



Multi – S.A.V.E.R. Cane (Multifunctional Safety Aid for the Visually Impaired and Elderly in Roadside Cane)



Yzhae Marrione C. Villaruel

ABSTRACT

The prototype of my invention was designed to address the prevalent issues of pedestrian lane and/or road accidents wherein Senior Citizens and the Visually Impaired (Persons-with-Disability) especially the Visually Impaired are mostly the victims. Motorists do not see the Senior Citizens and/or Persons-with-Disability crossing the street from a distance.

Based from the Metro Manila Development Authority's 2005-2015 Metro Manila's accident recording and analysis system, an average of 18 pedestrians a day were injured. MMDA Road Safety Unit said that pedestrians tend to look out for huge vehicles but fail to consider motorcycles swerving in all direction.

The primary goal was to create a **Light-Emitting-Diode Cane** which will serve as a warning for the motorists that someone is walking or crossing the street even from a great distance. A portion of the shaft or body of the cane – made up of a frosted acrylic tube and a **RUNNING red LED** – when turned on is advantageous to prevent the Senior Citizens and Persons-with Disability (Visually Impaired) from being hit by motorists whether during nighttime or rainy weather. Furthermore, a **Retractable secondary shaft** provides balance and durability with **built-in trifold umbrella** for comfortability. A **white LED** was also placed on the **adjustable head** of the cane to give better view of the road ahead. Sets of micro solar cell provides source of power.

Furthermore, the LED cane was not only created to ensure their roadside safety, but as well as monitoring their health condition. The **MULTI-S.A.V.E.R CANE (MULTIFUNCTIONAL SAFETY AID FOR THE VISUALLY IMPAIRED AND ELDERLY IN ROADSIDE CANE)** is an efficient and effective invention to increase awareness, empathy and respect for the rights of Senior Citizens and the Persons-with-Disability.

INTRODUCTION

Walking sticks started out as a necessary tool for the Shepherd and traveler. It was a nice hefty stick used to protect against thieves and to keep animals in line. Gradually, it evolved into different styles and materials which became a "SYMBOL OF AUTHORITY and SOCIAL PRESTIGE". Over time, it began to be known as a "MOBILITY CANE FOR ELDERLY".

The Research developed an EVOLUTION OF THE CANE INVENTION as an inspiration for herb Person-with-Disability mother suffering from Severe Systemic LUPUS ERYTHEMATOSUS, the mother's health complication including Raynaud's Disease and Fibromyalgia, among others made travelling alone difficult. The Researcher's mother also experienced roadside accidents due to her worsening visual impairment.

The newly – designed entry for 2020 JDIE which was applied for patent would be beneficial first and foremost to the Researcher's mother.

The purpose of the study is to prevent road injuries and fatalities involving Senior Citizens and Visually Impaired using a MULTIFUNCTIONAL CANE.

The research aims to create awareness on the possible interventions such as a sufficient technology through the initiative of the Local Government Units (LGU) towards their constituency.

The graphs are based on the 2019 Annual Report of the Metro Manila Development Authority's Metro Manila Accident Reporting and Analysis System (MMARAS). The program was created on 2005 to compile and maintain database of accidents. The graph shows about 22 pedestrians were killed in a day and 2140 pedestrians were injured a day.

RESULTS

	FUNCTIONALITY	DURABILITY	USER-FRIENDLY
RESPONDENT A	Security Visibility	Balance Compact	Lightweight Soft touch button
RESPONDENT B	Convenience Reliable	Sturdy	Easy access low maintenance

RESPONSES OF RESPONDENTS

DISCUSSION

Both Respondents A and B tried using the cane in Public.

Respondent A gives positive response in the experience. The Respondent claimed that the LED light ensures safety on the road as it warns motorists of the pedestrian from afar. While the proximity sensor aided the Respondent's visual impairment to avoid obstacles.

Respondent B claimed that the three-legged device supports weight and balance with ease. The compact yet lightweight materials used prevented the Respondent from muscle sore. Moreover, the umbrella provides comfort and convenience.

CONCLUSION

The National Government Agencies concerned and the Local Government Units should take the initiative in reducing deaths and injuries on the road through strict law enforcement and education on Road Safety. A number of motorists show disrespect towards Senior Citizens' and Visually Impaired's mobility which is a high-risk safety concern.

These reasons therefore are solid grounds for the invention of the Multi – S.A.V.E.R. Cane (Multifunctional Safety Aid for the Visually Impaired and Elderly in Roadside Cane). Functionality speaking it brings comfort and security. And even if all the sensors fail, a manual SOS is incorporated for quick emergency response. The cane was designed as user-friendly and durable.

RECOMMENDATION

The MULTI – S.A.V.E.R. CANE' s Application for Patent dated June 10, 2020 with Application number 1220050169 gears towards providing a user-friendly aid for Senior Citizens and Visually Impaired.

The researcher aims to coordinate with Local Government Units as their "FREE CANE-PROJECT PROPOSAL". Mass production would mean lesser cost which will be handled by a private company in waiting.

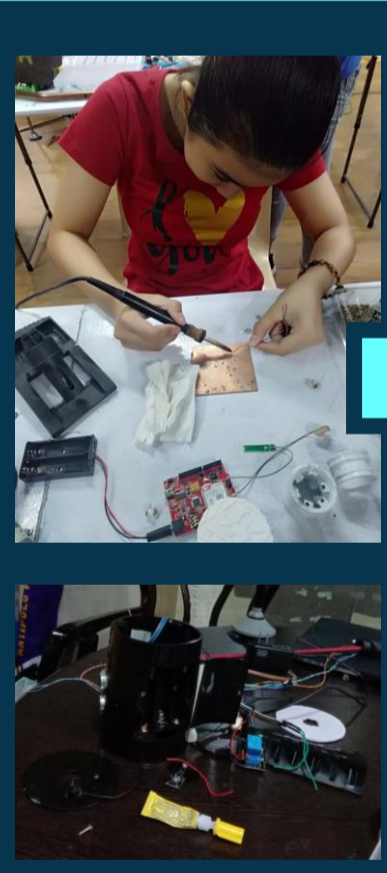
The research therefore recommends the use of a Multifunctional Cane over a normal cane for Safety, Security, and Comfort.

REFERENCES

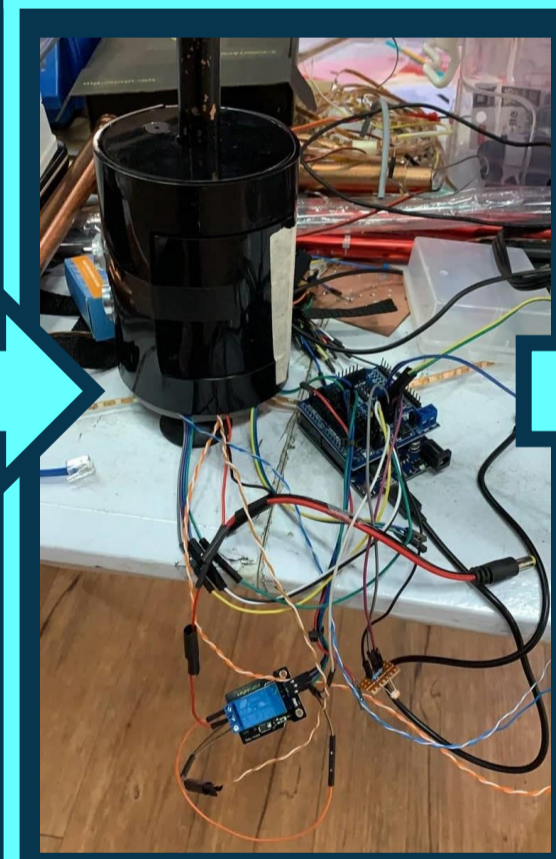
- MMDA_MISS. (n.d.). Freedom of Information (FOI). Retrieved June 13, 2020, from <http://www.mmda.gov.ph/homepage/2-uncategorised/3345-freedom-of-information-foi.html>. Accessed September 3, 2018. <https://www.fashionablecanes.com/ABOUT-CANES.html>.
 n.d. *Encyclopedia.com*. Accessed September 3, 2018. <http://www.encyclopedia.com/fashion/encyclopedias-almanacs-transcripts-and-maps/canes-and-walking-sticks>.
 n.d. *Encyclopedia.com*. Accessed September 3, 2018. <https://www.encyclopedia.com/plants-and-animals/animals/zoology-invertebrates/walking-stick>.
 Freeman, Rees. n.d. *Prezi.com*. Accessed September 3, 2018. <https://prezi.com/0vivi7ozl2p7/cane-symbolism/>.
 Inverarity, Laura. 2017. *Very Well Health*. August 31. Accessed September 3, 2018. <https://www.verywellhealth.com/types-of-canes-2696276>.
 Road safety leaders commit to reducing road traffic deaths and injuries in the Philippines. (n.d.). Retrieved June 18, 2020, from <https://www.who.int/philippines/news/detail/10-05-2019-road-safety-leaders-commit-to-reducing-road-traffic-deaths-and-injuries-in-the-philippines>
 Lester and Oerke Accessories of Dress, Peoria, IL. *The Manual Arts Press*. n.d.
 Tribidino, Raymond Gregory. 2016. *Vera Files*. October 4. Accessed September 3, 2018. <https://verafiles.org/articles/road-safety-issue-no-5-protecting-philipino-pedestrian>.
 World Health Organization; FIA Foundation for the Automobile and Safety; Global Road Safety. 2013. *Pedestrian Safety: A road safety manual for decision-makers*. Geneva, Switzerland: World Health Organization.

METHODOLOGY

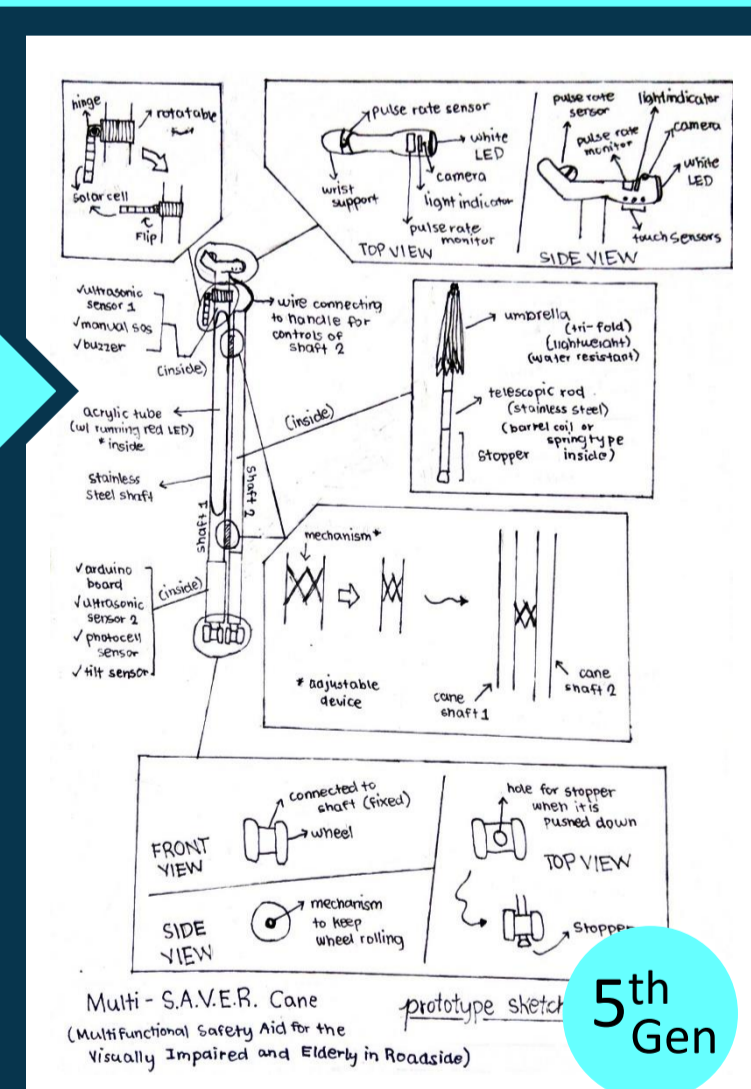
ASSEMBLY PHASE



TESTING PHASE



FINISHED PRODUCT



5th Gen

Evolution of Invention



TESTING

After the assembly process, the programming was double-checked. The connection and wirings has been checked as well. After ensuring that the prototype is working, several Senior Citizens and Persons-with-Disabilities were being asked for their feedback. Suggestions were noted and added to the prototype.

Functionality

Durability

User-friendly

ASSEMBLY

Cut the acrylic tube into desired length, heat the ends using hot air gun. Cool down, then insert on stainless steel shaft. Place red running LED strips inside the shaft, the ultrasonic sensor #1, manual SOS and the buzzer inside the upper part of the shaft. Place a rotatable ring between the uppermost of the shaft and the base of the handle, then attach the micro solar cell which can be flipped upward/sideward.

Create a slightly tilted wrist on the handle, then attach an adjustable wrist strap embedded with a built-in pulse sensor. Place a pulse rate monitor near the head of the handle, and a light indicator which is wired into the pulse rate sensor and the pulse rate monitor. Followed by a mini camera slightly tilted upward focusing on the cane user, then a white LED in front of the handle. On the right side of the head, place a touch sensor.

Inside the base of the main shaft, place the arduino board, ultrasonic sensor #2 and the tilt sensor.

Attach the handle of the cane to the shaft, connect the GSM and GPS modules to the arduino board, then all the wires into the arduino board.

Cut a stainless telescopic rod as a secondary shaft, then place a tri-fold umbrella on the upper part connected by a spring type mechanism or barrel coil. Place the stopper inside the bottom of the shaft. Connect the stopper wire to the secondary wheel and the manual grip handle, then connect the wire of the umbrella to the manual grip.

FLOWCHART OF MULTI – S.A.V.E.R CANE (Multifunctional Safety Aid for the Visually Impaired and Elderly in Roadside)