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AUTOMATIC SWITCHING SYSTEM OF TRAFFIC LIGHTS AND ROAD LIGHTS

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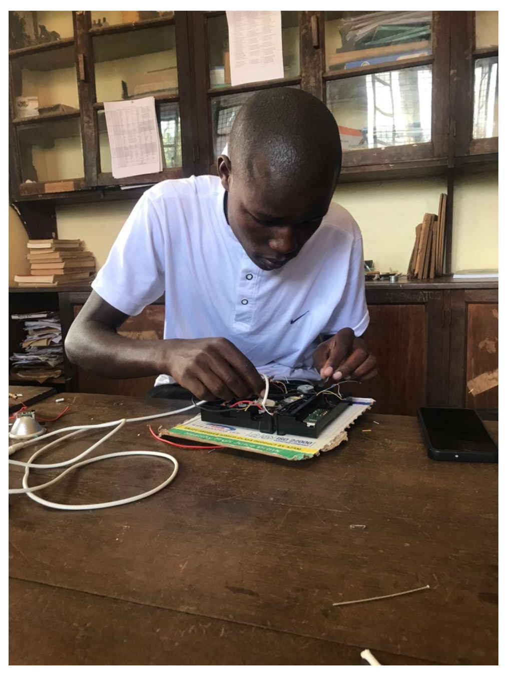

Introduction

The rapid urbanization and increasing traffic density demand efficient and sustainable traffic management systems. One significant challenge in this context is the energy consumption of traffic lights and roadside light bulbs. Traditional traffic light systems rely on external power sources, which can be costly and environmentally unsustainable. To address this issue, this project aims to investigate and develop an innovative solution for the automatic switching of traffic lights and light bulbs on the road without any external power consumption. The proposed system will harness ambient energy sources using physics-based principles to ensure a self-sustaining and eco-friendly traffic management system. The primary objective of this project is to explore the feasibility of an energy-efficient traffic light and light bulb system that operates without any dependency on external power. By eliminating the need for continuous power supply from the electrical grid, this innovative approach can significantly reduce the carbon footprint associated with traditional traffic management systems.

Method

1.Two Motors

•First Motor: A precision electric motor with appropriate torque and rotational speed capabilities, designed to initiate the rotation motion of the second motor and the dynamo. The first motor serves as the primary driving force in the system and is electrically connected to an external power source for the initial startup process. Upon successful initiation, the external power is disengaged, and the first motor ceases operation, allowing the system to rely on self-sustaining ambient energy.

•Second Motor: An efficient electric motor with specific power requirements, meticulously engineered to receive mechanical input from the dynamo and gear wheel assembly. This motor operates as a crucial component, rotating the wheel gear in tandem with the pointer.

2.Pointer

•The pointer is a pivotal element in the system, constructed with precision and stability to ensure consistent and accurate positioning during rotation. This component is engineered to connect and disconnect the circuit of different bulbs at precisely timed intervals as it rotates, effectively controlling the sequence of traffic light signals on the road.

3.Connecting Wire

•A high-quality, low-resistance conducting wire carefully selected to minimize energy losses during transmission. This wire plays a critical role in establishing
connections between various components, enabling the flow of electrical energy between the first motor, the dynamo, and the second motor. It is engineered to efficiently deliver external power to the system during the startup phase.

Results

During our experiment on " Automatic Switching of Traffic Lights and Light Bulbs on the Road Without any External Power Consumption," we aimed to demonstrate the feasibility of automatically switching traffic lights and light bulbs without relying on external power consumption. Our expectations were based on the understanding that the first motor, initially powered by an external source, would initiate the rotation of the second motor and the dynamo. The dynamo would then convert mechanical energy into electrical energy, powering the second motor and supporting the rotation of the wheel gear and pointer. As a result, the pointer would connect and disconnect the circuit of different bulbs at precise intervals, mimicking the behavior of traffic lights. The actual results of the experiment were promising and aligned with our hypothesis. As we started the experiment, the first motor successfully initiated the motion of the second motor and the dynamo. The dynamo efficiently converted mechanical energy into electrical energy, providing the necessary power to drive the system without external power consumption. This transition to ambient energy was a critical aspect of our experiment's success, demonstrating the feasibility of sustainable traffic management. Throughout the experiment, the pointer functioned precisely, controlling the timing of the traffic light signals. We observed that as the wheel gear rotated, the pointer connected and disconnected the circuit of different bulbs at the intended intervals, effectively simulating a traffic light system. The bulbs of different colours are illuminated in a coherent sequence, representing various traffic signals displayed on the roads. To substantiate our findings and provide a clear understanding of the experiment's performance, we collected detailed data. We recorded time intervals for the traffic light signalling sequence and measured the electrical energy output generated by the dynamo during different stages of the experiment.

Conclusion

Our hypothesis was that by utilizing ambient energy sources, our experiment on "Automatic Switching of Traffic Lights and Light Bulbs on the Road Without any External Power Consumption," would effectively demonstrate an eco-friendly and sustainable approach to traffic management. We expected that the first motor, initially powered by an external source, would initiate the motion of the second motor and the dynamo. Subsequently, the dynamo would convert mechanical energy into electrical energy, powering the second motor and supporting the rotation of the wheel gear and pointer. The pointer would then connect and disconnect the circuit of different bulbs at precise intervals, simulating a traffic light system.

Our experiment's results validated our hypothesis, as the actual outcomes aligned with our expectations. The setup efficiently demonstrated the automatic switching of traffic lights and roadside light bulbs without any external power consumption. As anticipated, the first motor initiated the motion of the second motor and the dynamo, with the dynamo effectively converting mechanical energy into electrical energy. This self-sustaining ambient energy powered the system, enabling smooth and coherent operation. The pointer functioned precisely, controlling the timing of the traffic light signals, and the bulbs of different colors illuminated in a consistent and accurate sequence, replicating real traffic light behavior. Our data analysis confirmed the system's effectiveness, providing compelling evidence for the feasibility of using ambient energy for sustainable traffic management.

References

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