



**CALIFORNIA SCIENCE & ENGINEERING FAIR  
2019 PROJECT SUMMARY**

<b>Name(s)</b> <b>Om Anavekar; Tarun Chichili; Arnav Gupta</b>	<b>Project Number</b> <b>S1003</b>
<b>Project Title</b> <b>An Intelligent Glove that Converts Hand Gestures and Sign Language Into Spoken Text</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives</b> The objective of the experiment is to design and create a glove for people with speech impairments, which can convert hand gestures and basic sign language into spoken text for anyone to understand.</p> <p><b>Methods</b> Key components in this project are the glove equipped with 5 flex sensors, the central PCB housing the electronic components, and the Arduino IDE. The software was developed in the IDE by us. All electronics were designed and assembled by us. The device is tested for 9 specific hand gestures ("A" "B" "C" "D" "E" "F" "No" "I need food" "I need help") over 10 trials by team members. Over each iteration, hardware and software (made by team members) changes are performed to improve hand gesture recognition. Additionally, participants are asked to use the device and provide feedback regarding its improvement.</p> <p><b>Results</b> Each of the different gestures tested had over a 70% success rate. The "C" and the "No" gesture had an 80% success rate and the "B", "D", "E", "F", and "I need food" gestures had a 90% success rate. All gestures were successful for every trial after Trial 6.</p> <p><b>Conclusions</b> The glove proved to work as the accuracy improved over time. This innovative device is groundbreaking and will bridge the communication gap between those who are speech impaired and those who are not. People will no longer have to spend time learning sign language, and those who do not know sign language can communicate with medical staff. With further advancements, grants, and research our group will be able to improve the accuracy of the glove and test more gestures.</p>	
<b>Summary Statement</b> A glove which converts custom hand gestures and sign language to spoken text for those with speech impairments was created and refined, making it efficient and cost-effective.	
<b>Help Received</b> The device, along with its hardware and software components, have been developed by us. School equipment was used to fabricate the device. Additionally, tests including human participants will be conducted at East Bay Post-Acute Healthcare Center.	