Guiding Visually Impaired through the streets

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Background Information

Blind people face many difficulties, with smaller ones such as heightened senses which may cause false alarms and larger ones such as difficulty in moving around an area be it because of the terrain or the obstructions
within the area.This disability of losing their sight not only prevents them from seeing but also inhibits their
movements as such many blind people rely on guide dogs.However as some blind people have allergies to fur,
guide dogs may not be of aid to them.And as most members of the public cannot differentiate a guide dog from
a pet even security guards, this may lead to them being unable to access other places or cause the guide dogs
to be distracted causing troubles and problems to the blind possibly preventing them to move around.

What are some current ways of coping with Blindness and their flaws

Blind/White Cane

Advantages:

-A cane is easily replaceable and affordable. With a cost between free to $40

-Canes give you tactile information about your environment.

Disadvantages:

-Has a risk of getting stuck in the cracks along the street,can be especially

dangerous when walking across roads

What are some current ways of coping with Blindness and their flaws

Guiding Dogs

Advantages

-Faster and more graceful travel in general,with a dog you breeze by people and obstacles without much change in pace or direction.

What are some current ways of coping with Blindness and their flaws

Guiding Dogs

Disadvantages

-Two to three week commitment to train with a new guide dog.Expenses incurred with a guide dog – require a lot of food and vet bills are not inexpensive.

-Time and responsibility of daily care for a guide dog – feeding, watering, relieving, grooming and playtime are all a part of a guide dog handler’s day.

-Dog attacks can ruin a dog’s confidence and ability to work.Dog encounters can be a dangerous situation with one serious act of aggression ending a dog’s working life.

Problem Statement

Blind people face many difficulties when it comes to maneuvering around even with the help of guide dogs.Hence in order to allow a more reliable way for the blind to move around and open up inaccessible areas we plan to design a robot that has the ability to lead a blind person around,finding routes that are more convenient for them and even identifying obstructions around them such as flights of stairs,walls and pillars, telling them how they should move even leading them.

What we hope to Achieve

-We hope to find a better way for the blind to manoeuvre through places and navigate to certain areas

Our Ideas

-Blind/White Cane Enhancements
-Navigation Robot

WHITE/BLIND CANE ENHANCEMENT

Using sensors such as ultrasonic sensors and IR reflection sensors,this not only allows it to see walls and pillars or anything in front of it but also helps look out for change in terrain and deepness of a drop this means it is able to look out for stairs

NAVIGATION ROBOT

allows it to see walls and pillars or anything in front of it but also helps look out for change in terrain and deepness of a drop this means it is able to look out for stairs.We also plan to give it movable wheel parts to allow it to move together with the blind person down the stairs.In addition to all that we would give this product a speaker or a bluetooth connected earpiece to notify the blind person if there is any change in terrain or obstructions in front.The product would also be yellow with a labelled “SIGHT BOT(please do not

Ranking	Evaluation Criteria	Description
1	Ease of Use	Ease of Use refers to how intuitive the product is, if it can be easily used by the user.It is placed first at it has the utmost importance to the user.
2	Ease of Handling	Ease of Handling refers to how easily the product can be held and brought around by a blind person. A product that is easy to handle is ergonomic and easy to hold in one’s hands
3	Durability	Durability refers to how well the product can withstand wear, pressure and damage
4	Spatial Integration	Spatial Integration refers to how the product interacts with its environment, this includes how much space it takes up and how well it can navigates through an environment.
5	Detection Accuracy	Detection Accuracy refers to how well the product detects change in elevation and terrain difference.
6	Ease of Manufacture	Ease of Manufacture refers to how easily we can make the product and the availability of parts needed for the product.It is ranked last as it has the least relevance towards the user.

Evaluation matrix

Criteria	White Cane Enhancement	White Cane (datum)	Navigation Robot
Ease of Use	8/10	8/10	8/10
Ease of Handling	8/10	8/10	7/10
Durability	4/5	4/5	4/5
Spatial Integration	6/10	6/10	9/10
Detection Accuracy	7/10	4/10	9/10
Ease of Manufacture	3/5	5/5	3/5
Total score	36/50	35 /50	40/50
Percentage	72%	70%	80%

Summary of evaluation matrix

	White Cane Enhancement	White Cane(datum)	Navigation robot
Total score	36/50	35/50	40/50
Percentage	72%	70%	80%

- We decided to pick the navigation robot because it has the highest score. This is because it had the best spatial integration and detection accuracy compared to the other two
- Its ease of handling and ease of use is slightly worse but still on par with the other two and its durability is the same as the other two.