

Hong Kong Student Science Project Competition 2022

Template of Extended Abstract (Invention Design Proposal)

(Word Limit: 1,000 words, Pages: 2 pages only)

Team Number: JCPE081

Project Title: Power Shoes

Project Type: Invention Design Proposal

To our best knowledge and after thorough literature research, as at 19/1/2022, there are no similar works.

I. Background

1. We head out almost everyday doing various activities such as sports, going to school or even shopping. Have you realised that we actually wasted a large amount of kinetic energy generated by walking?
2. Have you ever experienced your phone running out of battery in the middle of the day? While you don't have your power bank with you, it would be quite annoying isn't it? Furthermore, when your power bank also ran out of battery, it would be a disaster. In order to solve this problem, we decided to design power shoes that includes a portable power bank and helps charging your power bank during your daily life.

II. Objective(s)

1. Produce energy while walking so that people no need to charge and bring the power bank. This benefits people who need emergency electricity since it can reduce the problem of forgetting to bring a power bank for charging.
2. It is simple and easy for people to use and does not require complicated steps.
3. The materials of the shoes are inexpensive and hence the shoes are affordable for most of the people.

III. Methodology

Scientific theory

Metals such as copper and aluminum have electrons that are loosely held. Moving a magnet around a coil of wire, or moving a coil of wire around a magnet, pushes the electrons in the wire and creates an electrical current. Electricity generators essentially convert kinetic energy (the energy of motion) into electrical energy

When a conductor is placed or moved through the magnetic field it generates voltage i.e., electricity. This principle is called Electromagnetic Induction. The voltages generated will be based on the speed of the conductor moving through the electric field. Faster the speed of the conductor, the greater the induced electricity or voltage.

IV. Design of Invention

We will store the electrical energy in the power bank hidden inside the shoes, using wires. Whenever users want to charge their phone, all they have to do is to get out the portable power bank from their shoe and charge it.



V. Application / Market Need

Application and function of invention

When our phones are running out of battery, we are allowed to charge it anytime anywhere without using a power bank nor an electric socket as long as you have this power shoes

Market need

According to our survey, the majority does not refuse to wear our power shoes. People tend to do more outdoor activities without worrying the phone is running out of battery.

Potential impact

It can be applied to many groups of people, especially those who have limited access to electric power socket during work and study, it can provide a more convenient and stable energy source to fulfil their needs and demands

Limitation

As power bank and dynamo are present, the shoes may be a little bulky than normal sneakers. In addition, it is waterproof so the shoe layer is not thin and breathable. Furthermore, the power shoes cannot be immersed in water so it cannot be applied when there's heavy rain.

VI. Conclusion

The power shoes can provide a source of energy for charging mobile phone, which is convenient, environmental friendly and is welcomed by the majority walks of life.