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Klever Kicks a Smart Assistance Shoes for Blind

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ABSTRACT

The world is sometimes can be seen as a cruel and dangerous place for people with disabilities especially people that have lost their eyesight and becomes blind. As blind people are not able to see anything and they need some kind of device that can help them to walk and do other things in their daily life like normal people. The traditional device that has been used by blind people for many centuries is a stick to predict the obstacle near them according to (Strong, 2009)[8]. As research keep being developed, the assistance device for the blind people keep changing, in order to improve the effectiveness of the device. Our problem statement for this project is that, blind people sometimes become careless even though they are using traditional assistance device such as stick and this can lead to the great danger to their life. According to Direct Researcher, Christopher Hogan, from 2001 to 2004, on average, 40 blind people were hospitalised as the result of pedestrian accident (Hogan, 2008)[6]. Even though this issue can be considered as minor issue among our society, but it can be much worse in the future. In order to prevent and handle this issue, we invent a technological shoes, given name, "Klever Kicks". Basically, this shoes has two main purposes of its existence. Firstly, this shoes is able to assist the blind people whenever they are walking and secondly, this shoes is going to generate electric energy whenever it's user are walking. Technically, this shoes has two main mechanisms to make it become a functional device. The first mechanism act as energy producer which it is responsible as energy producer that can convert the kinetic energy into electric energy. The second mechanism of Klever Kicks is the ultrasonic sensor mechanism. The sensor mechanism is basically the most important component in this project which it can predict the obstacle or wall that is closed to the user by emitting a buzzer sound. The innovation of Klever Kicks can be seen as a unique and very effective product as we are using simple Arduino Board and it can convert the kinetic energy into electric energy by the help of piezoelectric effect. Klever Kicks is expected to become a high demand product as it is a product that can increase the effectiveness of assistance device for blind people with the help of technological device. This project is predicted to give public awareness to the society that it is important to develop the technology that are clean and do not contaminate environment as the Klever Kicks can generate electric energy without using any hazardous fuel. As the optimistic generation, it is important for us to make research and develop clean energy technologies that are safe to environment and future.

Keywords: Blind people; assistance device; ultrasonic sensor mechanism; arduino board

1. INTRODUCTION

Nowadays, electricity is the main power in our daily life. As we can see electricity is used widely in every country. There have been several technological breakthroughs by many brilliant people throughout history regarding electricity. It has come from being discovered as a small current to being transformed into useful power to run daily activities. One of the most famous scientists that innovates the usage of electricity is Thomas Edison [4]. Before the electricity was discovered, human tends to work harder to do something like carry the big and heavy items, light up the campfire, set up the fire for cooking and much more. With this discovery, all the human power is less used as the electricity help their daily life. You can do so much things with electricity as you wish.

As the world changes by time, people always busy with their works. Some of them always want improvisation in their daily life to make their life easier. For example, bread toaster, coffee maker, computer and much more. Because of the busy routine, they might not have a time to think about something not important. Sometimes, they do not even have the will to exercise as they are already tired and not in a good mood when they come home after an exhausting day. This pose a negative routine in their life. It becomes worst as some of they always forget to charge their smartphone overnight. Other than that we have observe problem among the blind people which have difficulties to do their daily activities. So, as we observe the problems around us, we have decided to innovate the multiuse shoes named "Klever Kicks".

This shoes is so special because it can generate electrical power from our movement. The principle is just like the dynamo. By this electrical energy, the user can use it as power bank and the best part is the user do not have to charge it as it can generate the energy by itself. Not only that, we also include the set for a blind people with sensor infront of the shoes. So, our objective of designing this shoes is, to give people motivation to people to exercise daily. Other than that, to make people life easier especially the busy person who do not have time to charge their gadgets. We also want to help the blind people to make their life easier.

2. INNOVATION DEVELOPMENT

Generally, this project has two main purposes, which it can act as an energy producer and a walking assistance for blind people. The idea and concept of this project came from the advancement of typical shoes or sneakers that we are using in daily life.

Firstly, the mechanisms and concept that we are using to idealize the idea of walking assistance for blind people is that we are using the Ultrasonic Sensor (Figure 2) that act as a detector to prevent the blind people got hit by something or barrier that are closed to them. Next, we are using Arduino Nano (Figure 2) as a motherboard that are responsible as a connector to the whole components of sensor's mechanism. Buzzer 5V (Figure 2) is used to emit sound whenever the Ultrasonic Sensor is getting closer to the barrier. All of these components need to be connected to the Arduino Nano so it can function as a part of mechanism.

Secondly, for the energy producer part of the shoes, we connect the Piezo plate (Figure 1) in series. Then, the LED light, diodes, capacitor, lipo battery is connected to each other in a electronic circuit. After that, the complete electronic circuit is connected to the Piezo plates. If all of the energy producer mechanism is completely connected to each other, it is able to convert the kinetic energy into electrical energy by walking. Lastly, the complete energy producer mechanism and sensor mechanism (Figure 3) is merged to become a device called, "Klever Kicks".

3. COMMERCIAL POTENTIAL

The innovation of Klever Kicks came from the idea of the production of sensor-based assistive devices specifically for visually impaired people for the reason that there is small amount of instruments to help these physically disable individuals. Using the C and C++ programming in our Arduino board that use variety of microprocessor in it board design. Our innovation is to use sustainable energy to charge our smart shoes using the piezoelectric effect of piezoelectric transducer to generate energy for our ultrasound sensor-based shoes.

In 2010, visual impairment has become a major global health issue with 82% of it are cases of all blind individuals with age above 50 years old. The blind and visually impaired person, specially are revealed to experience high risk in road traffic according to [7]. Consequently, this shows that Klever Kicks can penetrate the market of disabled assistive devices as the rise in trend of an independent lifestyle further due to the high demand of assistive devices that further fuels the market growth according to [5]. Moreover, the affordable price and simplicity as well as the compelling design of our product will further increase the probability of a positive outcome from this product. Besides that, we also aim to infiltrate the renewable energy market in developed and developing countries as the rise in stringent government regulations regarding climate change according to [1].

Overcoming the vast gap between the demand and the availability of assistive devices will be a challenge in this modernization era. Throughout the years, the demand of a new device for disabled individuals has increased significantly as new diseases and other causes such as drug abuse, stress and alcohol emerge in this 21st century. We are creating a smart assistance shoes using these materials (refer Table 1). The product is design specifically for blind people and visual impairment society.

Table 1: Estimation of costing Klever Kicks

No.	Item	Quantity (Set)	Price per Unit (RM)	Total (RM)
1.	Pezo Electronic Plate	3	6.00	18.00
2.	Capacitor	1	3.20	3.20
3.	Diode	5	1.00	5.00
4.	LiPo Battery	1	55.00	55.00
5.	Charging for LiPo	1	12.00	12.00
6.	Breadboard	1	5.00	5.00
7.	Arduino Nano Board	1	26.00	26.00
8.	Shoes	1	120.00	120.00
			TOTAL	244.20

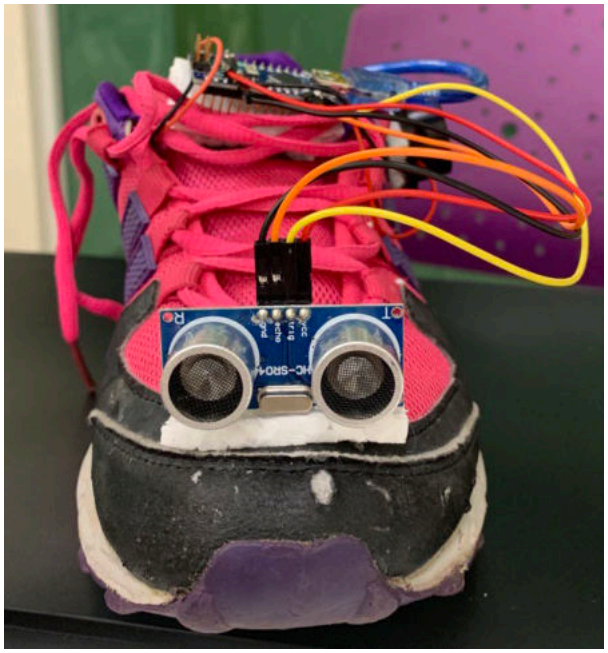

Figure 1: Innovation Prototype of Klever Kicks

4. CONCLUSION

Conclusively, our product can ease blind people to going through their daily life easily as they walk near things or people, the sound detector will ring. So that, they do not have to worry as they will hit things or people nearby if they use their blind stick because we already made the Klever Kicks. Not only that, every single steps will produce kinetic energy, then our product will convert it to electric energy which is people can use it to charge their gadgets. Usually if people go to hiking, there is no plug to charge their gadgets. As for that, people do no need to worry because the Klever Kicks will solve the problem as people can charge their gadgets through the shoes. Automatically, this will boost up the spirit to exercise more as they will have no problem to going through their daily life.

As the technology breakthroughs by many brilliant people regarding the electricity, we can endorsement our product by adding the massage at the footwear. We can use the electric energy that produced by every single steps, to turn the massage machine at the footwear. So that we can reduce the feet sore whenever we walk for a whole day. In the future, we can use the waterproof materials such as nylon and polyester fabrics for the shoes. Thus, the shoes will not get wet whenever the rains fall and the users will feel more comfortable. Unquestionably, it can avoid the damage for all the materials that been use in the shoes.

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