

“Smart Shoes”

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Abstract. Scientists have proved that being in the shoes for longer than five hours could harm us very much. We try to solve the problem of providing maximum comfort to human feet. People with vision and hearing disabilities as well as astronauts travelling in space will find them extremely useful.

Keywords: lacing; GPS; Bluetooth; Arduino; vibration motors.

Introduction

We live on Earth. This is the only known planet where life exists. People who live there, constantly moving. They use different types of shoes. Someone prefers running shoes, some shoes or boots. But there are people with certain disabilities, visually impaired, people with diseases of the feet, or those who travel long. There are individuals who are engaged in specific activities. They are: firefighters, soldiers, astronauts and people of other professions. They need special shoes. To help them, I decided to create shoes for staying in extreme conditions. "Special shoes" can be used during emergency situations on the Earth, fire, chemical and radiological contamination (like the Chernobyl accident), the anti-terrorist operations and in space to move around asteroids, planets or their satellites. During the different ATO my "special shoes" can be used in order to prevent military people from danger or just keep feet in a comfort. In 2020 it is planned flight to Mars. My invention will be able provide astronauts convenient, reliable radio-controlled shoes. In addition, these shoes can be successfully applied in everyday life.

Main Part

The idea is to create the best conditions for human feet and inform the user about the climate in the shoes. Navigation instructions are transmitted from mobile devices - wireless Bluetooth module for Arduino, which will control shoes. Travelers can use this technology in unfamiliar or dangerous places. They can use the navigation system, which will consist of a group of vibrating motors, GPS-navigator. The owner of the shoes just need to specify the start and end points, then you won't have to get the gadget out of your pocket or bag. The main features are: the presence in my development massagers and GPS-system, automatic mechanism of lacing and climate control in the shoes.

The goal of my project is to create a set of "special shoes" for the improvement of the people, their comfort and convenience. The complex will consist of: vibration massager, mechanism automatically doing lacing, GPS-navigator, mode of illumination, Bluetooth for data transfer, module for monitoring software, charger, climate controller, which will also measure temperature, heating, cooling and air conditioning inside the shoes. One more interesting function is a vibration signal about extremely difficult conditions.

It is for people with disabilities.

Research methods

All studies were conducted through experimental methods and methods of analytical mechanics. All experiments were carried out at home. In operation, air-conditioning system of pumping and piping system are used in the shoes. During the project development several experiments with the navigation system have been conducted as well as using into shoes were mounted two sphygmomanometers, which create excess pressure in the shoes, so they will be fixed on the legs without any effort. I've had a successfull experiment

with generators and inertial phone batteries. When moving the generator produces current and charges batteries.

Project objectives:

- To study the optimal conditions for feeling well in shoes;
- Analyze systems that improve the conditions of the feet;
- Analyze existing prototype shoes;
- Take into account advantages and disadvantages of new complexes;
- Indicate the differences between the prototype and a working model;
- Indicate advantages of my system;
- Perform software
- Conduct experiments with this device;
- Calculate the economic side of the shoes creation and availability of its price, affordable to use.

By creating this complex, I will significantly improve the lives and work of people on the Earth. Today in the world there are many people who need these shoes. It is important that all elements of the complex work flawlessly and were comfortable to use. I suggest, vibrating motors in the soles to serve as navigation system: they will alert you when you are walking on the turns, and when you stop or travel in transport will serve as massagers. For better orientation on the ground gyroscope will be used.

Conclusions

Comfortable shoes with broad functionality, including automated maintenance microclimate, tactile transmission of navigation signals and automatic lacing are not only the comfort of the owner but his health. Recent advances in micro-electronics, footwear design features let you realize interesting ideas to improve comfort without significantly increasing costs. Physical and chemical processes were investigated in a closed boots system. By creating this complex, I will significantly improve the comfort of life of people who will use it. Today in the world there are many people who need the shoes. Therefore it is important that all elements of the complex work perfectly and were easy to use. For better orientation on the terrain ultrasonic sensors (Sonora) are used. The main advantage of my "special shoes" is creating a microclimate that makes it impossible existence of fungi and bacteria, also automatic lacing mechanism reduce human effort.

For heating the air, a special heating element is used in the shoes and the cooling system uses coolers and pipes. Automatic lacing compressor mechanism will serve as a collar, sewn-in air chamber. All actuators are controlled through a platform Arduino Uno R-3 Special shoes can be used by astronauts, but now there is an urgent need in them in our country.

Today, these shoes are vital for many of our compatriots suffering from the ATO, and for those who are in the army defending the independence of Ukraine on the front. My project requires certain costs for the mass production, but I am confident in its support and realization because life and health are utmost.

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