The Prolific Warriors "The Master Claw"

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Abstract

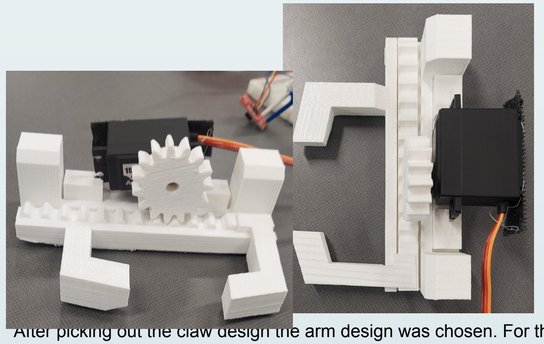
Astronaut's spacesuits are made so that they could offer the most protection possible for the harsh environment in space although spacesuits are layered for the astronaut's safety, they make it difficult to pick objects up. How can picking up objects be easier for astronauts while still providing safety? The question in fact could possibly be answered with one tool, in this case, "Thee Master Claw". Thee Master Claw is still in progress of being completed the idea of its finished product is a claw that is moved by a servo the servo receives directions from the Bluetooth sensor that is controlled by a Bluetooth app. When the Bluetooth app sends the signals to the servo it makes possible the first part of the pickup and the second part is made possible by its manually extendable and retractable arm piece. Thee Master Claw also contains a heart monitor to collect data for its user the data could be seen through Arduino. When Thee Master Claw is completed, it should be able to successfully pick up an object while recording the heart rate. Thee Master Claw still needs many tests to be run on it for example resistance tests and code tests but hopefully in the future Thee Master Claw could be the tool to help astronauts out in space.

Introduction

Thee Master Claw is a 3D-printed Bluetooth-enabled mechanical robotic arm that extends out to help astronauts grab potentially unwanted and dangerous objects while in space. This wearable technology contains a pulse oximeter, which accurately measures your heart rate and blood oxygen levels, ensuring the astronaut's safety during crucial moments in space. Thee Master Claw is designed to be extremely durable, yet lightweight allowing for easy maneuverability in zero gravity. Its Bluetooth capability allows astronauts to control it from a distance using either a smartphone or tablet you can easily control the claws' grip and strength giving you full control over the object you are trying to grab. Whether you are on a mission to repair a satellite, collect samples from a far-off planet, or simply need to grab a tool or piece of equipment, the Bluetooth-enabled robotic claw is the perfect solution. Its versatility and functionality make it a must-have tool for any astronaut.

Methodology

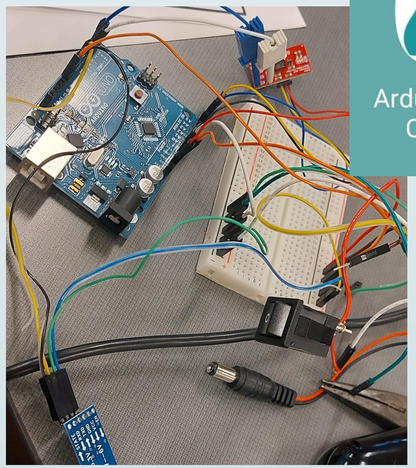
The wearables' objective was to design and create a Bluetooth-enabled robotic claw with a pulse oximeter and retractable arm to help astronauts grab potentially dangerous objects in space. The first step to creating the arm and claw was to define the requirements and specifications of the project. This included determining the maximum amount of weight the claw should have been able to lift, how heavy the claw should be, the range of motion required, the accuracy of the pulse oximeter, and the Bluetooth connectivity range. The next step was to design the mechanical structure of the claw. While choosing the claw design there were many styles other than the chosen one that was tested. To test the claw, design out the claws were 3-D printed and then put together. After many tests, the design below was picked. The design was found on a website and later transport into Tinker-cad where the claw was made bigger to allow for larger objects to be picked up. The gear that is moved by the servo was tested along with the claw on Tinker-cad to make sure that it would move before it was printed. Once printed the claw was tested with the servo to make sure that it opened and closed.

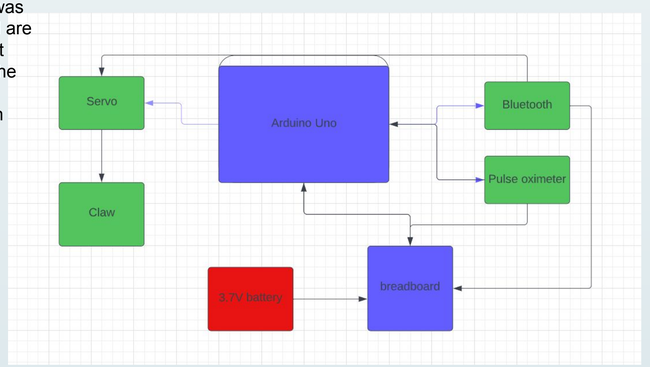


After picking out the claw design the arm design was chosen. For the arm part of Thee Master Claw, it was decided that the arm would extend and retract in a manual form where the person using it would just push out the drawer slide to make it extend and pull them in to make them retract. The next step after picking the design for Thee Master Claw was to plan out what systems would be used. To plan out the systems a block diagram was made. In this way, all the electrical systems could be organized. For the claw to move, a servo was used. The servo was connected to the Arduino Uno which contained all the code for "Thee Master Claw". The Arduino UNO had a Bluetooth sensor connected to it, a breadboard, a pulse oximeter, a switch, and a battery. Some of the systems were tested through Tinker-cad while others were tested as they were put together.

Results

Thee Master Claw was tested multiple times to make sure that it was able to meet its objective. The claw was tested in a small size to make sure that it worked. The final design was printed three times at a small scale if the claw did not move with the servo then alterations had to be made to it, the claw would be modified on tinker-cad and then reprinted until it successfully moved with the servo. Through the process of putting together all the electrical systems, each system would be tested individually. To test the servo a servo sweep was coded into the Arduino UNO which later sent the code to the servo. During the sweep, the most important part was to make sure that code was going into the Arduino board and moving the servo. Once the servo was tested and put as a working part the Bluetooth sensor was added the Bluetooth sensor was tested with a Bluetooth app if the sensor connected with the app it meant that it was functioning correctly. The pulse oximeter was later tested to make sure that it turned on and was connected correctly. The pulse oximeter was tested with some sample code. It was not tested further than with the sample code. Some additional tests are to be run with the heart monitor to make sure that it is capturing the data needed. Although further testing is needed for the heart monitor it was marked as working for connectivity. The last part to be tested was the battery. The battery was changed many times 9v batteries were tested but the battery life did not last as long as it would have been preferred. After testing the 9v batteries it was decided to use lithium-ion batteries instead because they last longer and are rechargeable. Once everything was put together it was tested during that testing some problems were run into. The main problem had to do with the code which was tested multiple times. The code is something that could continue to improve with future testing. The claw is functional to a certain degree but with further testing, it can be improved.





Conclusion

Thee Master Claw would be a useful tool to have in space. Further testing could help astronauts in space pick up objects. So far Thee master claw's systems have been tested and have worked. Something that can be tested further is the code and the pulse oximeter.

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