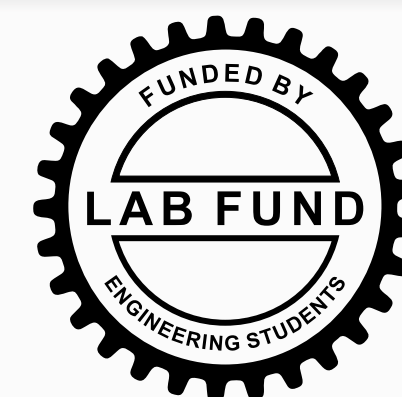


Machine Vision Air-Hockey Table

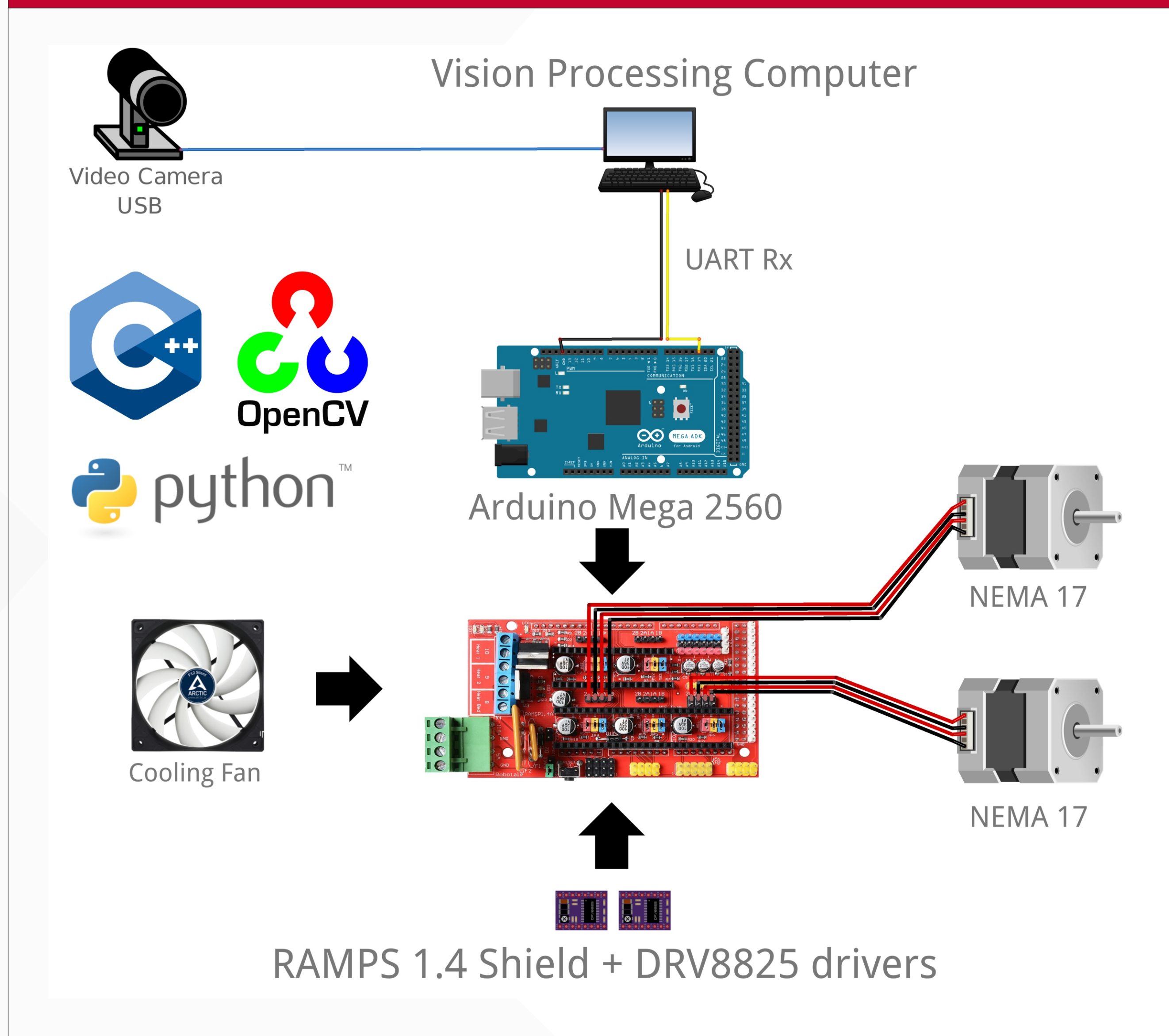
Alex Moksyakov - Andriy Yuzva - Nathaniel Milani - Jonathan Catalano



Winter 2019

Air - I Incorporates new technologies to innovate the classic game of Air Hockey

System Overview



Project Purpose

This project will provide a basic, and intermediate understanding of artificial intelligence in a robotic system. The functionality of the system involves puck detection using color saturation, trajectory prediction based on previous co-ordinates and velocity, delay calculation and manipulation of a H-Bot Grant system via Arduino board.

Design Implementations

Mechanical: Design involved 2D Linear H-Bot Gantry and 3D Printing Assembly, PVC Framing for camera mount and NEMA 17 Stepper Motor Mounts

Electrical: System currently requires I7 CPU processor, RAMPS 1.4 Custom Arduino Shield, Active Cooling, DRV 8825 Drivers, Arduino Mega 2560 and a Ps3 Eye Camera

Software: Software development utilized C++ back end with OpenCV library wrapped in Python based GUI.

Future Improvements

Mechanical: Implement Encoders, Up size motors, Improve camera mount

Electrical: Use GPU acceleration and higher precision micro-controller.

Software: Reduce latency through OpenCV. Use Real-Time Operating System. Implement a neural-network based on a Dataset of games played.

Mechanical System



Gantry

Custom 3D printed paddle. This paddle is controlled by the system and responds to the inputs from the mounted camera. Designed with reflective material to be easily captured by machine vision system.



Vision

Mounted Camera Set-Up
The camera used is a Sony Playstation 3 camera. This camera provides the lowest latency while also providing the widest field of vision for the entire playing field. The camera mounts were designed to assure stability in camera capturing during movement of the system

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