Utah Lake Aquatic Life Sorter

MECHANICAL ENGINEERING
UTAH VALLEY UNIVERSITY

Trent Peterson, Jeff Dickson, Brady Jensen, Aaron Raddatz

Coach: Dr. Brett Stone

Introduction

June Sucker

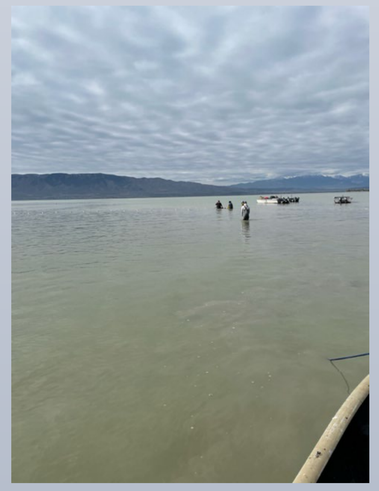
There are currently invasive fish species such as the common carp and pike found in Utah Lake. These fish damage vital habitats for native fish species such as the June Sucker and degrade the overall health of the lake.

Pike

Common Carp

Objective

Assist the Utah Department of Wildlife Resources and local fishermen in their efforts to remove carp from Utah lake by creating a device to accurately identify and sort fish species.



Local Fishermen on the Job

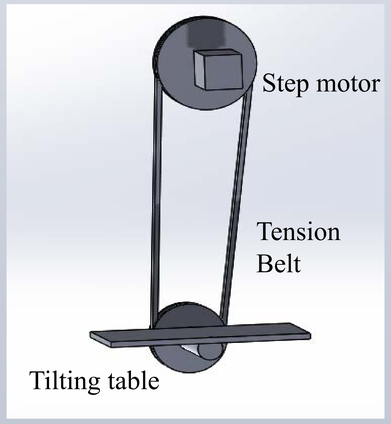
Method

First our team needed to go out to the lake and see the issue first hand. This is a carp being hung to measure it's weight.

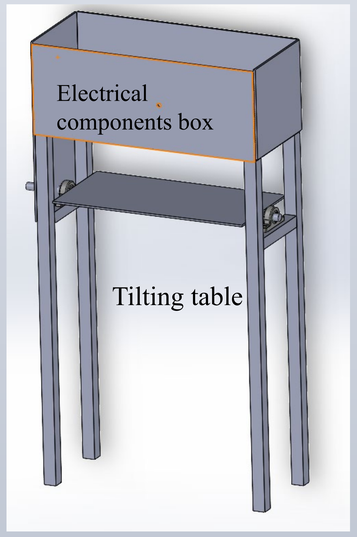
Design Need	Metric	Unit
Waterproof	18	ft
Max Operational Temperature	88	Degrees F
Min Operational Temperature	15	Degrees F
Min Visibility Distance	100	ft
Min Minor Maintainance Time	1	Day
Min Major Maintainance Time	1	year
Min Opperational Time	24	hours
Max Size	3x3	ft
Accuracy for Carp	95	percent
Accuracy for June Sucker	100	percent
Weight (preferred)	<100	lbs
opperators necessary	1	person
operations needed by user to function	<3	operations

The following criteria were created based off DWR recommendations and our designs were made to match them. The design that best fit the criteria was chosen as the final design.

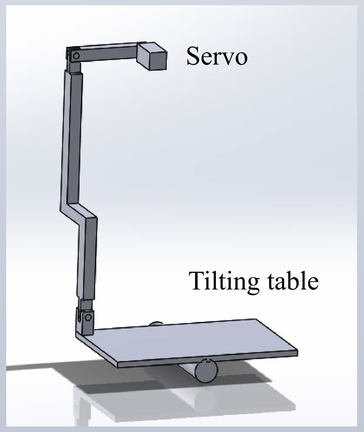
Results



Step Motor Design



Final Design



Servo Design

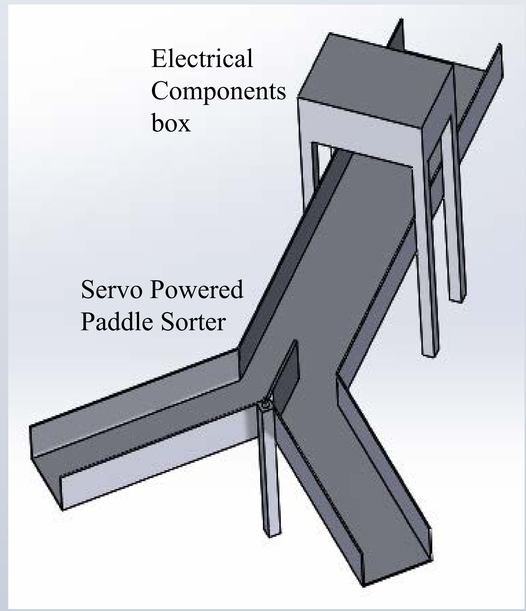
- The final design is a boat mounted, aluminum sorting cabinet that fish are loaded into individually.
- The fish are identified using a camera and "fishial recognition" software run on a Raspberry Pi.
- They are then sorted using a tilting table that rotates either clockwise or counterclockwise to send carp into the boat and all other fish back into the lake.

Future Improvements

Improved processing speed would allow for more efficient designs.

Processor	Average Speed (s)
Raspberry Pi	2.5
Computer with 1070 Graphics Card	0.12

Camera Speed



Improved Design Idea for Faster Processor

Potential Impact

- To better count population of fish.
- To tag or follow trends of fish.
- To ensure that the fish that are being turned in are strictly invasive species.