

Mark Making Machine: splat

By Christy Quang

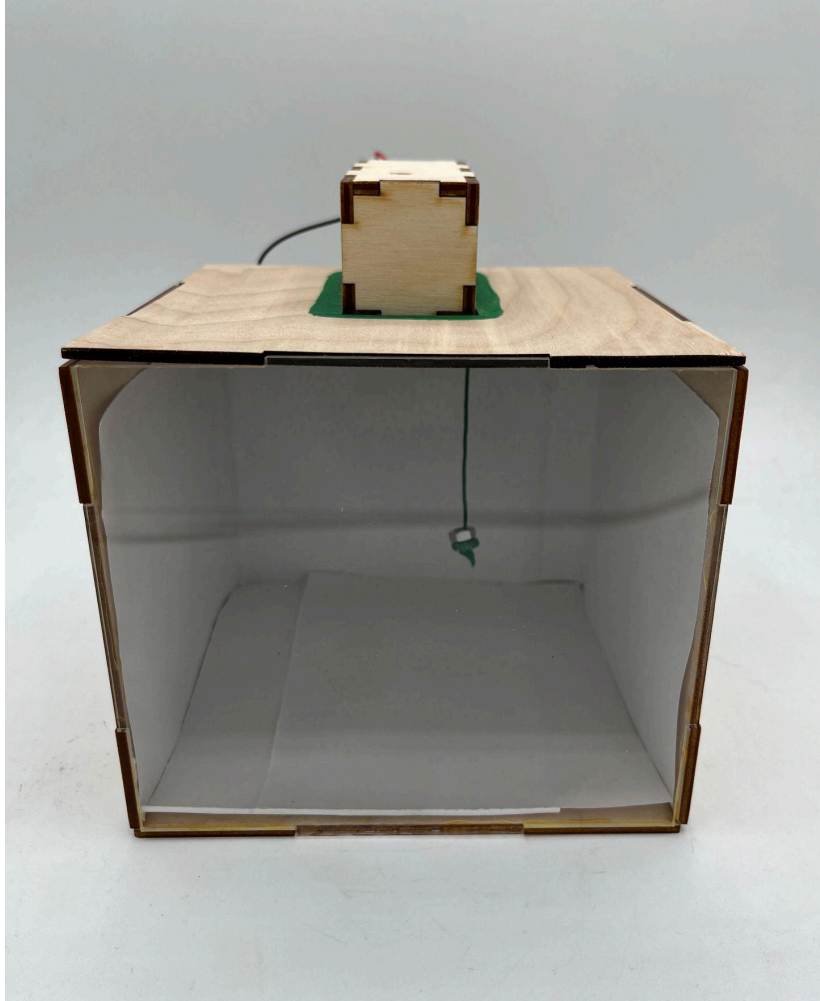
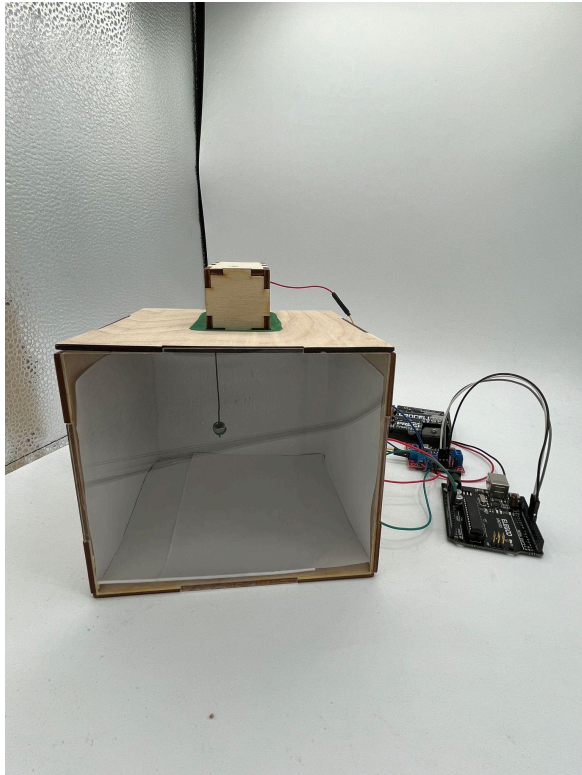


Image of static display of splat

Showcase / Description of Finished Piece

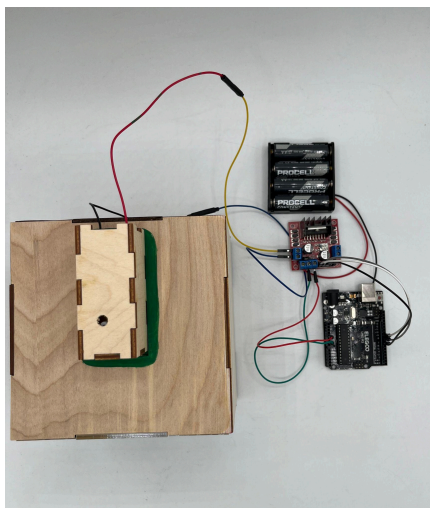


My mark making machine uses an Arduino Uno, L298N H-Bridge motor, L298N H-Bridge motor driver, and a battery box to create an automated box that splatters paint on small squares of paper. The light exhibit begins with the weights and strings dipped in paint, dangling down in still motion.

When the user powers on the battery box, the motor starts rotating in a clockwise motion. The string is tied onto the motor detachable head, causing it to swing around since there are two small washers at the end of the string. The weights and string are dipped into paint, creating a “splatter” effect and paint marks on the paper when the motor is continuously running. The final image is up to the viewer’s interpretation but

to me, the sound of the washers hitting the walls of the box make me think of two “punching zones” for the paint. They’re two sides of emotions (happy and sad) where the splatter marks in between are the different emotions of laughter, stress, etc.

[Full Video: Link to Google Drive Video](#)

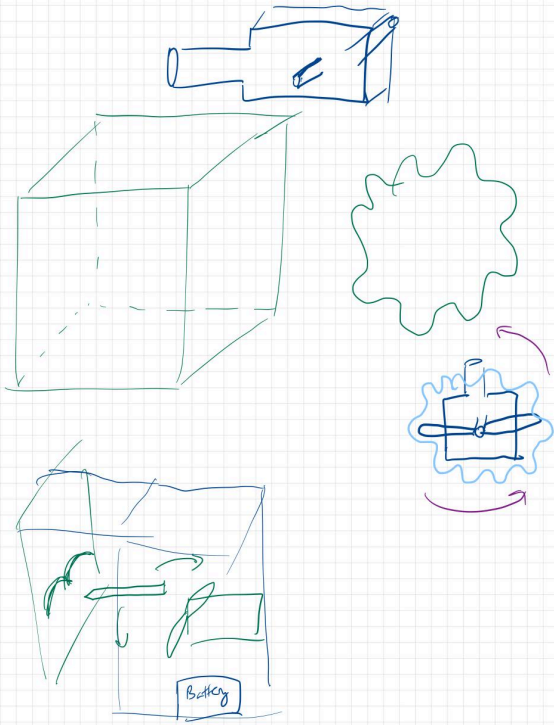


The piece includes an Arduino Uno board, one battery box, four AA batteries, one cable, one L298N HBridge motor, one L298N H-Bridge motor driver, a piece of string, two washers, paint, acrylic and plywood.

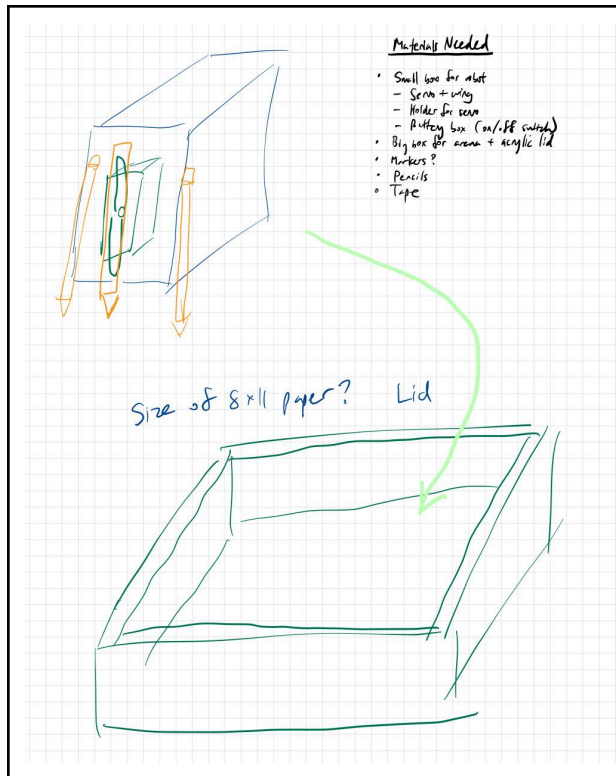
This is an image of the top down view of the mark making machine, showcasing all of the materials/electronics used.

Process

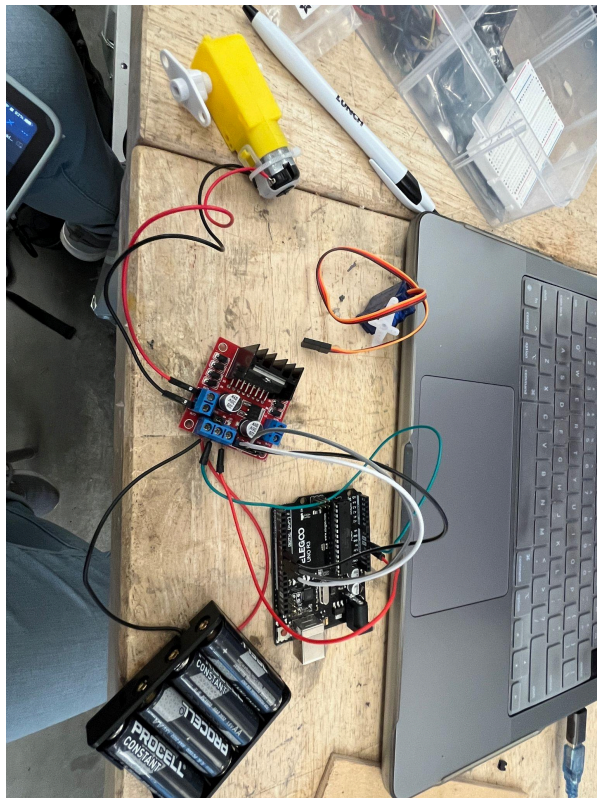
Ideation/Design Process



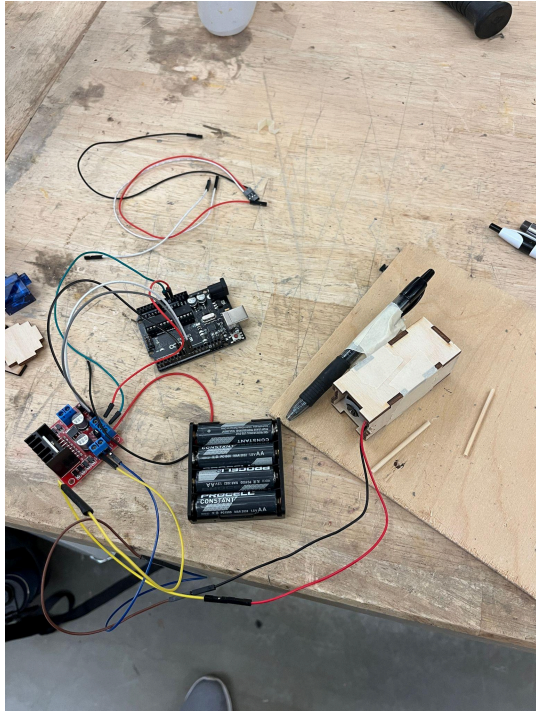
I was honestly lost at the start of this project because I didn't know what to even create. I knew that I wanted to design something "cool", but I don't have a lot of creativity. Since we had to incorporate using the motor or servo, I thought of attaching a gear to the servo wings so rotary motion could be created to move some sort of mark making utensil. As seen in the diagram, I thought of attaching a pencil to draw "hills" in an encapsulated box.



I decided that my original idea was too difficult so I instead pivoted to a small robot. The servo would be attached to a pencil which would drag along a small container with legs within a small arena.

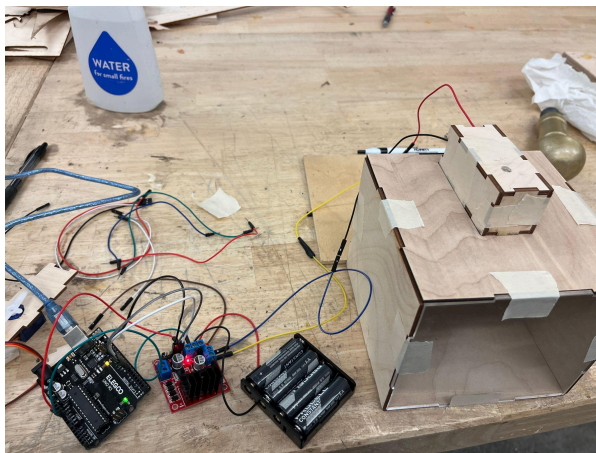


During class, I played around with the examples provided in Dr. Sudhu's tutorial.

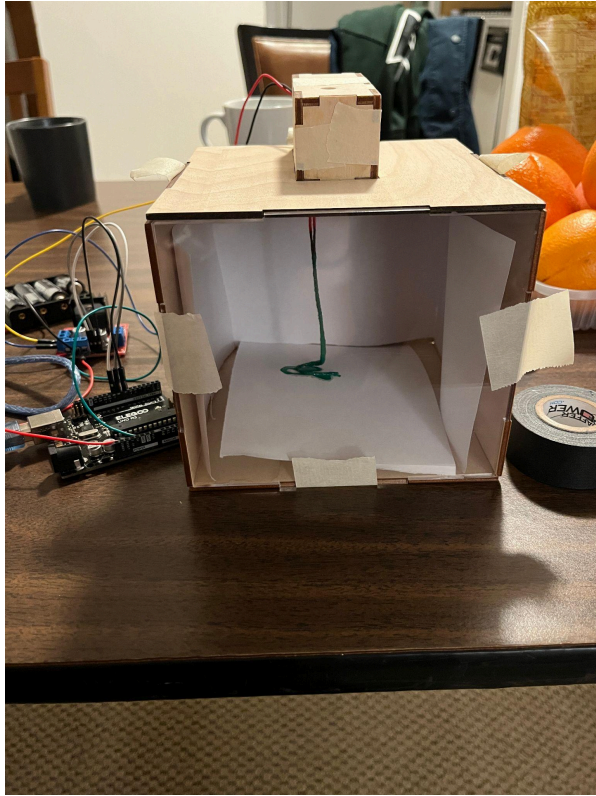


I attempted creating the small robot that would be moved by the motion of the servo wings and friction but while testing, I realized that there were a lot of problems that would be difficult to address. The weight/design I had created was inoptimal and made the overall capsule heavy and hard to move. Additionally, the wires/electronics limited the robot's range of motion so I decided to scrap the idea.

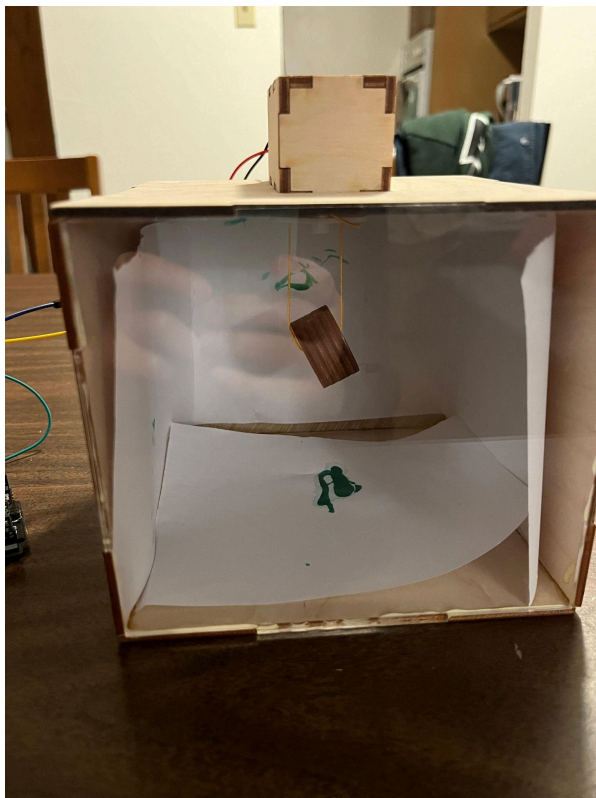
Prototyping/Building Process



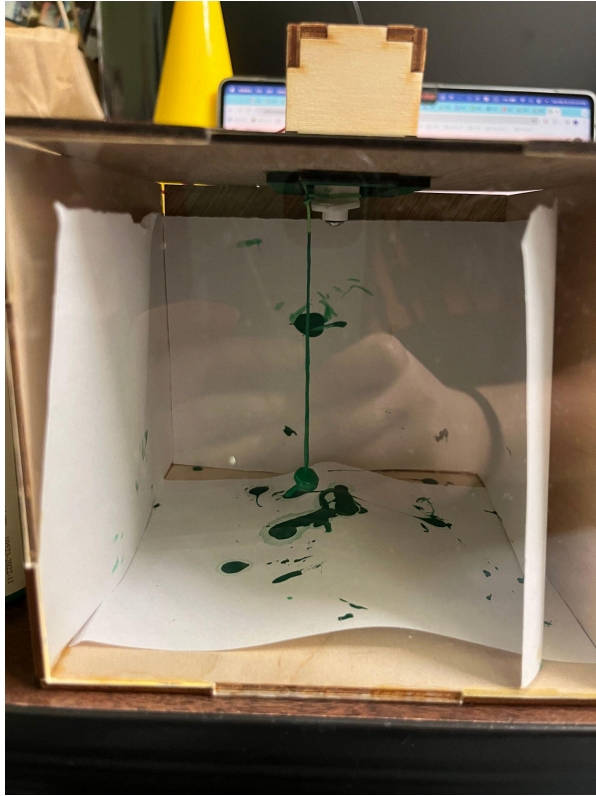
I was still able to somewhat reuse the design I had created initially for the robot since the heavier weight didn't matter for my splatter box. As such, I decided to create a box that had pieces of paper on all of the walls. I was hoping that the motor would be able to rotate at a fast enough speed to fling the string around, creating paint splatters across the paper.



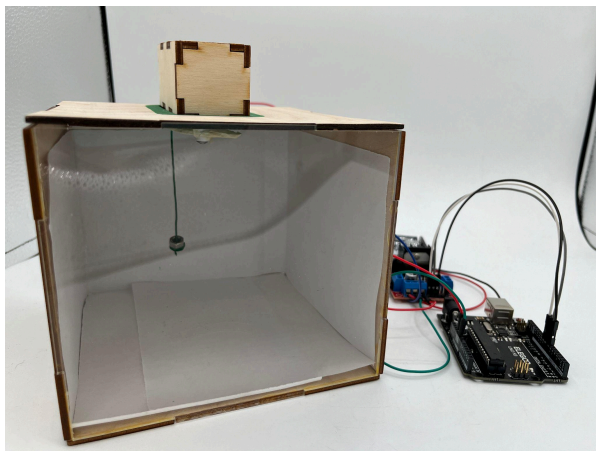
After laser cutting my boxes to hold the paper and the motor, I realized that the motor wasn't fast enough to swing the string around. At that point, I learned that servo motors provided the ability to change the degree and speed of the rotation whereas the L298N motor only allowed users to change the speed.



Since I was only able to change the speed of the motor, I decided to attach a "weight" at the end of the string to help create more speed/force for the motor to swing around. This kind of worked but my "weight" was too large and didn't really "splatter" the paint.



I switched my "weight" to small washers I had found and this worked better. However, I was having a lot of difficulty with the Arduino code since it wouldn't upload to my board for some reason.



I made very minimal changes to the example code written in the L298N example since my machine only needed one functionality – the ability to continuously rotate. I set the motor's speed to its highest possible value and let it loop.

Conclusion / Reflection

I plan on experimenting more with my machine since it's still not creating the desired "paint splatter" drawing I want. Another idea I had was replacing the string and washers with a paintbrush or sponge so that every time that material hit the paper, it could create a circular pattern. I envision users being able to insert a piece of paper and after using the machine, being able to take out a cool, "splattery" work of art with different colors, imitating the solar system. However in the meantime, I probably won't showcase this because I need to repurpose the board for future assignments. I feel satisfied with how the project turned out because I wanted to create some sort of splatter effect in a small, aesthetic container which I was able to do so. Through the process of creating this piece, I was able to gain more experience with motors and designing since it was really difficult to come up with the overall concept of this project.

I ultimately want to create a greater "splatter" effect and will continue to work on this bug, whether it be through swapping the motor with a servo, changing the motor, or adding more power/force.

Links

Code	https://github.com/christyquang/desinv23/blob/main/drawing_machine.ino
Final video	https://drive.google.com/file/d/1cWjBnthYwG55JzjPMTp9UVVXYZpooNQk/view?usp=sharing

Sources

Dr. Sudhu's Arduino Tutorial	https://github.com/loopstick/ArduinoTutorial.git
Andrea Lombardo's L298N Library	https://www.arduino.cc/reference/en/libraries/l298n/