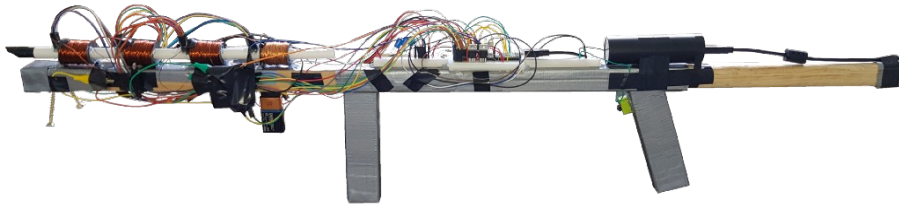


# Electromagnetic Coilgun

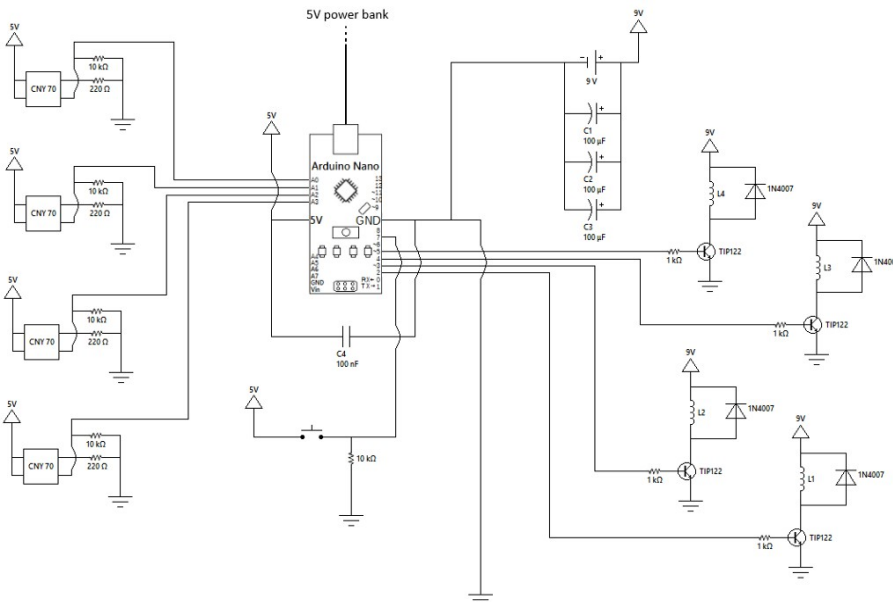
Utilizing electromagnetic forces for weapon technology



As part of my advanced research, I have built a makeshift coilgun. This project serves only as proof of concept, thus the ejected projectile is far too slow to hurt anybody. The shooting range barely amounts to one meter. But the theory behind this technology has been proven in practice by this coilgun.

For academic and educational purposes, I wanted to publish my research.

This is the circuit diagram:



An Arduino Nano microcontroller functions as the “brain” of this coilgun. The projectile’s position inside the barrel is measured by four optical (infrared) sensors. Each of them is placed directly behind the respective coil.

After pressing the button, the first coil will be activated and builds up its magnetic field which begins to attract the projectile.

Once the projectile, a nail, is inside the coil, it will be noticed by the respective sensor and the coil shuts down so that the nail keeps its additional momentum. This process gets repeated four times until the projectile gets ejected out of the barrel’s end.

The Arduino Nano, as well as the sensors, are powered by a five-volt power bank, while the coils have a nine-volt battery as their separate power source. Additionally, an array of three electrolytic capacitors is being used to smooth out possible fluctuations in the power grid.

And finally, this is the software that has been uploaded to the microcontroller:

<https://github.com/SebastianSupreme/Coilgun/blob/main/main.cpp>

I think it's amazing to see raw physical forces, engineering, and software acting in harmony to create something as magnificent as this project. And a coilgun like this is the perfect example of a project that has been developed using this whole spectrum.