RV College of Engineering, Bengaluru - 560059.

Go, change the world

Title: SONIC ENERGY REAP

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Theme: ENERGY

Introduction

The world needs new and innovative ways to generate energy. Our prototype explores harnessing sound energy to produce electrical energy using cutting-edge technology. Sound is all around us, from ocean waves to city noise, and can be a valuable resource. By converting sound energy into electrical energy, we can power remote devices and communities. Our prototype aims to develop this pioneering technology and create a more sustainable future.

Problem Definition

"Depletion of non-renewable sources of energy due to increase in energy consumption has created the need to find alternative sources of renewable energy like generating electricity from unwanted noise."

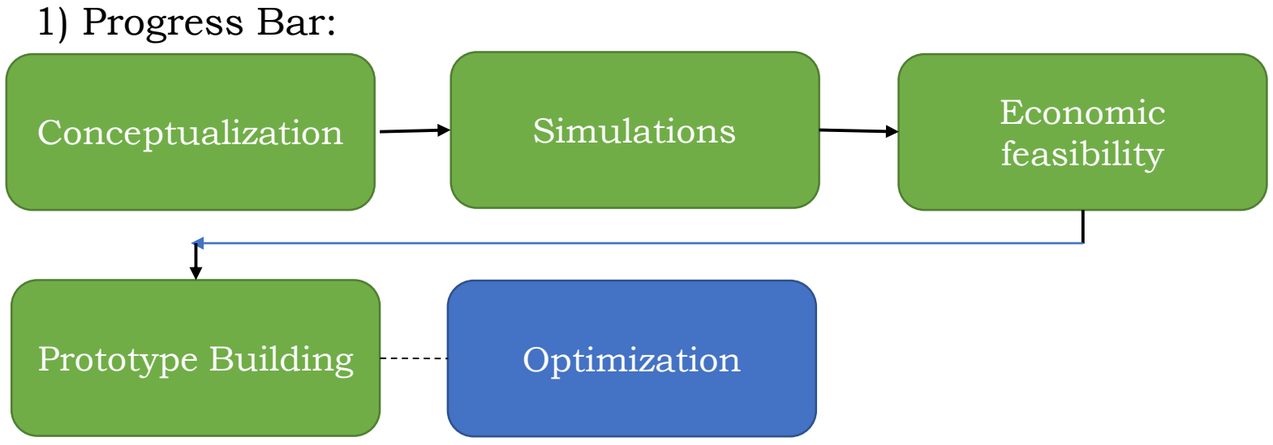
Objectives

Objectives Of Prototype:

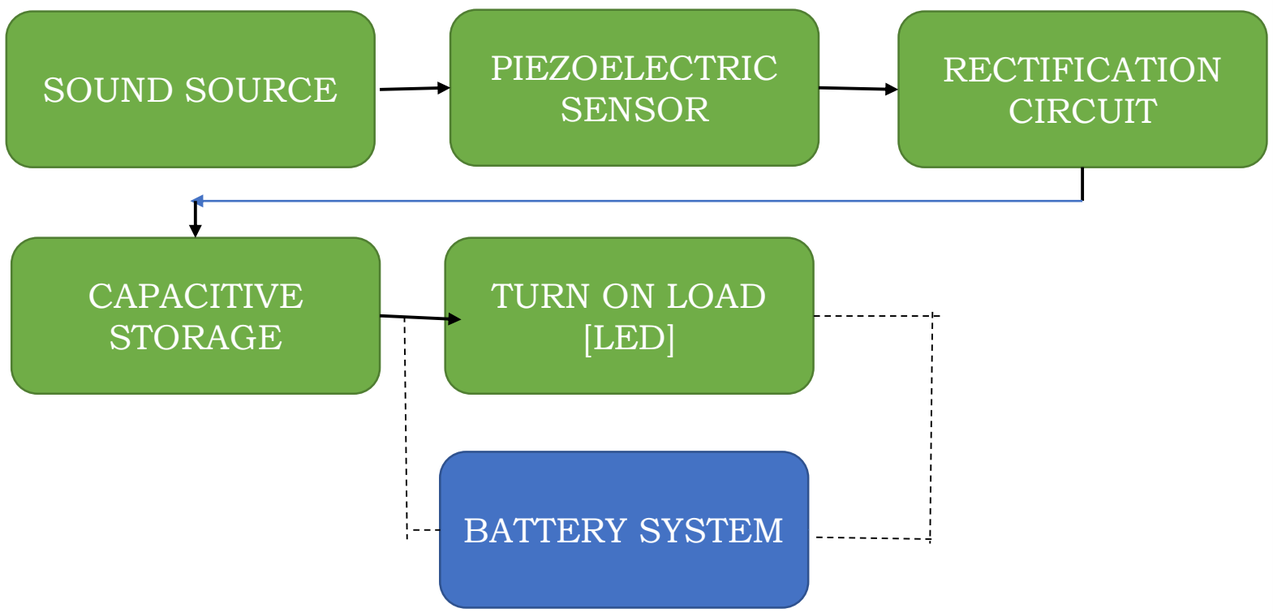
- To generate DC output from an Alternating source produced by piezoelectric sensor.
- Improve efficiency of the prototype.
- Achieve basic voltage sufficient to turn on a led
- To make the prototype easily usable by any user.

Methodology

1) Progress Bar:



2) Prototype Progress Bar With Methodology:



: Refers to the part where progress is to be done for future application in read world models.

Tools used

Tools used to implement the prototype includes:

1) Proteus 8 Professional
2) Ltspice
3) Arduino IDE
4) PyCharm
5) Tinkercad
6) Matlab

Results and Discussions

Our project involved feeding a sound source into a piezoelectric sensor, rectifying the signal, and storing the energy in a capacitor. We controlled the charging and discharging of the capacitor using a switch. The primary objectives were to identify a sound source, generate electricity from it, and enhance the model's efficiency.

Despite the unavailability of key materials, we successfully achieved these objectives. We identified a sound source and demonstrated electricity generation from it. For improving efficiency, we developed a feasible circuit design that stands out as one of the most efficient models for acoustic energy conversion. Future work involves integrating this circuit into a small device or chip. This device would convert sound into a DC signal, providing a user-friendly tool that operates seamlessly without exposing the internal processes. With all necessary materials, this project has the potential to become a highly efficient model for acoustic energy conversion.

Conclusions

- We have achieved a DC output of 2-3V from just three piezoelectric sensors in parallel, showcasing the potential for scalable energy generation.
- We have successfully powered an LED for a brief duration, proving the feasibility of using sound energy to drive electrical devices.
- Our prototype highlights the importance of rectification in harnessing AC output from piezoelectric sensors, enabling us to utilize the generated energy.
- This project paves the way for further research and development in sound energy harvesting, offering a promising sustainable solution for powering devices in various applications.

References

AUTHOR	PAPER TITLE
Alankrit Gupta, Vivek Goel, Vivek Yadav	Conversion of Sound to Electric Energy
A.Subramaniya Siva , N.Vinothini , S.Sathieshkumar	Piezoelectric Based Electric Energy Generation From Sound Energy
Yuan Wang, Xin Zhu, Tingsheng Zhang, Shehar Bano, Hongye Pan, Lingfei Qi, Zutao Zhang ,Yanping Yuan	A renewable low-frequency acoustic energy harvesting noise barrier for high-speed railways using a Helmholt resonator and a PVDF film