Alice: Robotic Hand to Translate English to ASL Using Speech to Text Technology for Hard of Hearing Individuals

Tekeyan, Alek (School: Tuscarora High School)
Lin, Jeanelle (School: Tuscarora High School)

The purpose of this project was to analyze the anatomy of the human hand and translate its mobility into a functional robotic hand (Alice) with the ability to translate English into American Sign Language finger spelling through speech recognition. Those who are hard of hearing require the assistance of trained interpreters, and so the project was inspired by the growing demand of ASL interpreters, at a 20% increase in the next ten years. Interpreters are also in short supply, with data from the National Deaf Center having shown a national shortage since 2020. Alice will be able to provide access to sign language interpretation in schools and institutions where there may not always be human interpreters available. Alice may also be a more inexpensive option than an interpreter, as the mean annual wage for an ASL interpreter according to the Bureau of Labor Statistics is $58,400, and the total cost of the materials to construct the hand was $100.19. The retail price will decrease further if Alice becomes mass-manufactured. The results of the project conclude that Alice in its current form is not suitable for real-world usage yet, as American Sign Language involves many hand gestures and even facial expressions that cannot be accurately translated through the prototype. However, with further engineering and research Alice could be enhanced to provide realistic translations like that of a human interpreter.

Awards Won:
NC State College of Engineering: Scholarship to attend NC State Engineering Summer Camp
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