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Look Ma, No Batteries: An Exploration of Electromagnetic Induction

The purpose of my project was to determine if I could construct an electric generator that operated on the principle of electromagnetic induction, and apply this technology to generate the energy needed to propel a model car. Currently available electric cars have a limited range and require the use of environmentally harmful lead-chemical batteries. Furthermore electric cars are often charged from outlets drawing energy produced from non-renewable fossil fuels. Electromagnetic induction, combined with supercapacitors, may provide a solution to these problems. After building several prototypes, my optimized generator (V2.1) produced 28 volts of electricity; this is a 14-fold increase over the prototype generator. The V2.1 was constructed using roughly 500 coils of copper wire (AWG 30) wrapped around a plywood frame. Electricity was generated by spinning two grade-N52 neodymium block magnets within this frame. The energy produced by the generator was stored in four 2.5 volt/10 farad supercapacitors. Stored energy was used to power a small motor, which turned the drive train of the car and spun the magnets, but not at the same time. Unfortunately even though the generator was able to spin the magnets it was not able to recover enough electricity to recharge the supercapacitors. However if additional research is conducted I am confident that an energy recovery system could be built and applied.