Limited Mobility Art Device

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Project Description

Jump the Moon Studio's purpose is to help people of all abilities become artists, no matter their limitations. The purpose of this project is to engineer a unique device that will assist the artists with limited mobility at Jump the Moon Studio in creating fun pieces of abstract art.

Problems to solve

The engineers aimed to create a unique device that persons with disabilities can be engaged and efficiently create unique pieces of art. The device also required to be economically efficient due to Jump the Moon Studio being a non-profit organization. The engineers sought to accommodate many forms of disability when designing the device especially limitations with grip.

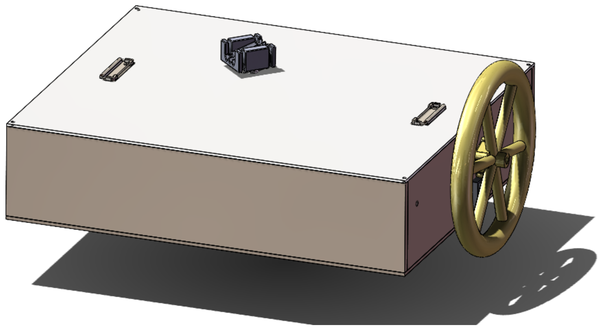

Figure 1. CAD rendering

Performance Review

The engineers performed a series of tests to verify the performance of the device.

- Force Analysis: Scale and Fish Scale
- Cycle: Finite Element Analysis
- Gear Ratios: Mathematical Computation

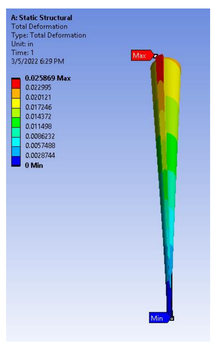

Figure 2. ANSYS analysis results

Future Work

This project became more complex than the engineers initially anticipated. The engineers believe this project to be impactful and important and while the excitement functions were not fulfilled, and some requirements were not met the engineers suggest continuations on this project.

The engineers suggest the following in upcoming years for project improvement: design more tool holders, create adaptable inputs, test with students to identify where redesign is needed, attach the device to a power chair for transportability.

Figure 5. To Those I Love The Most*

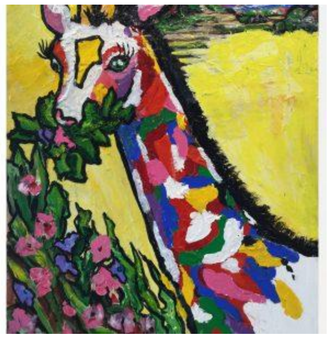

Figure 4. Giraffe*

Design Description

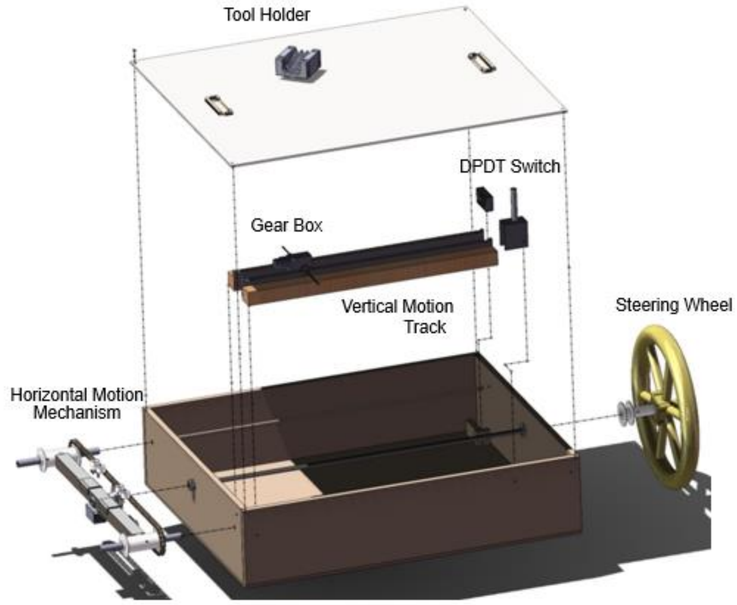

Figure 3. Subsystems of device

Lessons Learned

It is important to consider manufacturing capabilities during the design stage, the design stage is critical and will go through several iterations of design, take advantage of the experiences of senior engineers and mentors around you, be cautious of over engineering.

Design and Engineering Concepts Learned

- Tolerances and Clearances
- Alignment
- Electronic Specification
- Machining

Figure 6. Dramatic Monochromic*

Figure 7. Whale*

Conclusion

The device does not work completely as expected due to the motor being inefficient. Both the vertical and horizontal mechanisms work independently, however when operating together the motor is not strong enough to overcome the addition friction forces imposed by the keyed shaft.

Special Thanks to Michael Bingham at Jump the Moon Studio

*Artwork available at Jump the Moon Studio