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SMART SHOES FOR BLIND USING INTERNET OF THINGS: A REVIEW

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Abstract: This paper introduces a thought regarding managing the issues looked by blind people through smart shoes. Due to the blind people face many challenges especially when moving in public places. 285 million people are estimated to be visually impaired worldwide out of which 39 million people are blind and 246 have low vision [1]. Smart shoes will help a blind person to mover on independently with help of ultrasonic sensor to detect obstacles. In this paper presents various smart shoes for blind technology using Internet Of Things.

KEYWORDS

Visually impaired, Sensors, Obstacle detection, Smart Shoes

I. INTRODUCTION

People with visually impaired faced most of the challenges in the environment. The long Hoover Cane used by them is not advantages while walking and travelling. Using smart shoes for visually impaired people need not to be depending on others for mobility. The systems we have designed consist of sensors and vibrator for sensing the surrounding environment and giving feedback to the blind person. It is used as a safety device as well as navigation device. The electronic hardware will be fixed in shoes for users. User will wear the shoe and travel anywhere, and attached sensor will be sense obstacles near to the shoes alerts with the help of visually impaired people.

India contributes about 21% of the blind people over total population. In a million population, there are around 53 persons that are visually impaired, 46 thousand are having low vision and around 7000 have completely lose the vision [2].

Ages (in years)	Population (millions)	Blind (millions)	Low Vision (millions)	Visually Impaired (millions)
0-14	1,848.50	1.421	17.518	18.939
15-49	3548.2	5.784	74.463	80.248
50 and older	1,340.80	32.16	154.043	186.203
all ages	6,737.50	39.365 (0.58)	246.024 (3.65)	285.389 (4.24)

Fig 1: Estimating the blind population

II. FEATURE OF SMART SHOE

- Generate electricity while walk •
- Charge the phone on the go independently
- Health Tracker .
- Obstacle detection for Blind
- Location Finder using GPS
- Auto detection
- Having feature to give indicate right path •
- Less accident will be occurring from the blind people.
- Distraction free travel •
- Automatic rerouting and alerts •
- Various user controlled vibration pattern

III. TECHNOLOGY

Before, blind people use the hoover cane like smart stick as a tool for directing them when they move or walk. But presently develop the shoes which can be more efficient and user friendly, smart blind guidance system. U,

III.I OVERALL TECHNOLOGY

1. Smart assistive shoes

A smart assistive shoe for visually impaired people so they get rid of the shoes and make more independent. The shoes will detect the nearby the obstacles and simultaneously send a message to the receiver audio or vibration form [3].

Smart shoes alerts visually impaired people over objects which are coming between their ways and could help them in walking with less accident.

2. Integrated smart shoes

The integrated smart shoes aims at the development of an Electronic Travelling Aid (ETA) for visually impaired people that will help them to navigate safely. With help of Android application, wearable device is to be made help in navigating the path [4].

3. Li-Fi Based smart shoes

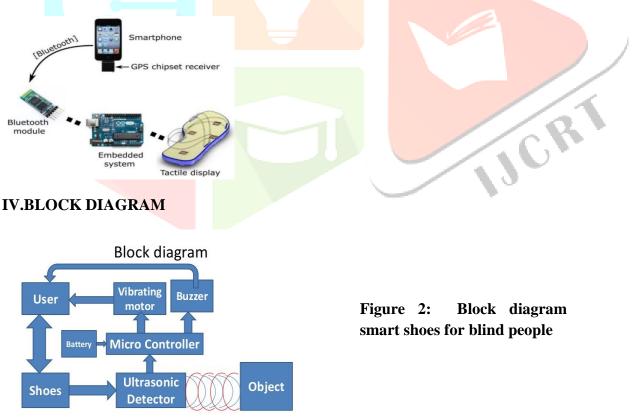
The Li-Fi technology can transfer the data with help of LEDs. It is a high speed wireless communication system, similar to Wi-Fi. This smart shoe that helps the visually impaired in navigation through voice commands which are conveyed through light source in the path [5].

The LiFi transmitter and the data are received through the LiFi receiver. The received data will contain information about data. Smart shoes that provides a stable navigation helps to alerts the visually impaired person over obstacles then to move independently.



4. Haptic shoe for Blind

A haptic shoe gets signals from a GPS enabled smart phones that allows the visually impaired peoples to walk independently, giving directions and alerting to obstacles. With the help of a proprietary app loaded to a GPS enabled smart phone, the user can connect with shoe via Bluetooth and interact with the app to set a destination.



V. HARDWARE DESCRIPTION

1. Arduino NANO Board

The Arduino Nano is a very small, breadboard friendly board based on the ATmega328P (Arduino Nano 3.x). It has more less the similar functionality of the Arduino Duemilanove, but in a various package. It lacks only a DC power jack, and works with a mini-B USB cable instead of a standard one.

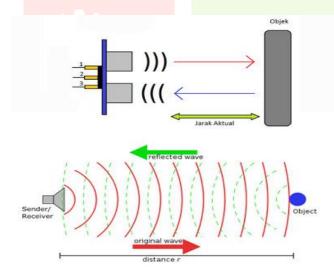


2. Ultrasonic Sensor

Ultrasonic level sensors the distance is measured by using ultrasonic waves. The sensor receives an ultrasonic wave and emits the wave reflected back from the target. Ultrasonic level sensors measure the distance target by calculating the time between the reaction and emission.



The ultrasonic sensor consists of a transmitter and receiver which are available as separate unit embedded together as single unit. The above image above shows the ultrasonic transmitter and receiver.





3. Buzzer

A Buzzer is an audio signalling device. There are many types of buzzer and here 5V passive Buzzer is used, which is used to create the sound.



4. Vibrator motor

This tiny motor produces vibrations by spinning an eccentric shaft at over 900 RPM when power at 1.5V. It is intended for operation around 1.5V, and polarity is not important that is, the motor can run CW or CCW.

The main purpose of this vibrator motor is to alerts the user from receiver the call by without sound and vibrating. These motor are applicable for different categories like pager, handsets, cell phones, bluetooth etc.

5. Bluetooth

The Bluetooth module can receives and transmit the data wirelessly by using two device. The Bluetooth module can receive and transmit the data from a host system with the help of the host controller interface.

The Bluetooth is the similar technology, which is used to connect one electronic device to another, without the usage of any wires and cables. It is a wireless technology to send and receive data between two devicef.



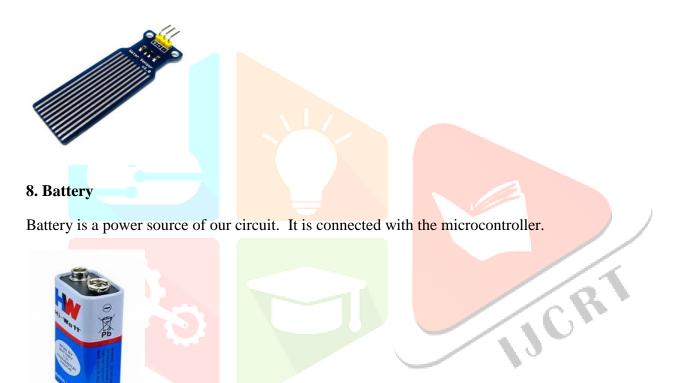
6. IR Sensor

A passive infrared sensor is an electronic sensor. It measures infrared radiating light from objects in its field of view. IR Sensor can measure the heat of an object as well as detect the motion. It is also used for detection of water in the path.



7. Water sensor

The water sensor is an easy to use tool for detecting water. It can act as a simple switch, where the switch is normally open and when there is water, the switch closes.



VI. LITERTURE SURVEY

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				The IR sensor is used for detection of water in the path.				
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				The signal is then converted to binary data which recognized as audio signals. Thus navigation done using Li- Fi.				
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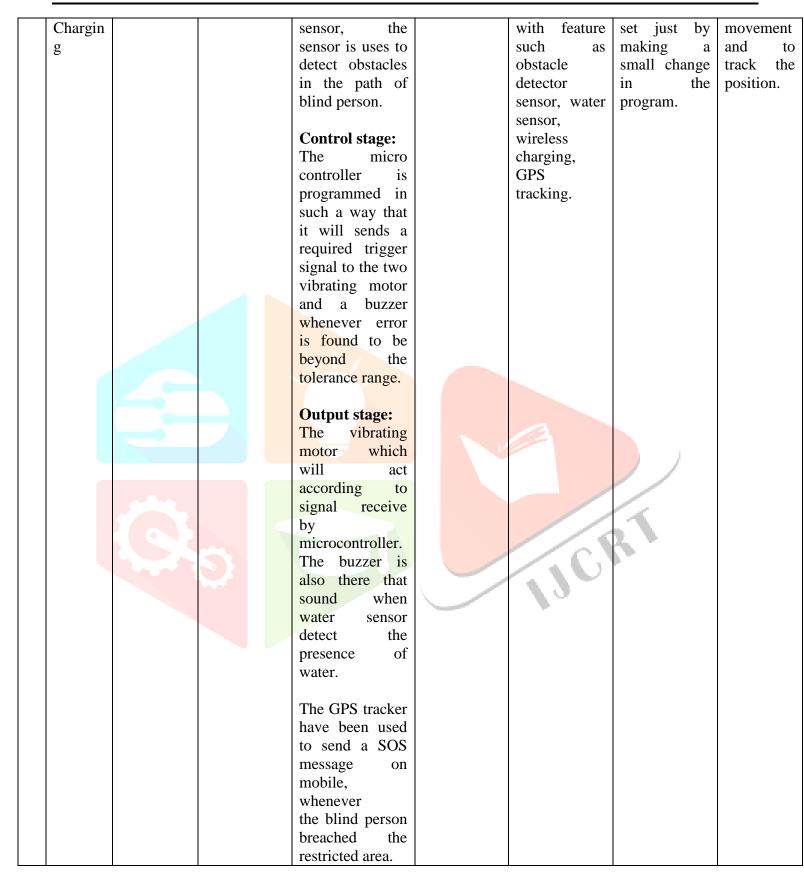
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		B,Nani		Travelling		object is	commands to	mobility,
				Aid(AID) to		detected near	the speaker	thereby
				help the blind		to the shoe	which give	make
				people to find		alerts them	indication to	them
				obstacle free		with the help	the user of	independe
				path. This ETA		of vibratory	the obstacles	nt after
				is fixed to the		circuit and	in the	prolonged
				shoe. When the		also	respective	used.
				object is		in	direction.	
				detected near to		advancement		
				the shoe alerts		with help of		
				them with the		speakers or		
				help of vibratory		headphone		
				circuit and also		that is voice		
				in advancement		command		
				with help of		with help of		
				speakers or		android		
				headphone that		application.		
				is voice				
				command with		. C.		
				help of android				
				application.				
				IR sensor which				
				detects the				
				presence of the				
				obstacles in the				
				direction and				
				sends the				
				command to the				
				controller the				
				detection of				
				object in the				
				direction.				
9	Smart	Saloni	Internationa		Dijkstra's	The system	Sensor will	Future
Í	Shoe	Mohanty	1 Journal of	Electronic	shortest	propose	detect	work will
	for		Advanced	component is	path	detects the	obstacles and	be focused
	Visuall	Malavika	Research in	fixed in shoes of	algorithm	nearest	vibrator will	enhancing
L					0			

	[~	[
	У	Karunan	Computer	user.		obstacle via	vibrate	the
	Impaire		and			an ultrasonic	according	performan
	d	Ibtisam	Communica	User will wear		sensor system	direction.	ce of the
		Sayyad	tion	shoes for easy,		and sends		system
			Engineering	mobility.		back	The	and
		Shlesha		Sensors will		feedback to	Bluetooth	reducing
		Khursade		sense obstacles,		inform blind	connection	the load
				vibrators will		person about	is provided	on the user
				vibrate for left		its location.	through	by adding
				and right turn			which mobile	the
				through path.		When sensors	and electronic	camerato
						will detect	part can be	guide.
				When sensors		any	connected.	
				will detect any		obstacles,		Image
				obstacles, user		user will be		acquired
				will be informed		informed		by the web
				through android		through		camera
				system being		android		and NI
				used by the user.		system being		cameras
						used by the		helps in
				Bluetooth		user		identificati
				connection is				on of
				provided				objects as
				through which				well as
				mobile and				scans the
				electronic part				entire
				can be				instances
				connected. The				for the
				system propose				presence
			51	detects the		1.5		of number
				nearest obstacle				of objects
				via an ultrasonic				in the path
				sensor system				of the
				and sends back				blind.
				feedback to				
				inform blind				
				person about its				
				location.				
1	Design	Mohamma	Internationa		Arduino	The shoe	The shoe can	In future
0	of	d Hassan	l journal of	There are	IDE coding	enable both	be used for	work we
	Arduin		electrical,	broadly three		partially and	nearly 3-4	will
	o based	M.D.	electronics	stages involved		totally blind	hour once the	focused
	Shoe	Atqur	and data	in the design of		person to self	rechargeable	GPS. Its
	for	Rahman	communicat	the proposed		navigate in	battery gets	also added
	Blind		ion	blind shoe:		an unknown	fully charged.	for
	with	Shakeb				environment.	The obstacles	motoring
	Wireles	Alam		Input stage:		The proposed	detection	visually
	S			Ultrasonic		shoes comes	range can be	impaired



VII. ADVANTAGE

- 1. Auto Detection.
- 2. Having feature to give the indicate right path.
- 3. Simple to use.
- 4. Less accidents will be accrued form the blind people.
- 5. This system is applicable for both the indoor and outdoor environment.
- 6. Automatic rerouting and alerts.
- 7. A reliable technology providing a voice feedback as per the surrounding.

8. The GPS tracker which will send the coordinate of the blind person position on mobile, the coordinate can be then used the track the position of google map.

9. User friendly system.

10. Navigation Assistance while travelling.

VIII. DISADVANTAGES

- 1. Less mechanical strength.
- 2. In water circuit will damaged.

IX. CONCLUSION

The main focus of this paper is the various **smart shoes for blind** technologies and their techniques. The smart shoes uses the most reliable source, light, to communicate data to the visually impaired. In future work will be focused on the enhancing the better performance of the system and reducing the load on the users.

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