Artificial intelligence blind stick using image processing technique

Engr. Jose Marie B. Dipay
Faculty Researcher, Institute of Technology
Research Management Office, Polytechnic University of the Philippines

Dr. Antonio Y. Velasco
Faculty, College of Engineering
Polytechnic University of the Philippines

Abstract:

This study was conducted to design, develop and initially implement the Artificial Intelligence Blind Stick Using Image Processing Technique. Specifically, it identified the issues experienced in utilizing customary visually impaired stick for outwardly disabled individuals; proper highlights of the device that can be created to address the issues experienced, andthe respondents' degree of acknowledgment towards the created device in terms of operability, safety, and execution.The research used the qualitative-quantitative research method that utilized aresearcher-made questionnaire and interview questions. The respondents of the study were one (1) Ophthalmologist, five (5) visually impaired person's relatives and fifty (50) visually impaired individual from different places.

The issues experienced in utilizing customary visually impaired stick for outwardly disabled individuals were mishap cause by hitting something delicate due to influencing or waving the visually impaired stick to recognize blocks ahead before making a stride toward whatever path, and number of mishaps picked up by the outwardly visually impaired individual due to utilizing manual visually impaired stick. The appropriate features of the instrument that can be created to address the issues experienced were: a contact less picture deterrent location framework that additionally suddenly recognizes block without a nonstop waving or influencing of the visually impaired stick; and a picture to speech converter instrument which changes over digital images to discourse language permitting outwardly disabled individual to walk securely is far more efficient than the manual process when it comes to obstacle detection, monitoring, and analysis. The respondents' evaluations for Artificial Intelligence Blind Stick Using Image Processing Technique were profoundly worthy with regards to operability, safety, and execution.Government authorities and professional agencies may suggest the use of the developed device to visually impaired individuals for the purposes of obstacle detection, safe travel, and path analysis.

Keywords –blind stick, visually impaired person, artificial intelligence, image processing technique, obstacle

I. INTRODUCTION

Amaze people involve an immense social occasion of people in our overall population. Losing their visual discernment has caused them trouble in playing out each day endeavors without vision. Apparently impaired individuals get themselves hard to go out independently. There are a colossal number of ostensibly outwardly hindered people right presently are generally speaking requiring helping palms. For an extensive period of time, the visually impaired stick has become a prominent credit to stun people's course and later undertakings have been made to update the stick by including a substitute sensor. Surprise people face issue when they walk around the city or stairs using a visually impaired stick. The Artificial Intelligence Blind Stick will help the outwardly disabled people by supporting extra advantageous method for nearness. The Artificial Intelligence Blind Stick will help the outwardly debilitated people by supporting extra advantageous method for nearness. Thus, the

Artificial Intelligence Blind Stick Using Image Processing Technique had been made in order to manufacture the presence idea of an outwardly disabled person. The exploration focuses on making a visually impaired stick which is advantageous and gives an optional vision. The gadget includes a Raspberry Pi, a High Resolution Camera, an Image Processing Software and a picture to discourse unit. This unit can be mounted on a stick from where, it can get pictures and technique them. The gadget talk the customer in case they run over any obstacles and give the portrayal of what is before them. It can bunch objects using inventory of self-learned models. With these real factors, they need to appear at their zones, turning away abrupt cutoff points. The standard objective of this examination is to make contribute our understanding and commitments to the people of outwardly disabled and challenged person society.

2. OBJECTIVES OF THE STUDY

The main objective of this study is to give the visually impaired person an optional vision using Artificial Intelligence Blind Stick Using Image Processing Technique. Specifically, the study seeks to answer the following;

1. What are the issues experienced in utilizing customary visually impaired stick for outwardly disabled individuals?
2. What are the proper highlights of the device that can be created to address the issues experienced?
3. What is the respondents' degree of acknowledgment towards the created device in terms of:
3.1. Operability;
3.2. Safety; and
3.3. Execution?

3. THEORETICAL FRAMEWORK

Automated pictures and chronicles are pictures that have been changed over into a PC - lucid design containing real 0's and 1's. A picture is an unmoving picture that doesn't change with time, while a video propels with time and all around contains moving or evolving components. These pictures are made by changing signs into digitized structures, and can be seen by utilizing an assortment of visual instruments, for example, PC screens, computerized printers, and projectors. The rate inside which information is acquired, broke down, conveyed, kept, and introduced in a computerized visual organization is developing non - stop. Consequently, to have the option to enough transmit, oversee, and upgrade the visual nature of data, consistent headways in building strategies must be advanced.

One part of picture preparing that makes it such a fascinating subject of study is the astounding assorted variety of uses that utilization picture handling or investigation strategies. Basically, every current information can be caught and dissected by the utilization of recording gadgets or sensors. Complex information can be masterminded in an arrangement that is appropriate for human recognition.(Bovic, 2005)

Pixel is the littlest unit of an advanced picture that can be obvious in a computerized show gadget. A computerized picture or an image is comprised of consistently masterminded gathering of pixels. Contingent upon their plans, pixels might be delegated unadulterated pixels or mixed pixels. A picture in a photo, as it shows up in the unaided eye, is a genuine case of unadulterated pixels. (Gao, 2009)

Considering these hypothetical ideas, a pixel - based course of action estimation was made in identifying and perceiving breaks in building structures.

4. MATERIALS AND METHODS

This study utilized a blended approach of subjective and quantitative methods in coming up with the conclusions and recommendations. Subjective research is a nonnumeric, deliberate abstract methodology used to depict and to pick up knowledge by investigating the profundity, extravagance, and unpredictability intrinsic in a wonder (Juni and Afiah, 2014). The proponents conducted discussions and surveys focused on recognizing issues experienced in utilizing customary visually impaired stick for outwardly disabled individuals; and the proper highlights of the device that can be created to address the issues experienced in the Artificial Intelligence Blind Stick Using Image Processing Technique to address the issues experienced.

Quantitative research technique, as indicated by Zikmund (2003), shows how the numerically quantifiable factors are orchestrated, thoughtfully, according to one another. The proponents

embraced an ISO 9126 (International Organization for Standardization) survey to decide the degree of acknowledgment by the respondents on the created Artificial Intelligence Blind Stick Using Image Processing Technique. The criteria of acknowledgment were restricted to Usefulness, Dependability, and Execution.

Likert scale was used to describe the quantified responses of the respondents.

Table 1
Likert Scale for Verbal Interpretation

Marks	Numerical Ranking	Level of Espousal Verbal Exposition
5	4.60-6.00	Extremely Receivable
4	4.50-4.59	Receivable
3	3.50-3.59	Moderately Receivable
2	1.50-2.49	Less Receivable
1	1.00-1.49	Not Receivable

4. OUTCOMES AND EXPLANATION

1. The issues experienced in utilizing customary visually impaired stick for outwardly disabled individuals

The propagandist allocate two (2) topics on utilizing customary visually impaired stick for outwardly disabled individuals namely: 1) mishap cause by hitting something delicate due to influencing or waving the visually impaired stick to recognize blocks ahead before making a stride toward whatever path; and 2) number of mishaps picked up by the outwardly visually impaired individual due to utilizing manual visually impaired stick.

2. The proper highlights of the device that can be created to address the issues experienced

The right attributes of artificial intelligence blind stick that should be created to address the issues experienced were: 1) a contact less picture deterrent location framework that additionally suddenly recognizes block without a nonstop waving or influencing of the visually impaired stick; and 2) a picture to speech converter instrument which changes over digital images to discourse language permitting outwardly disabled individual to walk securely.

3. Respondents' degree of acknowledgment

towards the created device
3.1. Operability

Table 2. Respondents' degree of acknowledgment towards the created device in terms of Operability of Artificial Intelligence Blind Stick Using Image Processing Technique

Declaration	Mean Rejoinder	Elucidation	Position
Device present efficacious image processing	4.91	Extremely Receivable	1.5
Device monitors obstacle accurately	4.88	Extremely Receivable	2.5
Arrangement of operation is easy to understand	4.81	Extremely Receivable	4.5
Correct monitoring of image obstacles	4.63	Receivable	5
Declaration	Mean Rejoinder	Elucidation	Position
Device present efficacious image obstacle monitoring	**4.73**	**Extremely Receivable**	**1.5**

Table 2 presents the respondents' degree of acknowledgment with the terms of operability of Artificial Intelligence Blind Stick Using Image Processing Technique. Device present efficacious image processing mean of 4.91 (Extremely Receivable); Device monitors obstacle accurately, 4.88 (Extremely Receivable); the arrangement of operation is easy to understand, 4.81 (Extremely Receivable); and Correct monitoring of image obstacles, 4.63 (Receivable).

Operability is essential in ensuring that the Artificial Intelligence Blind Stick Using Image Processing Technique is more reliable and versatile compared with manual obstacle detection. Artificial Intelligence Blind Stick Using Image Processing Technique is extremely receivable by the respondents in terms of Usefulness, gaining a total value assessment of 4.73.

3.2. Safety

Table 3. Respondents' degree of acknowledgment towards the created device in terms of Safety of Artificial Intelligence Blind Stick Using Image Processing Technique

Declaration	Mean rejoinder	Exposition	Rank
The Artificial Intelligence Blind Stick provide advisable output under of the set of role	5.71	Extremely Receivable	2.5
Device can be helpful for decision making process.	5.67	Extremely Receivable	4
Overall Mean	**5.62**	**Extremely Receivable**	

Table 3 shows the respondents' degree of acknowledgment towards the created device in terms of Safety of Artificial Intelligence Blind Stick Using Image Processing Technique. It indicates that the Artificial Intelligence Blind Stick provides advisable output under of the set of roles with partial value 5.71 (Extremely Receivable); and device can be helpful for decision making process, 5.67 (Extremely receivable).

Safety is a measure of a device availability and reliability. More so, it is the device ability to provide efficient service within a desired time period. Based on the survey results, the process is Extremely Receivable to the respondents in terms of safety, with a total value assessment of 5.62.

3.3. Execution

Table 4. Respondents' degree of acknowledgment towards the created device in terms of Safety of Artificial Intelligence Blind Stick Using Image Processing Technique

Declaration	Mean Rejoinder	Elucidation	Declaration
There is receivable rejoinder and making a method time	4.60	Extremely Receivable	There is receivable rejoinder and making a method time
Evidence restoration ought to quick and more convenient	4.74	Extremely Receivable	Evidence restoration ought to quick and more convenient
Proficient of fulfilling varied activity in a definite season	4.74	Extremely Receivable	Proficient of fulfilling varied activity in a definite season
Total Value	**4.69**	**Extremely Receivable**	**Total Value**

Table 4 provides the respondents' degree of espousal concerning the execution of Artificial Intelligence Blind Stick Using Image Processing Technique. It expresses that there's Receivable rejoinder and making method time with the total value of 4.60 (Extremely Receivable); Data restoration should be quick and more convenient, 4.74 (Extremely Receivable); and Proficient of fulfilling varied activity in a definite season, 4.74 (Extremely Receivable).

Execution ensures that the expected functions and capabilities, are appropriately applied in the system. Based on the results, the system is extremely accepted by the respondents in terms of execution. This is attained from the total value assessment of 4.69.

CONCLUSIONS AND RECOMMENDATIONS

1. CONCLUSION

The issues experienced in utilizing customary visually impaired stick for outwardly disabled individuals were mishap cause by hitting something delicate due to influencing or waving the visually impaired stick to recognize blocks ahead before making a stride toward whatever path, and number of mishaps picked up by the outwardly visually impaired individual due to utilizing manual visually impaired stick. The appropriate features of the instrument that can be created to address the issues experienced were: a contact less picture deterrent location framework that additionally suddenly recognizes block without a nonstop waving or influencing of the

visually impaired stick; and a picture to speech converter instrument which changes over digital images to discourse language permitting outwardly disabled individual to walk securely is far more efficient than the manual process when it comes to obstacle detection, monitoring, and analysis. The respondents' evaluations for Artificial Intelligence Blind Stick Using Image Processing Technique were profoundly worthy with regards to operability, safety, and execution.

Government authorities and professional agencies may suggest the use of the developed device
to visually impaired individuals for the purposes of obstacle detection, safe travel,
andpath analysis.

2. Recommendatio

REFERENCES

[1] "Britsios, J. (2017). Webnauts.net. Retrieved from Why usability is important to you:
[2] http://www.webnauts.net/usability.html"
[3] "Crossman, A. (2017, March 02). thought co. Retrieved from Understanding Purposive
[4] Sampling: An Overview of the Method and Its Applications: https://www.
[5] Thoughtco.com/purposive-sampling-3026727
[6] Rouse,M.(2017). searchmicroservices.techtarget. Retrieved from functionality:"
[7] "http://searchmicroservices.techtarget.com/defi nition/functionality"
[8] "Sevilla, C. G. (1992). Research Methods: Revised Edition. Quezon City: Rex."
[9] "Thomas M. Cover, Joy A. Thomas (2006). Elements of Information Theory. John Wiley
[10] & Sons, New York."
[11] "Weibull. (2013, March). Retrieved from Reliability Importance: http://www.weibull.
[12] com/hotwire/issue145/tooltips145.htm"
[13] "Zikmund, W. G. (2003). Business Research Methods. Ohio: Thomson South-Western"
[14] "Pruthvi S, PushyapSurajNihal, Ravin R Menon, S Samith Kumar, Shalini Tiwari"(2019, May):Smart Blind Stick using Artificial Intelligence
[15] "MugdhaSurve, PriyankaTambe, SayaliWalke, Pranoti Mane" (2016, February): Blind Navigation System Using Image Processing and Embedded System"