doesn't emit smoke or dangerous compounds when heated Dimensional stability: Fiberglass can withstand variations in temperature and humidity. It has a low coefficient of linear expansion.

Fig.2: Fiber glass

It's recommended to use clean filtered water because adding hard water might lead to the accumulation of scale and lime. The water is progressively heating by internal burners once the vaporizer is plugged in and switched on, bringing the water to a boiling point where it turns from a liquid to a gas. The gas is then forced through a hole in the vaporizer and released into the surrounding air. This will keep going until either there is no more water in the container or the vaporizers is disconnected.

## MINI FAN:

Simply put, a portable fan is one that is not mounted to a wall or ceiling permanently. From tiny rechargeable batteries fans that fit in the hand to gigantic box fans designed to ventilate a whole room, portable fans come in all forms and sizes. An achieve the out comes to keep the air moving, control the temperature of a space, and supplement the usage of an air conditioning unit to improve energy efficiency is to utilize a portable fan. The main purpose of the mini fan is to push the heat from the fiber tube and circulate inside the sweater a 4 cm wings fan is placed inside the sweater Fiberglass is available in a range of diameters and may be blended with a number of synthetic resins as well as various mineral matrices like cement. Non-rotting: Fiberglass does not rot and is unaffected by rats, insects, or other organisms. Temperature Conductivity Steamer the Function of Steam Vaporizers Steam vaporizers manufacture steam by heating water and releasing it. The chamber of a steam vaporizer must be filled with clean, filtered water to the stated fill line in order to operate.

Fig.3: Mini Fan

## BATTERY:

During a power outage, batteries are the main source of backup power. At home, electrical gadgets are commonly connected to batteries so they may function even if the power goes out. For instance, utility providers may have varied rates for customers depending on the time of day. These customers can use batteries to manage their energy needs by discharging energy during periods of high cost and storing energy when costs are low. Batteries can store solar and wind energy and discharge it when it's most necessary. Battery which is used to produce electrical energy to the steamer in which the electrical energy is converted to heat energy so that it produces steam and the battery produce up to 70v, the intake current is 100V and the capacity of the 200000 which is in the shape of pad and the heater is 125watt heater which is capable of heating the Deionized Water which heats conducting liquid.

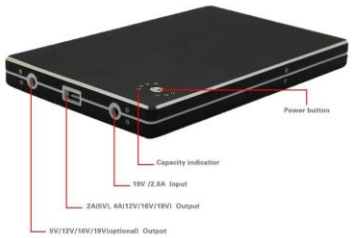


Fig.4: Battery

## TEMPERATURE MAINTAINING SYSTEM FOR BATTERY:

27°C is the required temperature for the battery's specs. A battery will function better at a higher temperature, but if the exposure is kept up for a long time, the lifecycle will be shortened. The graph below provides an illustration of how a typical 18650 Li-ion battery's voltage value decreases as temperature decreases.

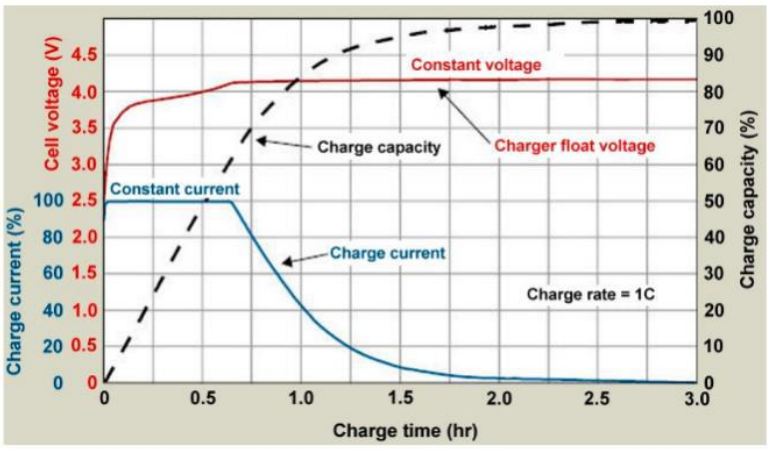


Fig.5:

On the other hand, at low temperatures, the capacity drops as quickly as the temperature drops. For instance, a battery will normally produce just 50% of its capacity at 27°C when operating at -18°C. This is because the battery's electrochemical reaction rate is influenced by lower temperatures.

## SWEATER:

It will cover the whole heating system and also It is used to give a extra resistance to the cold air with the help of sweater the fiberglass tube is placed inside the sweater which is supporter for the tube . The sweater which is made up of light weight material so the user will can work effectively and the sweater is layer system type.

Fig.6: Sweater

## SENSORS:

Temperature sensors are devices that measure temperature, identify cold and heat, and provide an electrical signal. Temperature sensors are found in commonplace items including household water heaters, thermometers, freezers, and microwaves. There are several applications for temperature sensors, most notably in the geotechnical monitoring sector. A temperature sensor may also be thought of as a simple tool that measures how cold or hot something is and then converts that measurement into a readable unit. The temperature of boreholes is measured using soil, massive concrete dams, or structures, specialized temperature sensors are employed. Therefore, the sensors' application is to measure the temperature inside and outside of the sweater. Depending on the outside temperature will be increased or decreased.


Fig.7: Temperature Sensor

## PROCESSOR:

The processor, which is a chip or logical circuit, responds to and processes the fundamental commands required to run a particular computer. An instruction's fetching, decoding, execution, and writeback are the processor's main responsibilities. Every system, including desktop and laptop computers, mobile phones, embedded systems, etc., contains a processor, sometimes referred to as the brain. The processors' two main parts are the CU (Control Unit) and ALU (Arithmetic Logic Unit). While the arithmetic logic unit performs all mathematical operations, such as additions, multiplications, subtractions, divisions, etc., the control unit acts as a traffic officer, controlling the command or operation of the instructions. The CPU may communicate with input/output devices, memory, and storage devices that make up the other components.

Fig.8: Processor

## CONCLUSION:

As result the smart sweater (SS) the user will experience the comfortable feeling in the cold climate. The(SS) will makes the user feel in warm inside the sweater even the atmosphere temperature is low then (SS) because of the heating system inside the sweater makes the (SS) as the best and effective sweater .The weight of the sweater Is 1kg with battery and the heating system so the user can work effectively because of the light weight and the battery will least longer and the system is operated by a processor an sensor which will make the sweater even better . the heating technology is the main things that makes the user comfortable and sweater is made up of **synthetic fibers** and sweater is a layer system so that the tube with contain the heat will touch the user.

## ADVANTAGES:

1. The appropriate temperature was attained fairly rapidly.
2. Fast, homogenous liquid heating at higher heating rates
3. decreased issues with surface fouling
4. No heat transmission remains after the current has been turned off
5. Minimal upkeep expenses and high energy conversion rates
6.instantaneous system shutdown 7 Lower maintenance expenses due to the absence of moving parts
8 .A quiet system that is ecologically friendly
9 .Lowering the chance of surface fouling on heat transfer
10. More features could be introduced soon. The features include voice control, fitness monitoring, GPS navigation, wireless charging, and washable technology

## DISADVANTAGES:

1.camplex coupling between temperature and electrical filed distribution.
2.can't be used for long period of time because of the battery usage.
3.The battery is heavy

## LIMITATION OF THE SMART SWEATER (SS):

The smart sweater (SS) main degrade is that it runs on a battery so that it needs to be charged and it can't be used for a long period of time and the over-heating can cause the system malfunction

## FUTURE SCOPE OF THE SMART SWEATER:

Data about the wearer is collected by smart clothing and used to personalize the user's experience. This data is frequently exchanged with a smart device application. The advantages that smart clothing can provide to other businesses are becoming more and more clear as it becomes more typical in some industries, including sports. Enhancing worker capacities through enhancing health and safety and, in turn, increasing productivity, is possible with the use of smart clothing. For instance, "exosuits" are a type of wearable robotic equipment created to assist workers who perform demanding and repetitive activities. Exosuits ensure that the physical strain of the job is reduced and that the worker's safety is prioritized by adding tension in reaction to movement. Workers are able to work securely for longer periods of time without the physical strain of these duties. Hero Wear, a firm that seeks to make the exosuit less robotic and more integrated inside uniforms and apparel, is based on this idea. The intention is to make this technology more accessible to white-collar employees who may have trouble sitting still for extended periods of time and nurses who perform physically demanding activities

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