A.I. in Surf Board Development for Search and Rescue

Introduction

The Lifeboard is designed with a single simple purpose in mind, to help lifeguards save lives. The process of saving lives is however not so simple. In each case of a rescue there is a different set of circumstances involved. It is for this reason that the Lifeboard comes equipped with many functions to make each unique rescue as simple and easy as possible. The Lifeboard, other than its obvious use as a rescue board, comes with a retractable netting in the front of the board that can scoop the victim up and raise them up to the level of the board. This would be especially useful for rescues involving an unconscious victim. This netting occupies approximately one third of the board's total length depending on the specific size preferences.

Materials & Methods

- Materials

- 3'x2' XPS Foam Board (x2)
- 3'x2' plywood board
- LCD Panel
- Watertight Plastic Casing Box
- Pixy Camera
- Bilge Pump
- 2 inch pvc coupler
- ¾ inch pvc elbow (x2)
- 3 inch wide PVC pip
- Arduino Uno Board
- Adafruit Mini Pan-Tilt
- Netting

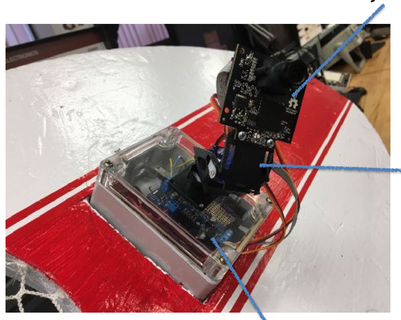
- Procedure

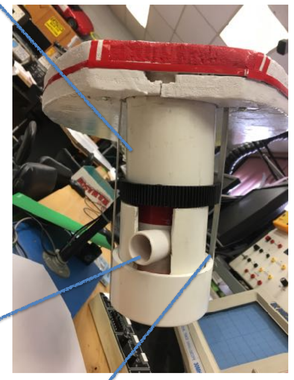
Scale 2 XPS 3' x 2' foam boards (0.75' thick) and a 3' x 2' plywood board (0.25' board) based on 8'4" Clark Foam Board model by Roger Hinds and Rich Harbour. Clamp 3 boards together (plywood in center) and file down to achieve uniform shape/ Secure 3-inch tall, 2-diameter wide PVC pipe to front of plywood board using a combination of screws and L-brackets. On the corresponding XPS foam board, cut a 2.5 diameter hole in which the PVC pipe will go through. Cut small rectangular shaft along the length of the board to allow wires to snake through center of board. On the other XPS foam board, measure the length and width of the plastic casing box (making length of box perpendicular with length of board), and cut a hole all the way through the foam board 2' from the back of the board. Drill a 0.25' hole in the center of the bottom of the plastic casing box and the plywood board under it for the wires, and a 0.5' hole for the cables providing power. Secure 2 1' long, 0.25' thick wooden block to the inside of the box perpendicular to the length of the box to serve as elevation. On top of these blocks, secure the Arduino Uno board. Connect the Pixy Camera to the Adafruit Mini Pan-Tilt using screws. Secure the Adafruit Mini Pan-Tilt to the center of the plastic box by drilling holes and using screws and nuts.

Materials & Methods (cont.)

Solder wires to the motor, one for positive, one for negative. Place motor in the 3-inch tall PVC piping, and snake the wires through the shaft in the XPS foam board. Secure the bilge pump on top of the motor, preferably without the use of screws. Snake wiring through the shaft, and through the hole in the middle of the plastic box. Connect the wiring to each corresponding spot, including the wiring for the Pixy camera to the Arduino Uno board. Measure the combined height of the motor and the bilge pump. Using this measurement, cut out the required length from the 3-inch wide PVC pipe. Top off the PVC piping with a PVC pipe end. Take note not to secure PVC pipe down directly, as to allow the bilge pump to function, the PVC pipe must be able to rotate.

Design Prototype





Conclusion

Currently, the overall goal of the Lifeboard is to help lifeguards in the rescuing of people in large bodies of water, cannot be reached. It is incomplete, and requires further modifications that will enable it to undergo tests to determine its ability to function safely and efficiently. At the current stage of the Lifeboard, it is unable to perform in aquatic environments. Several parts of the Lifeboard are placeholders while more efficient alternatives are being researched. Further modifications and research will be done in order to create a definitive model that functions and is reasonably priced.

Future Modifications

As previously mentioned in the results section, there are several improvements that must be made in order to complete my innovation. For instance, the board must be waterproof in order to protect the electrical wiring within the board. This can be solved by the use of a waterproof material as a coating for the entirety of the board. Certain parts of the prototype are connected to the board by the use of superglue or other relatively weak adhesives. Ideally, adhesives will be substituted by more secure forms of connection such as screws, bolts, etc. Pertaining to the turbine, it is covered by heavy PVC piping, which causes the turbine to detach from the board. To prevent this, a cage/bracket is used to hold it in place. In order to solve this problem, a future modification could consist of finding a more lightweight material to cover the turbine, or find a stronger adhesive to connect the turbine to the board. The board is not balanced properly; additional attachments must be put in the front portion of the board in order to even out the buoyancy. In addition, a system between the board and a bracelet worn by the lifeguard could be synced so that the board can track the lifeguard despite not physically seeing the lifeguard. Ample lighting may be added to help locate the board in darker lighting.

Contact Information

References

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