

DESIGN AND DEVELOPMENT OF LEVEL 1 SAFETY VEST**KARAN.R (18BFT007)****SANTHOSH.S (18BFT018)****VIMALRAJ.S (18BFT020)****PRABHU.K ASSISTANT PROFESSOR II****KUMARAGURU COLLEGE OF TECHNOLOGY****DEPARTMENT OF FASHION TECHNOLOGY BATCH (2018 – 2022)****1. ABSTRACT**

Annually various activity fatalities result from pedestrians being stricken by automobiles intrusive into work zones.

To improve the protection of pedestrians, it's necessary to grasp the underlying causes of accidents. With targeted analysis, patterns emerge, and causative factors may be known. These findings might then be helpful to get the idea for recommendations that may facilitate boosting bicycler's and pedestrians' safety.

Little analysis has been conducted in this space. Attributes of retroreflective personal safety clothes on pedestrian conspicuity in the dead of night were assessed during a field study. mistreatment instrumented vehicles on a closed track, participants drove through simulated work zones attempting to discover pedestrians set within the work zones. (Sayer, 2004).

Here is a trial to create A level one safety vest by digital illustration. It's useful for pedestrians who travel on the road because the variety of accidents is increasing and is usually owing to scarcity or lack of communication and vision through cars and larger automobiles.

The present analysis work emphasizes on style and development of a safety vest, it's pictured as a row of lights in an arrow mark format to indicate the presence of a pedestrian traveling by road.

For the wearer's comfort, the vest is created in cotton-poly material with a 60/40 mix that helps in straightforward movement and it's a pair higher than the traditional materials. It has been studied to provide 2 % better the wearer's compatibility in terms of comfort.

2. INTRODUCTION

Electronic textiles square measure distinct as a result of their place in the seamless integration of textiles with electronic components like microcontrollers, sensors, and actuators. what is more, e-textiles needn't be wearable. Smart textiles may be divided into two completely different classes aesthetic and performance-enhancing aesthetics including materials that illumine and materials that will amendment color. A number of these materials gather energy from the atmosphere by interesting vibrations, sound, or heat, reacting to those components.

The color is ever-changing and lighting also can work by embedding the material with physical science which will power it. Performance-enhancing good textiles square measure meant to be used in athletic, extreme sports, and military applications.

If straightforward and effective process strategies for these materials are developed it'll create them additionally amenable to industrial and alternative applications. it'll produce additional demand and can facilitate human life.

There is an increasing need to have easily deployable and autonomous technical devices to support the safety and well-being of civilians. Additionally, and not negligibly, these new devices should also ease the bur-

den of the respective users in their daily routines. Therefore, fastidiously designed solutions may offer a lot of resources and time. rather than defrayment time on issues of safety.

There are already a great variety of sensors and devices deployed on roads and at homes, and more are expected shortly. However, utilizing these multiple sensors and the information that they provide is not straightforward, as often the data is not easily accessible or available. Also, difficulties arise, when managing the multi-sensor data to make intelligent reasoning and to be able to conclude the children's safety and well-being. (MIRJAMI JUTILA, 2014)

The vision-based detection of a civilian is an important element for various applications in both safety management and productivity measurement. Computer vision provides a rich set of data that helps distinguish between others that can be found nearby. Within the last decades, video surveillance has become common on construction sites with the deployment of vision sensors. The better the quality of the camera is, the higher the quality of the acquired images will be. Computer vision techniques, in combination with computer networks and automated image recognition, take advantage of this. The valuable information in video frames of complex construction tasks can be provided promptly and accurately with highly sophisticated computer vision techniques.

Detecting the safety vests is an important foundation for various applications in safety management and productivity measurement. The fluorescent yellow-green color and fluorescent orange-red color of safety vests are generally considered the most distinctive colors which represent workers in construction-site images. The objective of this study is to provide an evaluation of the safety vest detection using color information in construction-site images. The data sets of two colors of safety vests and the background were generated and used in this study. A comparative analysis of combinations of five color spaces (RGB, nRGB, HSV, Lab, and YCbCr) and six classifiers (ANN, C4.5, KNN, LR, NB, and SVM) was conducted. The performance of each combination was assessed in terms of precision, recall, and F-measure. Moreover, an evaluation of the effects of color space conversion and the absence of luminance components on the detection performance was conducted. The comparison results showed that the C4.5 classifier combined with YCbCr and SVM classifier combined with Lab, respectively, outperformed other combinations on each data set of safety vest colors. Furthermore, RGB color space transformation into non-RGB color spaces enhanced the classification performance. The evaluation also showed that the removal of luminance components did not help to improve the performance

There have been a few studies on the use of computer vision techniques to detect pedestrians. The researchers in most previous studies employed the shape of the human body as a feature for construction worker detection. However, these studies were limited to detecting workers with upright postures. (H. SEONG, 2017)

Although these methods may work in controlled construction scenarios, construction worker detection in construction scenes remains challenging because of the various postures of construction workers in the construction scene.

To meet these challenges, color-based features have obvious advantages over other features (especially in complex environments) because the color of an object of interest is independent of the positions and shapes. Color-based features are commonly used in various object detection techniques such as the detection of workers, equipment, and materials on construction sites.

The color property of the safety vest is expected to be an accurate and robust feature that has the potential to overcome the limitations of pedestrian detection that uses shape-based features. The American National Standards Institute stipulated that wearing a high-visibility safety vest helps reduce the likelihood of accidents.

3. MATERIALS

3.1 Nylon straps

3.2 Arduino UNO board

3.3 Breadboard

3.4 Connecting wires

3.5 PCB

3.6 5v LED bulbs

3.7 Addressable LED strips

3.8 Two way switch

3.9 Battery 9V

3.10 ultrasonic sensor

3.1 NYLON STRAPS

Nylon is a strong, flexible artificial fiber a strap is a narrow piece of leather, cloth, or other material. Straps are used to carry things, fasten things together, or hold a piece of clothing in place. Nylon webbing is sturdy and durable. It is an excellent choice for webbing. It has soft touch and flexibility. It's widely used in climbing harnesses, slings, furniture manufacturing, military, survival utility, etc.



FIG.3.1 Nylon Strap

Many of the products we use every day have webbing straps. Webbing and tape are often used for decorative furniture trim, tie-downs, sporting goods, shade edge reinforcement, belts, purses, backpack straps, bag straps, seatbelts, dog collars, parachutes, lanyards, and more.

3.2 ARDUINO UNO BOARD

Arduino Uno is a microcontroller board based on an 8-bit ATmega328P microcontroller. Along with ATmega328P, it consists of other components such as a crystal oscillator, serial communication, voltage regulator, etc. to support the microcontroller. Arduino Uno has 14 digital input/output pins (out of which 6 can be used as PWM outputs), 6 analog input pins, a USB connection, A Power barrel jack, an ICSP header, and a reset button.

Used for controlling the arrow mark representations on PCB in the vest.



FIG.3.2 Arduino Uno

3.3 BREADBOARD

A thin plastic board is used to hold electronic components that are wired together. Used to develop prototypes of electronic circuits, breadboards can be reused for future jobs.

Because the solderless breadboard does not require soldering, it is reusable. This makes it easy to use for creating temporary prototypes and experimenting with circuit design. For this reason, solderless breadboards are also popular with students and in technological education. Older breadboard types did not have this property.

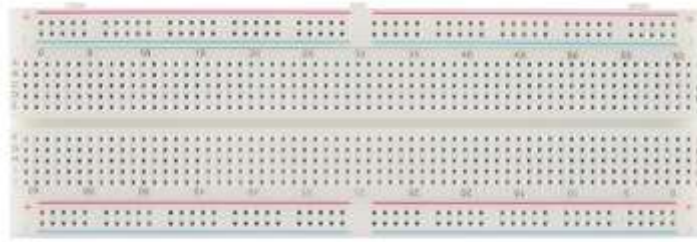


FIG.3.3.Breadboard

A stripboard and similar prototyping printed circuit boards, which are used to build semi-permanent soldered prototypes or one-offs, cannot easily be reused.

3.4 CONNECTING WIRES

Each is a pair of thick electric cables fitted with clips at either end, used for starting a vehicle by connecting its dead battery to the battery of another vehicle; a jump lead.



FIG.3.4 Jumping Wires

Individual jump wires are fitted by inserting their "end connectors" into the slots provided in a breadboard, the header connector of a circuit board, or a piece of test equipment.

3.5 PCB

A printed circuit board is a laminated sandwich structure of conductive and insulating layers. PCBs have two complementary functions. The first is to affix electronic components in designated locations on the outer layers using soldering.

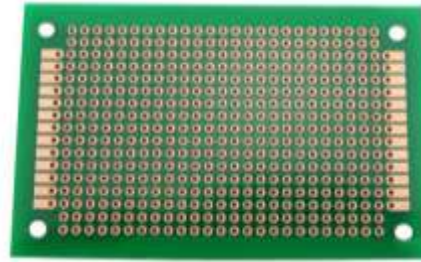


FIG.3.5 PCB

PCBs mechanically support electronic components using conductive pads in the shape designed to accept the component's terminals, and also electrically connect them using traces, planes, and other features etched from one or more sheet layers of copper laminated onto and/or between sheet layers of a non-conductive substrate.

Components are generally soldered onto the PCB to both electrically connect and mechanically fasten them to it. Printed circuit boards are used in nearly all electronic products and some electrical products, such as passive switch boxes.

3.6.7 ADDRESSABLE LED STRIPS 5v LED BULBS

Individual LEDs are controlled, specifically color differences and whether or not each LED is addressable. An LED strip light is a flexible circuit board populated by surface mounted light-emitting diodes and other components that usually come with an adhesive backing. Traditionally, strip lights had been used solely in accent lighting, backlighting, task lighting, and decorative lighting applications.



FIG.3.6 Led Bulbs



FIG.3.7 Led Strips

Increased **luminous** efficacy and higher-power SMDs have allowed LED strip lights to be used in applications such as high brightness task lighting, fluorescent, and halogen lighting fixture replacements, indirect lighting applications, and ultraviolet inspection during manufacturing processes, set and costume design, and even growing plants.

3.8 TWO WAY SWITCH

You would use a two-way light switch when you have two switches controlling one light, for instance in a hallway, where you have a switch at both ends of the hallway that controls the hallway light.

You can switch the light on and off from either end of the hallway In contrast to a simple light switch, which is a single-pole, single-throw (SPST) switch, multiway switching uses switches with one or more additional contacts and two or more wires are run between the switches. When the load is controlled from only two points, single-pole, double-throw (SPDT) switches are used. Double pole, double-throw (DPDT) switches allow control from three or more locations.

3.9 BATTERY 9V

The nine-volt battery, or 9-volt battery, is a common size of battery that was introduced for early transistor radios. It has a rectangular prism shape with rounded edges and a polarized snap connector at the top.

The nine-volt battery format is commonly available in primary carbon-zinc and alkaline chemistry, in primary lithium iron disulfide, and the rechargeable form in nickel-cadmium, nickel-metal hydride, and lithium-ion.

Mercury-oxide batteries of this format, once common, have not been manufactured in many years due to their mercury content.

3.10 ULTRASONIC SENSOR

An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity. Ultrasonic transducers and ultrasonic sensors are devices that generate or sense ultrasound energy.

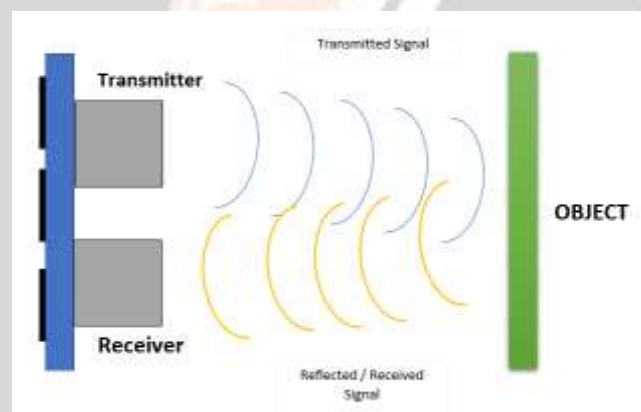


FIG 3.10

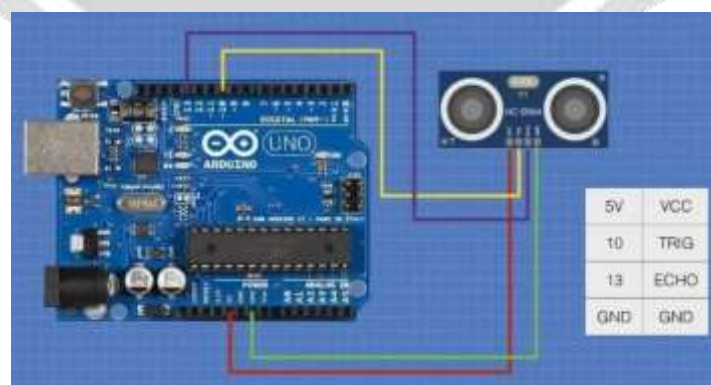


FIG 3.11

4. RESULT

In our fast-moving society, automobile accidents happen a lot and tend to have casualties who are on foot or on bicycles.

Normal people tend to keep themselves fit via training and some do it in various ways such as running cycling hitting the gym.

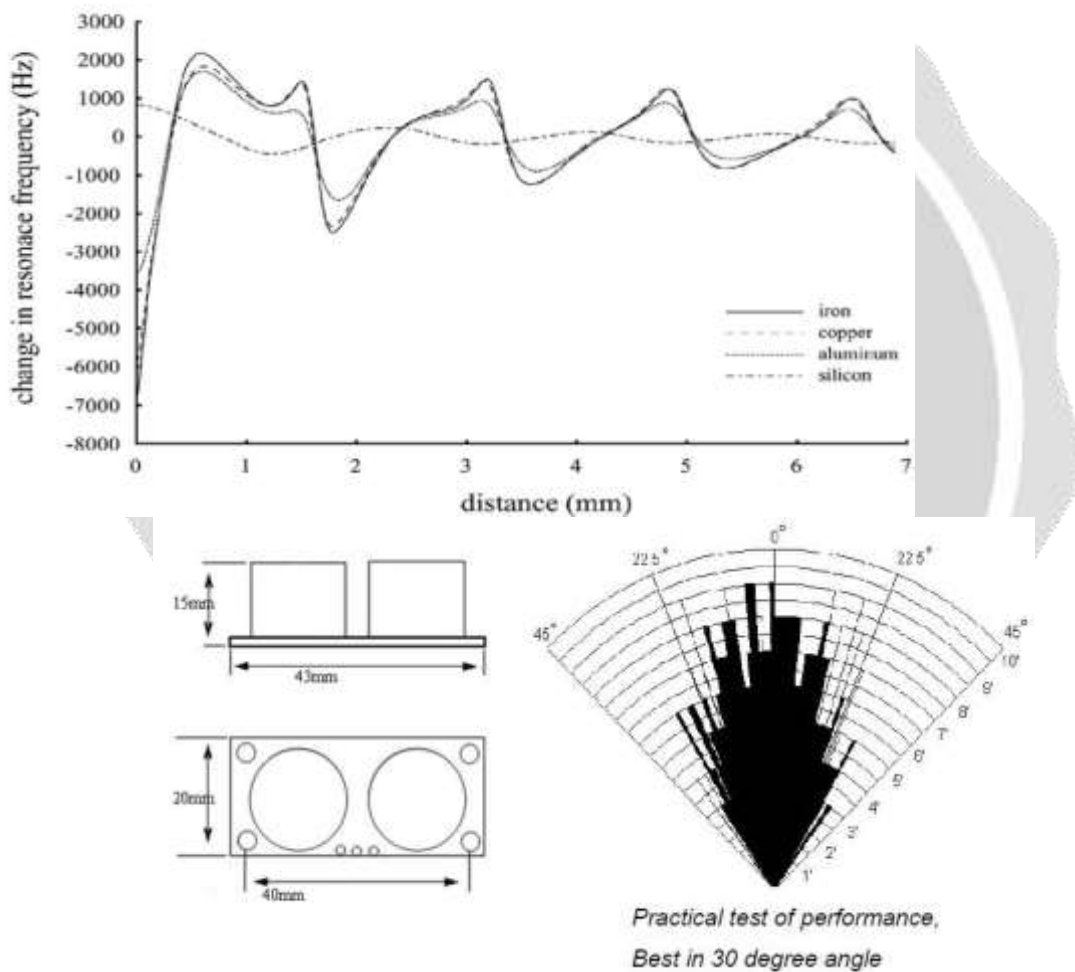
Our concerned people are those who travel by foot or bicycle for any reason it helps in allowing others to know that an individual is present near them or within range of their viewpoint.

With the help of statistics and analysis, we can help prevent collisions between civilians and automobiles. This vest can help people by visible safety.

Our safety vest helps civilians to be noticed from a faraway distance to avoid complications ahead. Decrease the number of casualties in a road accidents.

For example, our safety vest guides both the user of the vest and also the people far off who are on their motorcycle or car, etc.

The user is notified by the ultrasonic sensor that someone is approaching close to them and also the LED lights transfer signals to show the others the next location of the user.



5. CONCLUSION

It is envisaged that the introduction of this safety vest will allow the civilians to carry out their daily routine walk workouts on roads securely by reducing the accident rates. Particularly, such a design is expected to reduce road accidents, especially during night-time in large traffic zones where the visibility is low. For the past years, Occupational Health and Safety has been continuously improving safety management through safety equipment and training. However, these improvements are still not enough in lessening the accidents and deaths

happening on site. Aside from human errors, the limitations of traditional safety management are also causing accidents. The continuous development of technologies increases the possibility of improving safety

Management. Technology widens the range of protection that normal safety equipment can offer. Smart construction objects utilize different technologies to offer more functions than a typical construction object. It is advisable that road users use them to create an environment where unfortunate circumstances on the roads are reduced. In fact, this safety vest could be further improved and designed for additional safety.

6. REFERENCE

- [1]. <https://www.sciencedirect.com/science/article/pii/S1877050914007078>
- [2]. <https://www.koreascience.or.kr/article/JAKO201028542319985.page>
- [3]. <https://search.proquest.com/openview/03e285fff7a50fb5a6a4ac696c141c3/1?pq-origsite=gscholar&cbl=1646340>
- [4]. <https://iasks.org/articles/juspn-v06-i1-pp-33-39.pdf>
- [5]. <http://www.internetofthings.fi/extras/IoTMagazine2015.pdf#page=32>
- [6]. <https://www.koreascience.or.kr/article/JAKO201028542319985.page>
- [7]. <https://www.koreascience.or.kr/article/JAKO201809355933222.page>
- [8]. <https://link.springer.com/article/10.1007/s12205-017-1730-3>
- [9]. <https://link.springer.com/article/10.3758/BRM.38.1.158>

