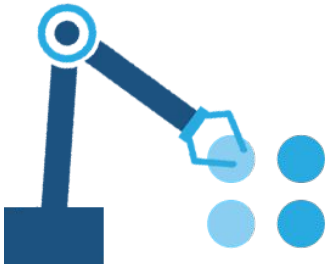

NanoPack

A PACKING MACHINE FOR NANOVIEW BIOSCIENCES

Team 33: ECE/ME Interdisciplinary
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Value Proposition

Client: NanoView Biosciences

Need: An efficient method for packaging silicon chips into containers which will be distributed to clients

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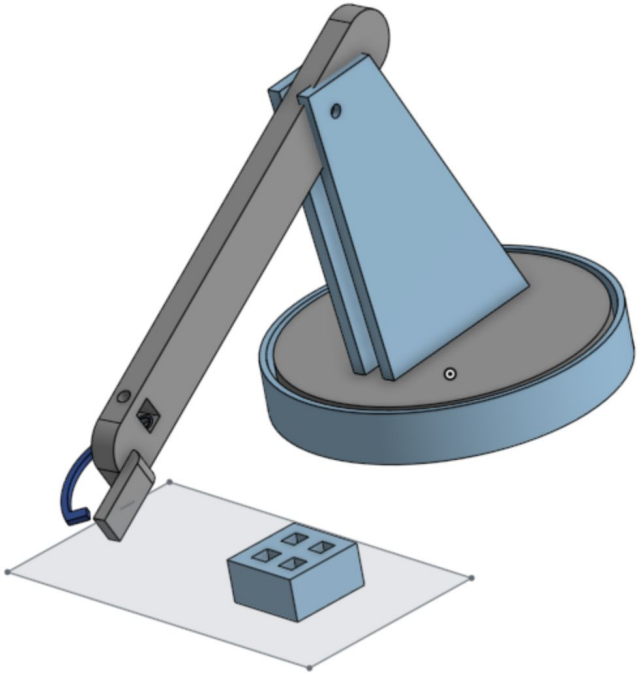
NanoPack is a proprietary packaging solution that provides automated chip movement.

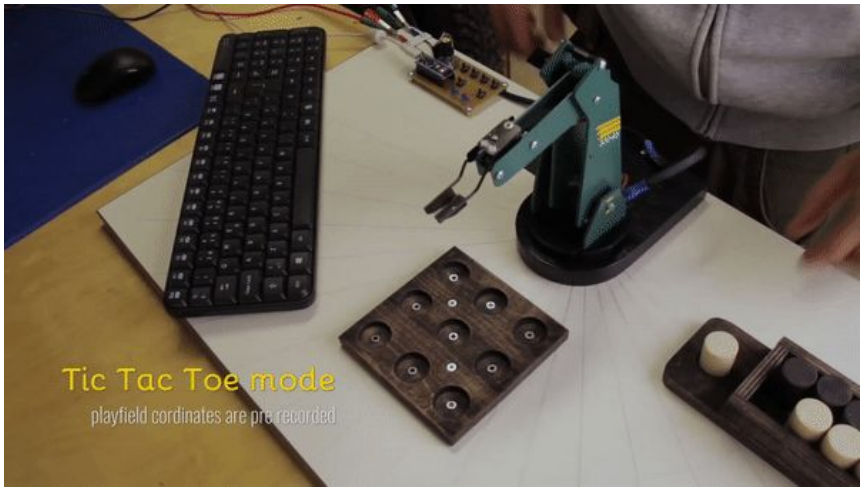
- Unlike human-handled packaging, our product can package 10x faster, with fewer errors
- For NanoView, this reduces the cost per chip they pay, and helps to ensure the future of the company and product.

Product Objectives

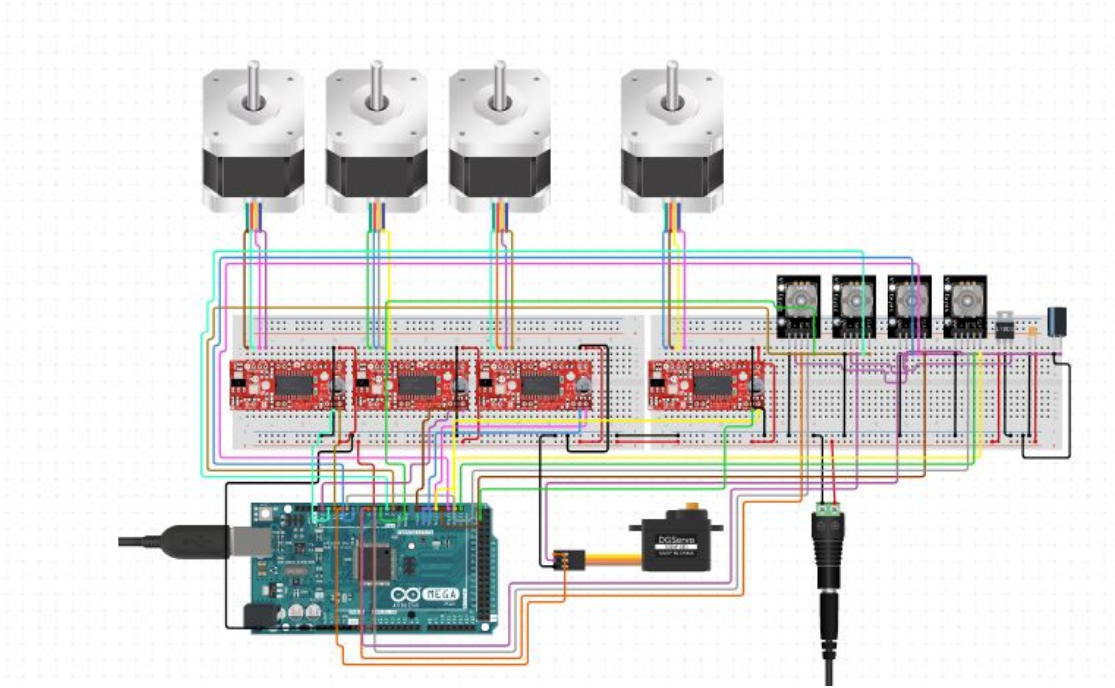
- 10x increase in throughput compared with human-packaging
  - 4-axis robotic arm to move chips
  - Machine Vision used to compute locations and optimal path
- Fewer errors in packaging
  - Machine Vision used to recognize chip number, ensuring proper chip placement
- Seamless, user-friendly integration into the production process
  - Human places traveler, clamshells, and imports CSV to software
  - Starts machine from software app
  - Machine completes, human removes carriers and prepares next run.

Mechanical Design

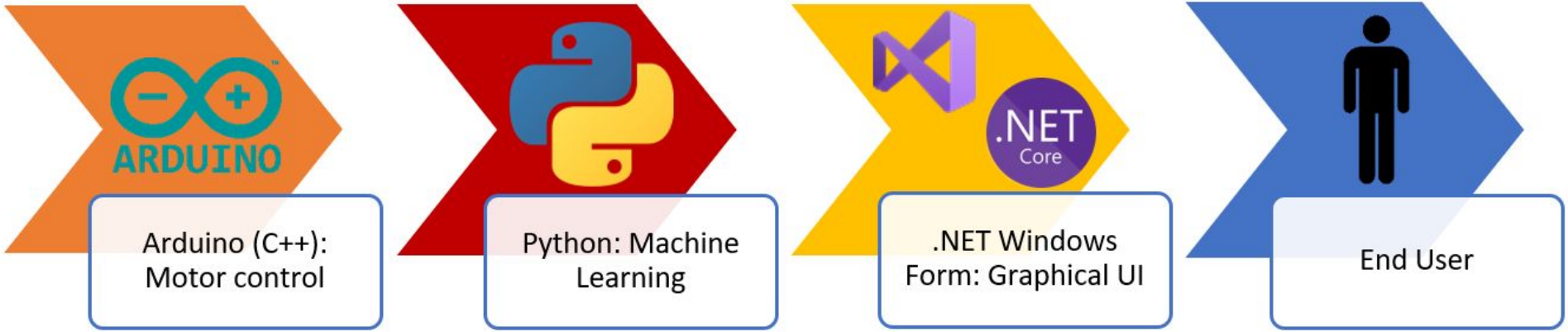




Credit to:
https://www.instructables.com/4-Axis-Robot-Arm-DIY/



Hardware Design



Software Design

NanoPack

Project description: As NanoView increases in size, they will have to ship out larger quantities of their chips to clients. The current method of having lab technicians use tweezers to physically place chips from the internal carrier called a traveler into shipping containers called clamshells is labor-intensive, and prone to error. Our solution will be an automatic packaging device that it is 10x faster than human-packing, with the correct chip placements guaranteed.

Societal Impact: *By reducing the cost and increasing the efficiency of the packaging process for NanoView, we provide them a greater ability to meet the demand of the market and lower the cost per chip they incur, ensuring the continued longevity of the product.*

Special Sauce:

- Speed up of 10x from human-packaging
- Fewer errors in packaging
- Seamless, user-friendly integration into the production process

Technology Solution:

- Machine Vision to detect chip numbers and chip placement
- 4 Axis robotic arm to control tweezer angle and movement
- Software Application to verify results and control movement