NOISE TO ELECTRICITY GENERATOR FOR CHARGING ELECTRIC VEHICLES

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Keywords:

Piezoelectric Microphone, Noise to Electricity Generation, Voltage Amplifier, Electric Vehicles.

Introduction:

- Nowadays there is a shortage of energy sources and at the same time the electrical loads and modern devices which are based primarily and directly on electric power are increasing. This Reality is a major challenge facing the government Using several energy sources and not relying on a single source, especially if this source is a conventional source, is a necessary step.
- Conventional energy sources such as fuel and natural gas will expire with time, so researchers are trying so hard to develop and explore renewable energy sources such as solar, wind, vibration, and thermal energy.
- Pollution is a major problem facing all countries in the world. As it relates to the environment, the rapid growth of the urban and industrial sector has been incorporated into large-scale hazardous waste products. The huge increase in cars and citizens led to a major analysis of the "Noise Pollution".
- It has become a major problem facing communities. Unwanted noise affects institutional development that has a direct and indirect effect on human health activities.
- In the quest for sustainable development in urban areas, the incorporation of electric vehicles (EVs) has emerged as a pivotal strategy in reducing carbon emissions and encouraging cleaner transportation options.
- Nevertheless, the main Identify applicable funding agency here. If none, delete this challenge remains in devising effective and environmentally friendly approaches for charging EVs within the current urban infrastructure.
- As cities continue to battle widespread noise pollution, the NEG presents a transformative approach by converting background noise into a customized renewable energy source for charging EVs.

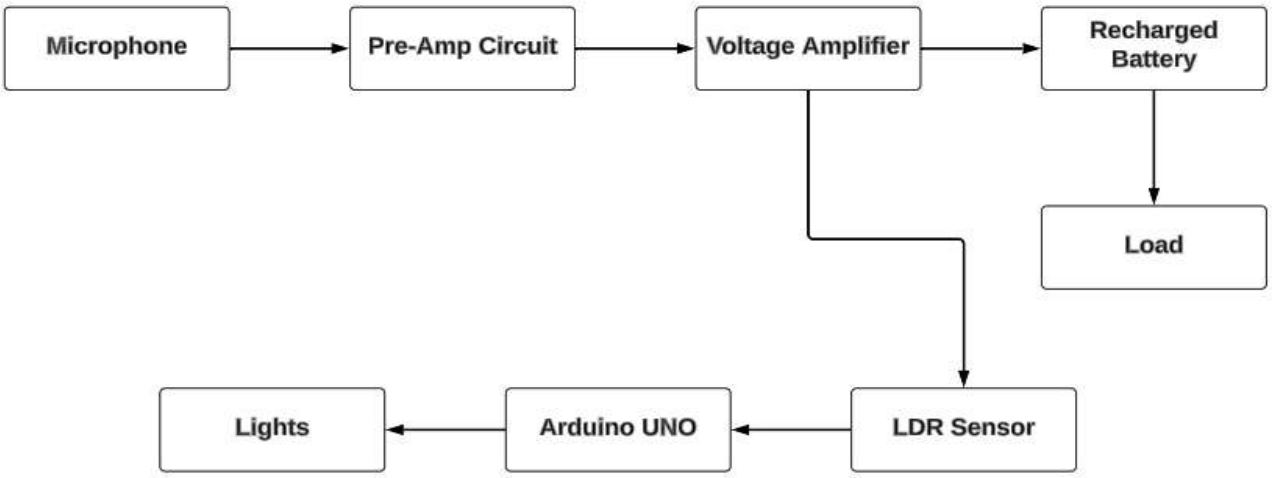
- By strategically siting advanced piezoelectric and electromagnetic transducers in urban centers, this technology captures and exploits noise energy, addressing not only the environmental issues linked to noise pollution but also the increase in energy demands from the rapidly expanding EV industry.
- The introduction establishes the foundation for exploring the design principles, deployment strategies, and empirical data supporting the potential of the NEG to revolutionize sustainable urban transportation.

Objectives:

- The main objective is to generate electricity using noise.
- To charge the electric vehicles using the generated electrical energy.
- To store the generated electrical energy in a rechargeable battery for future purposes.
- To turn on/off the automatically the lights of electric vehicles using the generated electrical energy by using LDR sensor.
- Investigate the economic and environmental benefits of utilizing noise as a resource for generating electricity in the context of electric vehicle charging stations.

Methodology:

Block Diagram:



Working flow of Block Diagram:

- The block diagram represents an electronic system designed to capture, amplify, and store sound signals, and control lights based on light intensity.
- The system begins with a Microphone that captures sound signals. These signals are then fed into a Pre-Amp Circuit which amplifies the weak signals from the microphone.

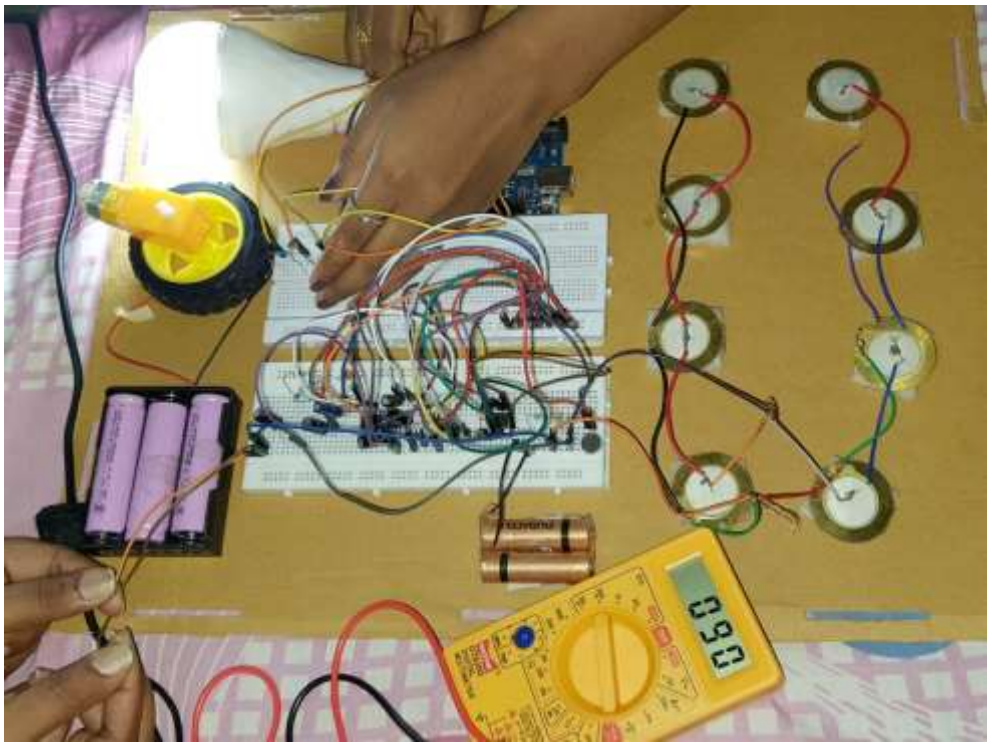
- The amplified signals are further boosted by a Voltage Amplifier and the output from the Voltage Amplifier is used to charge a Recharged Battery. The energy stored in this battery is then used to power a Load.
- In parallel to this, the system also includes a light control circuit. Lights are controlled by an Arduino UNO microcontroller.
- The Arduino UNO is also connected to an LDR. The LDR Sensor detects the intensity of light, and this information is used by the Arduino UNO to control the lights.
- This system could be used in various applications where sound signal processing and light control are required. The specific application would depend on the nature of the Load and the Lights.
- For example, it could be used in a sound-activated lighting system, where the lights respond to the intensity of sound captured by the microphone.
- When noise hits the piezoelectric microphone, it converts that noise into electrical energy. Generally, electret microphone doesn't conduct until we give the power supply to it and as per the datasheet of microphone.
- we have given max power supply as 5v to the microphone, and we have connected resistor and capacitor to convert ac to dc and then we use lm386 op amp as a preamplifier to amplify the output of piezoelectric microphone we have designed the op-amp circuit for the gain of 100.
- The amplified output is now given to an audio amplifier. We have used TBA 810 IC as an audio amplifier here it is very old and rare IC which will be used to amplify the signals.
- The generated electrical energy is stored in a rechargeable battery and connected to load.
- We have used LED sensor to automatically turn on/off the lights in electric vehicles and we have written code for the same. the integration of smart control systems enables dynamic adjustments based on varying sound intensities, further enhancing the overall efficiency and adaptability of sound-based energy generation systems.

This approach not only optimizes energy utilization but also ensures a seamless and automated operation of the electrical system

Conclusion:

- The project focuses on evaluating the efficiency of the noise-to-electricity conversion process. The connections were arranged in a series to create both voltage and current.
- The completed correct piezo microphone arrangement is shown in the figure below. By arranging all the sensors and placing them on a wooden play structure.
- It will produce a minimum voltage of 10mv and a maximum voltage in the range of 50-60 millivolts.
- The generated voltage is first fed to amplifier circuit and the output after amplifier is max of 150mv and then it is stored in a rechargeable battery before being used for the bus as well as for charging personal devices and lights.

- So, when we applied the noise to piezo microphones it produces max of 150mv which can be used for charging after storing it into an rechargeable battery and we also got output for automatic lights turn on/off according to LDR sensor.



- The "Noise to Electricity Generator for Charging Electric Vehicles" project successfully demonstrated the feasibility of converting ambient noise into electrical energy.
- By arranging piezo microphones in a series fashion and amplifying the generated voltage, we achieved a maximum output of 150mV, suitable for charging applications.
- The use of a rechargeable battery allowed for energy storage and utilization for bus charging, personal devices, and automatic lighting control.
- Overall, the project proved the concept of harnessing noise energy for practical use, contributing to sustainable energy solutions.

i)Description of the innovation in the project:

- The technique developed a new method for generating electricity form sound pollution. Sound is a mechanical form of energy which is available in the form of waves.
- Also, according to law of thermodynamics, mechanical energy could be converted into electricity. Transducer is also used to convert Mechanical energy to electric energy i.e. it can convert sound energy to electric energy.
- A simple example of the use of transducer to convert sound to electric energy and vice versa is in speakers, headset, also it could be converted into electric energy by other methods.
- It can be used in lightning the streetlights by using the noise pollution made by vehicles, it could also be used in industries, airport runways (as the sound pollution is mostly there, and the energy of sound here is very high

so we will get pleasant output), also the electricity produced in nuclear power station could increase.

- It doesn't end over here; there are many applications of it. Waste form of sound energy can be used for some creative purpose. Random unwanted noise can be a source of electrical energy which can be converted by a transducer.
- The output of a transducer is enhanced using a boost converter device. The resultant electrical energy is stored in a battery such that it can be used for further applications.
  So, it would not be wrong if in future we see sound energy as new source of power. As sound has an enormous amount of energy with it, it can be used by converting it into electric energy

Scope for future work:

- The scope of the project includes enhancing conversion efficiency for higher energy output, exploring scalability for multiple vehicle charging, integrating with renewables for a hybrid energy solution, adopting smart grid technology for efficient distribution, optimizing sensor placement for improved energy capture, and researching advanced energy storage for reliable supply.
- These efforts aim to create a more robust and impactful energy generation system with broad applicability in sustainable transportation and system.
- Traffic Noise: Noise from vehicles on roads and highways is a common source of daily noise pollution for many people.
- Industrial Noise: Noise generated by factories, construction sites, and industrial equipment can contribute to noise pollution.
- Aircraft Noise: Those living near airports may experience noise pollution from aircraft taking off and landing.
- Urban Environment: In cities, the constant hum of urban life, including sirens, car alarms, and other urban sounds, can contribute to noise pollution.
- Household Appliances: While not pollution in the traditional sense, the noise from household appliances, like blenders, washing machines, and vacuum cleaners, can be a source of unwanted noise in daily life.
- These are the applications where we can use our project . The noise produced in these areas are used for converting them into electricity and we can use it for charging mobile phones or for home electrical appliances