Optimizing Piezoelectric Energy Into Morse Code

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"Piezoelectricity is a phenomenon that happens in certain materials that generate electric charge under mechanical stress due to their non-centrosymmetric molecular structure. The development of self-sustainable sensors and dispositive is becoming a popular and important area as shown in varies of investigations" (Akinaga, 2020). This investigation aims to develop a method that uses piezoelectric energy to power an LED to communicate in Morse code. Before testing two criteria of proficiency are established; more than 80% of the evaluations need to be in the first try, while more than 98% of the evaluations need to be in the third try or less. For letters, E, A, and S had a 96% success rate on the first try, while J and N presented the most difficulty with a 76% to an 80%. Numbers like 2 and 5 had a 92% success rate on the first try with some variability in others like 8 and 9 with 76% to 84%. Word comprehension varied, with "Bad" being understood 92% in the first try and decreasing with "Words", and "Many" with 56% to 72%. Despite some challenges, the two criteria of proficiency were surpassed. The subjects were never exposed to Morse code before the test, demonstrating how efficient and easy this communication method is. Future research aims to optimize piezoelectric energy harvesting for Morse code, exploring advanced materials. Efforts include integrating communication modalities for accessibility and miniaturizing the device for emergency systems. Development target's reliability for enhanced emergency response and public safety.

Awards Won: