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Smart Walking Stick with Fall detector

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Abstract: ***There are many aged people in our surrounding. They can't walk without the help of other people of the society. One has to ask guidance to reach their destination. They have to face more struggles in their daily life. Today technology is growing to a greater extent, however there is no cost-effective device for aged people.***
The history of walking stick can be traced far back when the simple wooden stick was used by human for support. James Biggs of Bristol claims to have invented the walking stick in the year 1921.
For an aged person it becomes difficult to do his/her day-to-day activities, therefore Smart walking stick can help people in moving and allowing them to perform their work easily, during walking in the street, which makes it very dangerous. GPS is used which tells the user about his current location.
Keywords: Fall detector, Stick, GPS, GSM Module, LDR sensor, Torch.

I. INTRODUCTION

Safety of the aged people should be at the highest priority.
Aged people have difficulty to interact with environment. As vision is the most important part of human physiology as 83% of information human being gets from the environment is via sight.
The 2011 statistics by the World Health Organization (WHO) estimated that there are 70 million people in the world living with visual impairment, 7 million of which are blind and 63 million with low vision.
Most of the people having low vision might be the aged group of the society. This stick would also help them.
To navigate unknown places, they will bring a sighted family member or their friend for support. This stick can help aged people to navigate safely.
The most unique feature of the stick is fall detector which immediately alerts the person's caretaker about a mishap. This stick also consists LED torch which gives clear vision to the person in the night.

II. DESCRIPTION

1) *Stick:* Stick is the main architecture of our project because all of the concept is based on the smarting the stick .all the components required will be assembled on the stick. The chemical composition of wood varies, but is approximately 50% carbon, 42% oxygen, 6% hydrogen, 1% nitrogen, and 1% other elements (mainly calcium, potassium, sodium, magnesium, iron, and manganese) by weight. polypropylene is also being used to increase the hardness of the material.

Fig.1 Stick

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2) *GPS Module:* GPS stands for Global Positioning System. A GPS navigation device (EM-411), GPS receiver, or simply GPS is a device that is capable of receiving information from GPS satellites and then to calculate the device's geographical position. Using suitable software, the device may display the position on a map, and it may offer directions. It is a space-based radionavigation system made up of at least 24 satellites that provides geolocation and the time information to a GPS receiver anywhere on or near the earth where there is an unobstructed line of sight to four or more GPS satellites. The stick can be easily navigated by the assistance of GPS technology.

Fig. 2 GPS

3) *GSM:* GSM modem or GSM module is Global System for Mobile Communication. It uses mobile telephone technology to provide a data link to a remote network. The stick also has an alerting system which connects to a GSM network and alerts the person's immediate caretaker about a mishap. It contains GSM connectivity, it does not need to be paired to any device. If the user is not feeling comfortable while walking or even while sitting, he/she can use the alert switch provided on the walking stick. This alert switch when pressed by the user sends an alert message to some pre-stored mobile number using GSM module that the user is not feeling well along with its location as latitude and longitude determined using GPS module.

Fig.3 GSM Module

4) *Instant Fall Alerts:* Caregivers automatically receive a phone call, a text message or an email. The caregiver signals that he/she can respond to the alert. Confirmation is sent to the stick, which lets its user know that someone has been warned. The onboard battery lasts long enough to allow charging between weeks of use. detector is designed to monitor person's movements and raise an alert if it detects a fall.

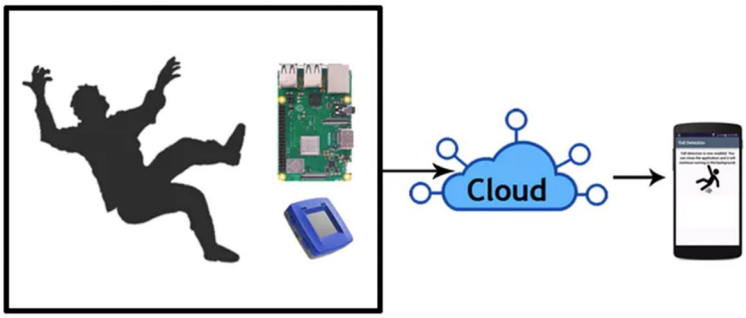

Fig.4 Fall detection system

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5) *Inbuilt LED Torch:* torch can be made adjustable to the user with inclination of the angle of the torch. Base of the stick is made of complex material which helps in giving a better grip and stability to the user. also water resistant so the user might not slip over the spilt water the range of the LED light can be adjusted according to user interface over a range of 10,12m for wide range and 2,3 m for short range of light**.** Light Dependent Resistor (UNI4), changes its resistances due to change of the light intensity. During night, LDR will have high resistance and no current pass through it but through a LED connected parallel to it which illuminates and acts as a Flashlight, which can be easily noticed by others. It alerts people about the presence of blind person to let him to pass the way.

6) *Features of Smart Walking Stick*

Fig.6 Smart walking stick

a) Smartest than the other mainstream stick.
b) Entirely automated.
c) Can be maintained & operated easily.
d) Very comfortable to function.
e) Authentic & Durable.
f) Simplicity of the design makes it effective.
g) navigation assistant.
h) Additional features like GPS, adjustable torch.
i) Overall manufacturing cost is low & parts are available in both local & international market.
j) Automated fall detection system.
k) Adjustable height of stick.
l) Steady and grippy handle.

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III. WORKING

There are actually three different kinds of sticks.:

1) Standard mobility stick, used to navigate.
2) Support stick, used by people with visual impairments who also have mobility challenges.
3) ID stick, a small, foldable stick used by people with partial sight to let others know they have a visual impairment.

Aged person if falls down there may be a severe injury to them or might be vital. They can also suffer with health problems.

A. Some Common ones Include

Urinary tract infection, Dehydration, Anaemia (low red blood cell count), which can be brought on by bleeding in the bowel or by other causes Pneumonia Heart problems such as atrial fibrillation Strokes, including mini-strokes that don't cause weakness on one side.

These problems could be eased to the aged people by using not only the stick but a smart stick.

One of the main features of this device is that it will be affordable.

Using the sensor, aged people can detect the objects around them and can travel easily. When the sensor detects any object, it will notify the user by beep or vibration. Aged people might need a stick to balance themselves through walking around.

Some of the modifications like a sensor could be attached to it so that if any tragedy happens at an instant and stick falls down, an automatic message is sent to their care takers and this would be a life-saving tool.

Attach a torch and a GPS system into it which makes their life convenient.

IV. FUTURISTIC SCOPE

The stick is especially designed by focusing on the safety and latest features to give safe and comfortable experience to the user. In the modern era automation makes life more easier and smoother. The problem of injury to aged people and its further consequences is being faced. This stick solves these common problems by providing better solution and advanced features. Specially designed by combining all the advanced features at a most affordable price in its category.

V. CONCLUSION

This will be designed so that, the aged person shall be able to move from one place to another without anyone help, which will increase the rate of mobility for the visually impaired person. This smart stick will be integrated with multiple sensors, which will help in navigating the way while walking and keep alerting the person if any sign of danger is detected.

This will gives good results in detecting obstacles on the way of the user it and will be real help for the aged people. At the same time Global Positioning System (GPS) is linked with the voice stick, so that person can know his current position which will be informed to users through voice instructions.

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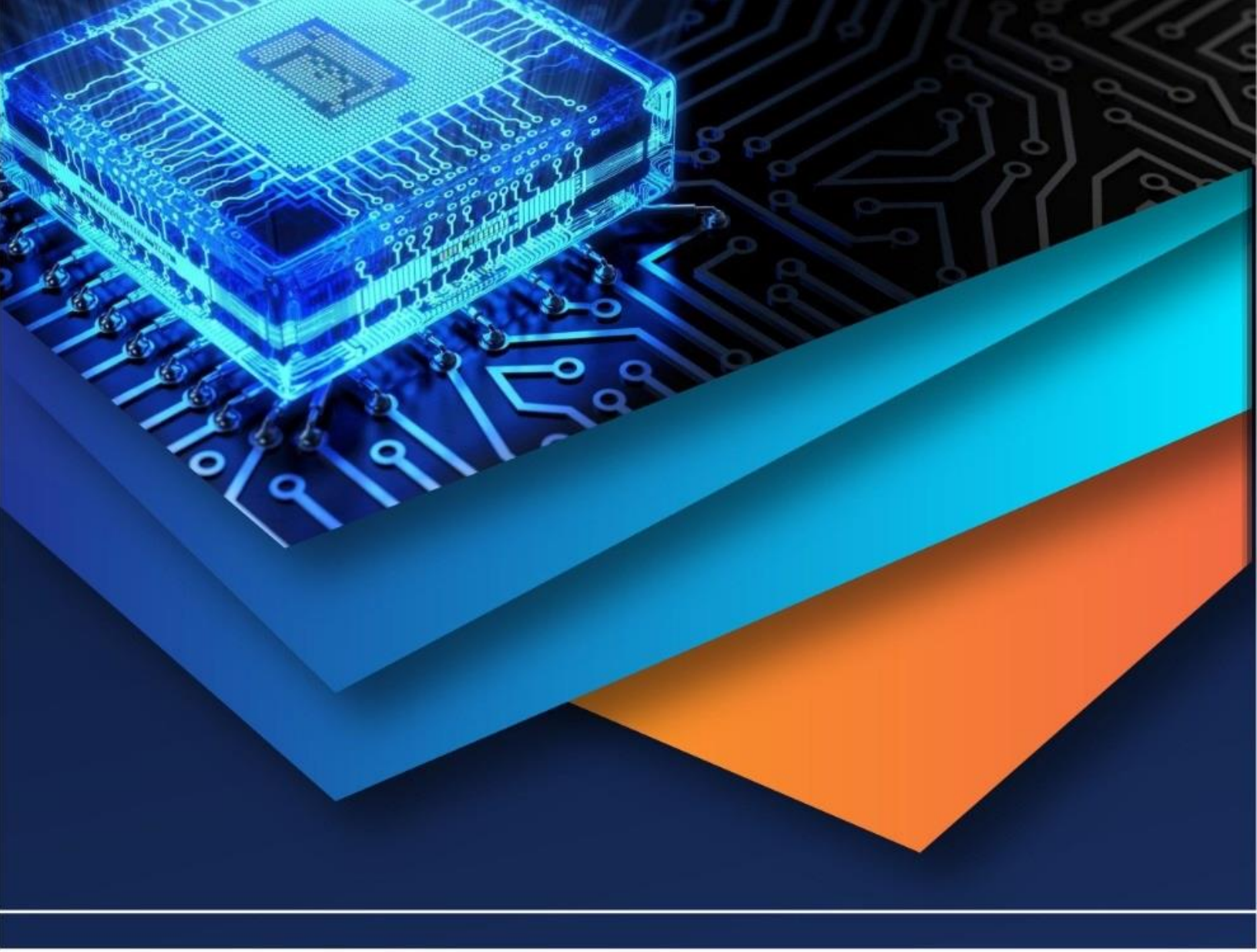

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