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| **Title:** | Design, Testing, Evaluation, and Implementation of an Arduino-based Mosquito-Repellent System | | |
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| **Abstract:** |  |
| Aims: The primary objective of this research drive is to design, develop, and evaluate an Arduino-based mosquito-repellent system. This work underscores the importance of developing sustainable and eco-friendly solutions for mosquito control.  Study Design: An Arduino microcontroller board is used, and an assembly language program is developed to repel mosquitoes from the surroundings. This system uses piezoelectric disks, LED lights, LCD monitor along with the Arduino board and produces ultrasonic sound to protect humans and the environment from mosquitoes.  Place and Duration of Study: The research effort was steered by the authors in a group under the supervisor of a faculty member as a part of the course capstone project work of the Bachelor of Science in Engineering degree in Computer Science and Engineering at the American International University Bangladesh (AIUB), Dhaka, Bangladesh. The authors performed their research tasks at AIUB from May 2023 to January 2024.  Methodology: The innovative mosquito-repellent system uses an Arduino Mega 2560 microcontroller to generate a cutting-edge solution to tackle the problem of mosquito infestations. The system can produce an electric signal that can emit mechanical ultrasound signals to be harnessed using a series-connected eight piezo-electric discs. To power up the system, it uses four Li-ion rechargeable batteries charged by using solar energy from the home solar system. Besides, it uses LEDs to indicate the status of the repellent system.  Results: The generated ultrasonic signal is observed on the oscilloscope screen and its’ value is exhibited on the LCD screen to evaluate the system performance. Testing confirms that the system can drive away mosquitoes within its 3 m surroundings in 2-3 minutes. Besides, the system parameter and cost comparison show that this scheme suggests a worthwhile and sustainable result for making a mosquito-free environment.  Conclusion: The development of a mosquito-repellent system using ultrasonic sound waves based on an Arduino microcontroller offers a sustainable and effective alternative to traditional methods of mosquito control. Since the system is chemical and health-hazard-free, it is eco-friendly and makes human life more comfortable. The system is portable and cost-effective, making it suitable for use in various settings. | |