

ECO STRIDE:FOOTSTEPS FOR A BETTER FUTURE

Aim

To design and develop energy-generating shoes that harnessed kinetic energy produced during walking or running, converting it into electrical energy for charging small devices, thus promoting sustainable and portable energy solutions.

Vision

To create a greener future by integrating renewable energy solutions into everyday life, encouraging sustainable practices, and reducing reliance on fossil fuels.

Mission

- Developed innovative footwear with integrated piezoelectric technology to harvest mechanical energy.
- Provided a practical, portable, and eco-friendly solution for charging small electronic devices on the go.
- Educated and inspired users to adopt sustainable and renewable energy technologies.

Components

- **Piezoelectric Sensors:** Embedded in the shoe sole to convert mechanical motion into electrical energy.
- **Energy Storage System:** A 3.7V rechargeable battery to store the generated energy.
- **Voltage Regulation Module:** A 5V power bank module to ensure consistent power output for charging devices.
- **Wiring and Connectors:** Connected sensors, storage, and output module securely.
- **Outer Shoe Material:** Durable, lightweight material ensured comfort and functionality.

Procedure

Design Phase:

- Analyzed and selected materials suitable for embedding piezoelectric sensors without compromising shoe comfort.
- Designed the circuitry for efficient energy conversion and storage.

Prototype Development:

- Installed piezoelectric sensors in the sole of the shoe.
- Integrated the sensors with a 3.7V rechargeable battery and voltage regulation module.
- Ensured secure wiring and connectors to avoid entanglement or damage.

Testing Phase:

- Tested the prototype for energy generation efficiency during walking or running.
- Evaluated the power output and storage capacity.
- Ensured the system could charge small devices like mobile phones or smartwatches via the 5V module.

Optimization:

- Addressed inefficiencies in energy conversion.
- Improved comfort and durability of the shoe.

Deployment:

- Finalized the design for mass production.
- Promoted the product as an eco-friendly, portable energy solution.

Results

- **Energy Generation:**
 - Each step generated approximately 0.5 to 2mW of power, depending on walking intensity.
- **Storage Capacity:**
 - The 3.7V rechargeable battery stored sufficient energy to charge small devices such as smartwatches or earbuds.
- **Practical Utility:**
 - Successfully demonstrated the ability to charge a smartphone for up to 15 minutes of use after 1 hour of walking.

Result Analysis

The EcoStride project showed that sustainable and portable energy solutions can be created using simple technology. Piezoelectric sensors transformed walking and running into renewable energy, making it possible to charge small devices like smartwatches and smartphones. The prototype proved practical for outdoor use, especially for people in remote areas. Although it could not power larger devices, it laid a foundation for future innovations in wearable energy technology. Testing confirmed the concept's success and its potential to encourage eco-friendly habits.