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Vibrating Rod VBR-01

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ABSTRACT

From a person with sight disability point of view, the simplest thing can be deemed as a challenge to them. One of the common everyday acts the unsighted deemed as challenging is crossing the roads. Thus, this innovation is designed to help the visually impaired to cross the roads safely by using their sense of touch instead of only relying on their sense of hearing. For this innovation to serve its purpose, the visually impaired have to hold on to the rod attached to the pole of the traffic light and wait for it to vibrate as a signal to cross the road. The commercial potential of this innovation is that it is user-friendly, reasonably priced and very beneficial to the disabled. In short, this advancement may assist with facilitating their burden to walk across the street more safely without the assistance of anybody.

Keywords: Visually impaired; vibrating rod; cross the roads

1. INTRODUCTION

Traffic lights, otherwise called traffic signals, traffic lights, traffic semaphore, signal lights, stop lights, redlights (In the Southern United States), robots (in South Africa, Zimbabwe and different places of Africa), and traffic control flags in specialized parlance, are flagging gadgets situated at street convergences, person on foot intersections, and different areas to control streams of traffic. The first ever automatically controlled traffic signal in Chicago was first invented in the 1910's by an American inventor named Ernest Sirrine. His traffic signal utilized two non-lit up show arms masterminded as a cross that turned on a hub, as indicated by Inventor Spot. The signs said "stop" and "proceed". By 1912, the first electric traffic light that uses red and green light was invented by Lester Farnsworth Wire, a police officer in Salt Lake City, Utah, according to Family Search. Yet somehow the "first electric traffic signal" credit goes to James Hoge. In 1917, William Ghiglieri copyrighted the first automatic traffic light which utilizes 'red' and 'green' followed by William Potts (1920), who added the yellow 'caution' light. Early traffic signals utilized a scope of hues to pass on directions, however the framework that has stayed with us is generally founded on that of the railroad, where red, which has the longest wavelength of any shading on the unmistakable range, flagged an admonition, or "Stop."

Some of the many advantages a traffic light control system offers could include moving cars safely to help them avoid collisions with cars and people. We assist in movement and help to maintain an orderly flow

by giving certain cars the right of way and not others [1]. They are valuable systems that not only improve vehicles but also pedestrian traffic as it is efficient and safe. In most situations, such devices eliminate common types of accidents such as broad-sided collisions [4]. They play a crucial and vital role in our daily lives when it comes to safety [1].

In all of this, signal timing is something that plays a very important factor. It is what actually makes this function and provides safety in the flow of traffic for people. There are three main types of signal timing that include fixed timing, actuated timing, and timing coordinates. Fixed timing uses the same present time intervals which do not change depending on the volume of traffic. Actuated timing uses a detector which can adapt itself to different volumes of traffic. Coordinated timing helps minimize random starting and stopping, helping traffic flow and creating a traffic jam less likely to occur [1].

Blind people have trouble crossing the road junctions without the help of others or when there are traffic congestions. This disability prevents them from crossing the roads safely. Therefore, we have come up with an idea that could not only aid them when crossing roads but also save their lives. 'The vibrating rod' was innovated to be placed at the designated traffic lights that are connected to the traffic light system. The 'rod' will sense the colour change of the traffic lights and vibrates when it turns red to alert the holder when to cross the road safely. The inability to witness any change in the surrounding sets them back from participating in normal and daily activities. This not only brings their motivations down, but they are more wary about the things that go around them. As a visually impaired person, they go through a lot of challenges in life. Through this innovation, we would like to ease one of their burdens when they are travelling by foot to nearby places [1].

2. INNOVATION DEVELOPMENT

The originality of this innovation comes from the problem statement stated above as we encounter blind people having difficulties while crossing the road. This innovation is meant to lessen their burden in crossing the road and ensuring their safety. It is a simple innovation that is low in cost as it is only an additional feature to the original traffic light. The idea of this innovation is designed so that it can be beneficial not only for the visually impaired but also for everyone.

How does this innovation operate?

i. The rod is attached to the pole of the traffic light and the sensor is connected to the traffic light system.
ii. They need to hold onto the rod while waiting for their turn as the rod will vibrate when it is safe for them to cross.
iii. The sensor will stimulate the vibration system located in the rod to signal the holder when the traffic light turns red that indicates the holder may cross the road safely.
iv. The most common situation is the box junction, as the traffic light turns red, the rod will vibrate after a few seconds to make sure there is no vehicle passing through.

This rod allows the visually impaired pedestrians to be confident while crossing the road as they do not have to rely only on their hearing senses. They will not get confused by the sounds in the surroundings and focus on the task at hand instead.

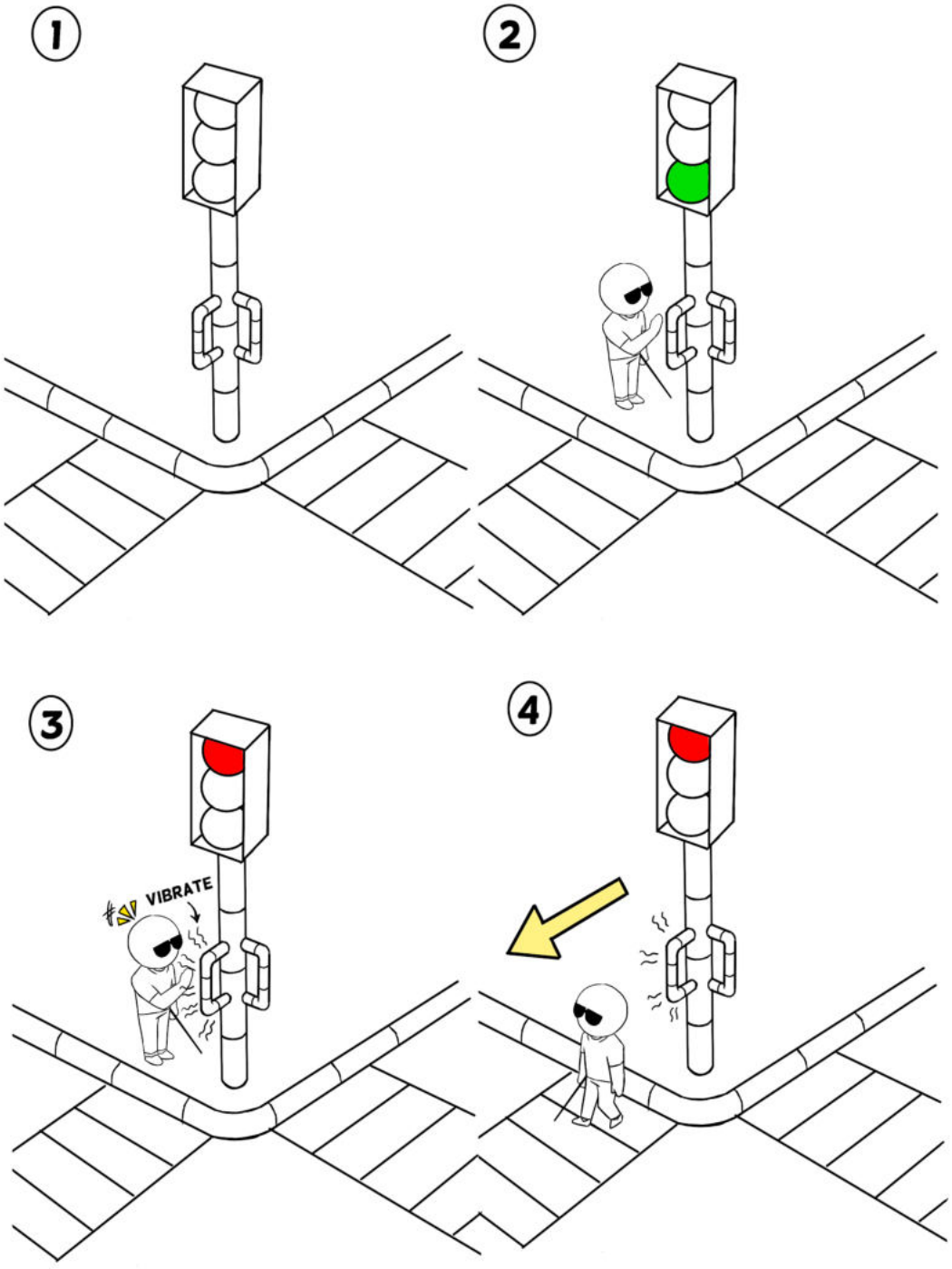

Figure 1: Innovation illustration

3. COMMERCIAL POTENTIAL

As the traffic light becomes more indispensable, developing its function will expand its functionality or use all over the world especially in improving the safety and making it easier for the disabled group. This innovation has high potential in the aspects of technological advancement, market, economy, legal and social impact.

In the technological aspect, it can be produced as a very useful product that benefits the disabled as it uses simple technology and a low consuming cost. Despite this innovation may seem complex to outsiders, it is actually very user-friendly for the disabled as it does not require the user to do anything other than to grab hold of the rod and be on high alert for when the rod vibrates. This innovation also has little to no possibility of bringing harm to the environment as it is a mere additional feature to the existing traffic light.

Aside from the technological aspect, the importance of this product in the market aspect is also significant with its function. Due to this innovation has not yet seen the light, the probability of this innovation being in high demand is great after entering the public market as it benefits the minority. The main reason that can be observed from this innovation other than as an aid tool for the disabled, this innovation can also become a major factor in reducing the rate of traffic accidents regarding the disabled. Countries with a high rate of visually impaired citizens such as India and China will gain the most benefit from this innovation in lowering the rates of accidents involving the visually impaired. Moreover, in the economic area, this innovation can bring in a lot of income if it manages to break through the international market as the traffic light system is used in most if not all developed countries across the globe. This opens a whole new door in the development of traffic lights and gives our beloved country, Malaysia a chance to be the first and main supplier to other countries.

Last but not least, we plan to commercialise this product and possibly do a collaboration with PPK Technology Sdn. Bhd which is Malaysia's very own indigenous high-tech undertaking since 1985 designing, constructing and producing the Intelligent Traffic System. Approvement and agreement by the government, of course, would make this innovation become legal and safe to be applied across the country. This is to ensure the possibility of this creation to go further and will be used on every traffic light.

The vibrating rod innovation does not require a complex mechanism, thus the cost to obtain the materials to construct the rod solely depends on the current price of the desired metal which is stainless steel, on the market. The price is estimated to be about RM 450 that includes the stainless steel pipe (30 cm), the vibration system and service.

Table 1: Estimation of vibrating rod marketed price

No.	Material	Estimated price (RM)
1.	Stainless steel pipe [10]	300.00
2.	Vibration motor and electrical components [8-9]	100.00

Table 2: Estimation of vibrating rod prototype

No.	Material	Quantity	Price per unit (RM)	Total price (RM)
1.	PVC pipe	2 sets	5.10	10.20
2.	Vibration motor	2	5.50	11.00
3.	Arduino uno board	1	36.00	36.00
4.	LED	6	0.70	4.20
5.	100 Ohm resistor	6	0.10	0.60
6.	Jumper wire	3	8.00	24.00
7.	Bread board	1	4.00	4.00
			TOTAL	90.00

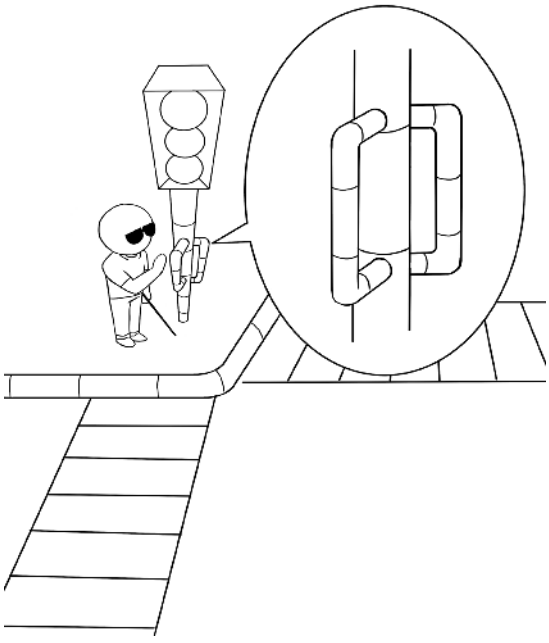

Figure 1: Innovation prototype

Coding

The purpose of this coding is used inside our prototype to demonstrate how it will function in real life. However, it can only be used for the prototype as in reality, we would suggest it to connect with the traffic light system itself. Coding system by using arduino uno board.

```
const int motorPin1 = 3;
const int motorPin2 = 2;
const int motorPin3 = 4;
const int motorPin4 = 5;
int red = 8;
int yellow = 9;


int green = 10;
int red2 = 11;
int yellow2 = 12;
int green2 = 13;
void setup()
{
  pinMode(motorPin1, OUTPUT);
  pinMode(motorPin2, OUTPUT);
  pinMode(motorPin3, OUTPUT);
  pinMode(motorPin4, OUTPUT);
  pinMode(red, OUTPUT);
  pinMode(yellow, OUTPUT);
  pinMode(green, OUTPUT);
  pinMode(red2, OUTPUT);
  pinMode(yellow2, OUTPUT);
  pinMode(green2, OUTPUT);

}

void loop()
{
 {
  digitalWrite(motorPin3, LOW);
  digitalWrite(motorPin4, LOW);
  digitalWrite(red, HIGH);
  digitalWrite(yellow, LOW);
  digitalWrite(green2, HIGH);
  digitalWrite(yellow2, LOW);
```

```
 digitalWrite(red2, LOW);
 digitalWrite(motorPin1, LOW);
 delay(500);
 digitalWrite(motorPin2, LOW);
 delay(500);
 digitalWrite(motorPin1, HIGH);
 digitalWrite(motorPin2, HIGH);
 digitalWrite(green, LOW);
 delay(5000);
 digitalWrite(motorPin1, LOW);
 digitalWrite(motorPin2, LOW);
 digitalWrite(yellow2, HIGH);
 digitalWrite(green2, LOW);
}
 delay(1000);
{
 digitalWrite(motorPin1, LOW);
 digitalWrite(motorPin2, LOW);
}
 delay(100);
 {
 digitalWrite(yellow2, LOW);
 digitalWrite(red, LOW);
 digitalWrite(yellow, LOW);
 digitalWrite(green, HIGH);
 digitalWrite(red2, HIGH);
 digitalWrite(motorPin3, LOW);
 delay(500);
 digitalWrite(motorPin4, LOW);
 delay(500);
 digitalWrite(motorPin3, HIGH);
 digitalWrite(motorPin4, HIGH);
 delay(5000);
 }
 {
 digitalWrite(motorPin3, LOW);
 digitalWrite(motorPin4, LOW);
 }
 delay(1000);
 {
 digitalWrite(red, LOW);
 digitalWrite(yellow, HIGH);
```

```
 digitalWrite(green, LOW);
 delay(1000);
 }

}
```

4. CONCLUSION

In conclusion, this innovation may help to ease their burden to cross the road safely without the help of anyone. In the future, this vibrating rod could be improved so that this disabled group may travel without worrying about their safety. This should be attached to all the traffic lights and additional features such as a camera to enhance the efficiency of the pole. Different sounds can also be installed to make it easier to differentiate which road to cross. Safety criteria such as a sponge or soft material to be wrapped around the rod are needed so that it is not harmful, especially towards children. Furthermore, a smaller and shorter height of this innovation that is equipped with interesting sounds that would interest children to hold up to the rod instead of running while waiting for their turn to cross the road.

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