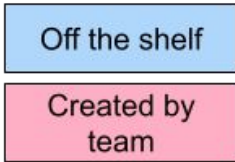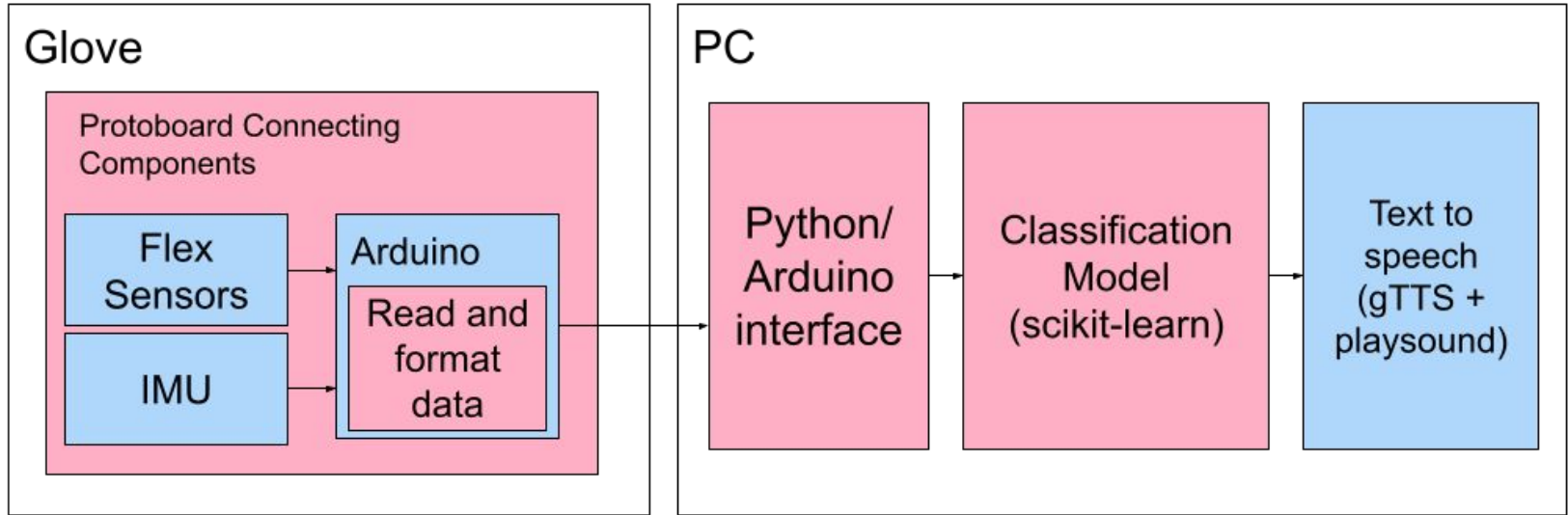# B4: Gesture Glove

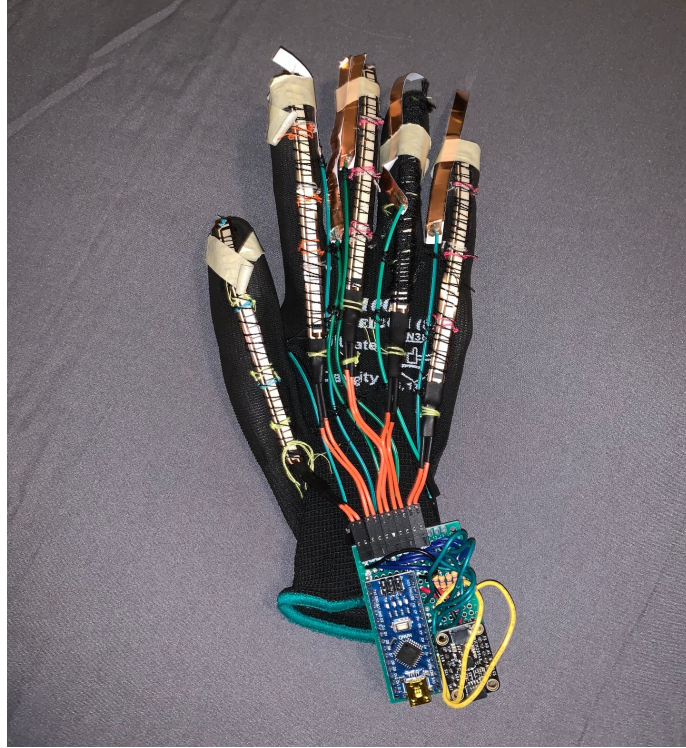Sophia Lau, Stephanie Zhang, Rachel Tang

Application Area

- Help facilitate smoother communication between American Sign Language (ASL) speakers and non-ASL speakers
- Portable, unobtrusive device
- Recognize ASL gestures then output the interpretation over speakers
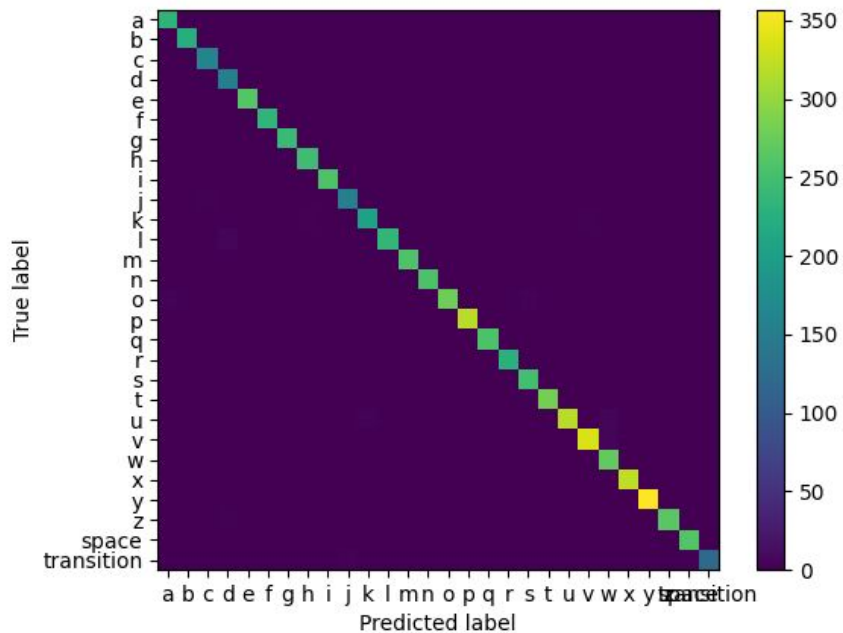 - Translates 26 ASL letters

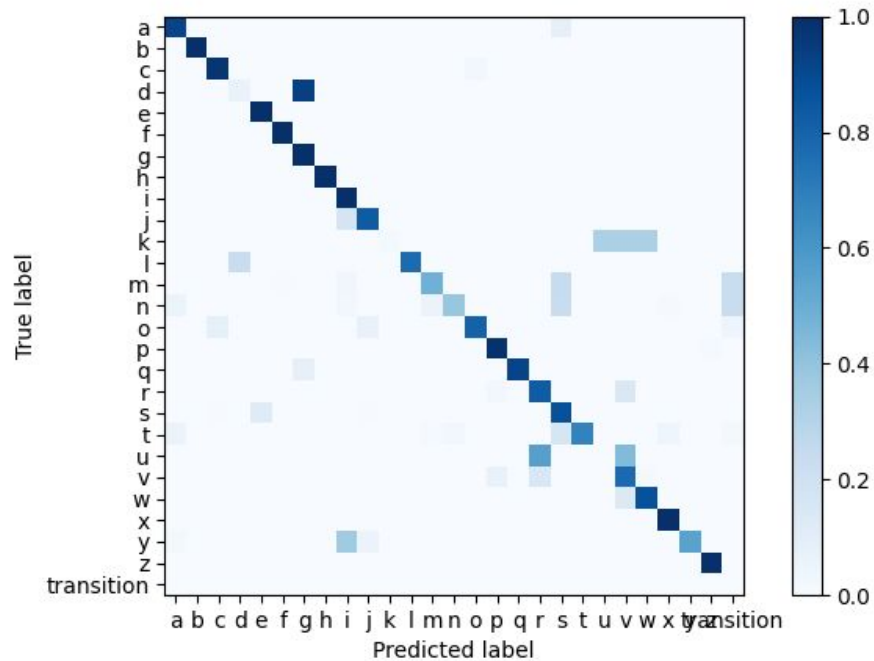# Solution Approach

Complete Solution

Performance

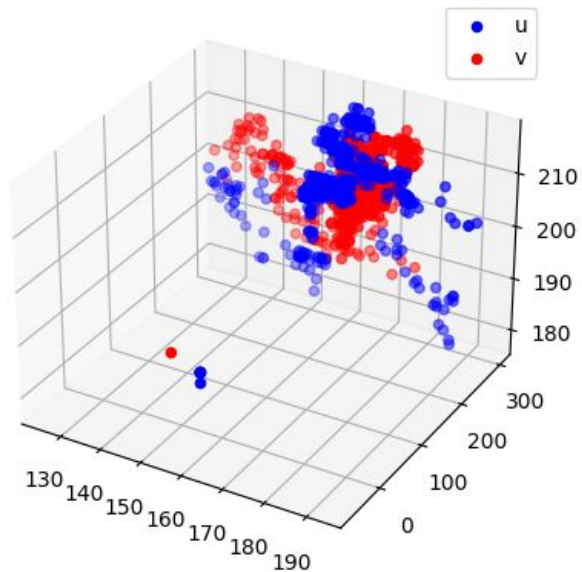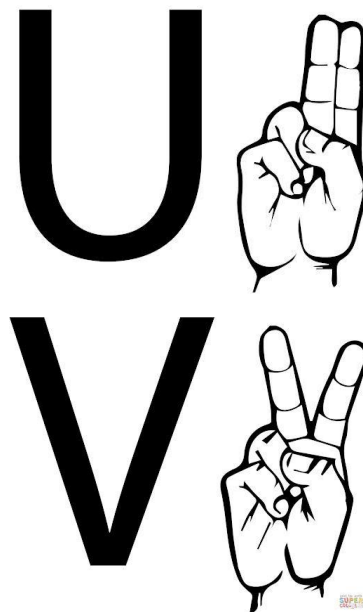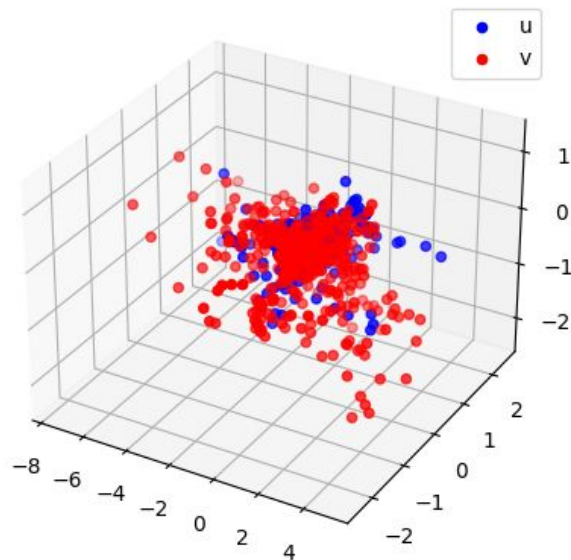| Requirement	Specification	Performance
Accuracy	90%	98.90% | 75.86%
Latency	Less than 100 ms	63.94 ms/prediction
Frequency	.5 s per gesture	0.862 s/gesture
Craftsmanship	Less than 200 g	~75 g

Confusion Matrices: Testing vs. Real-time Data

Data Analysis - Similar Letters

U vs. V (Thumb, Pointer, Middle)

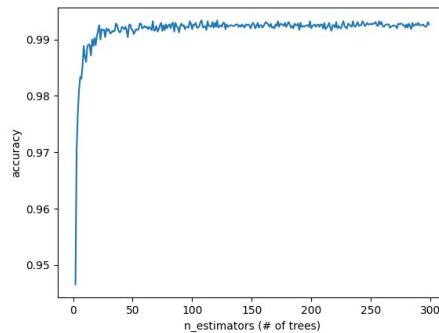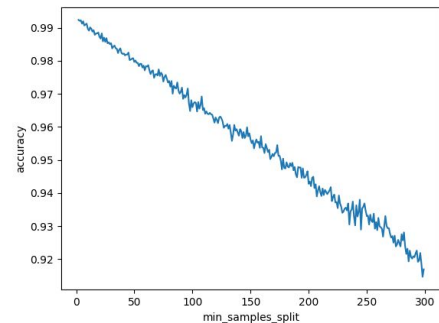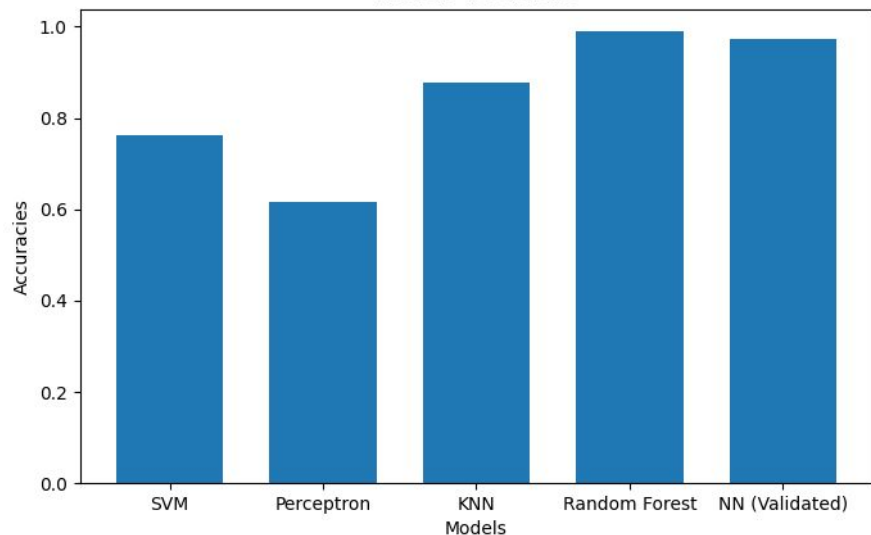U vs. V (Gyroscope X, Y, Z)

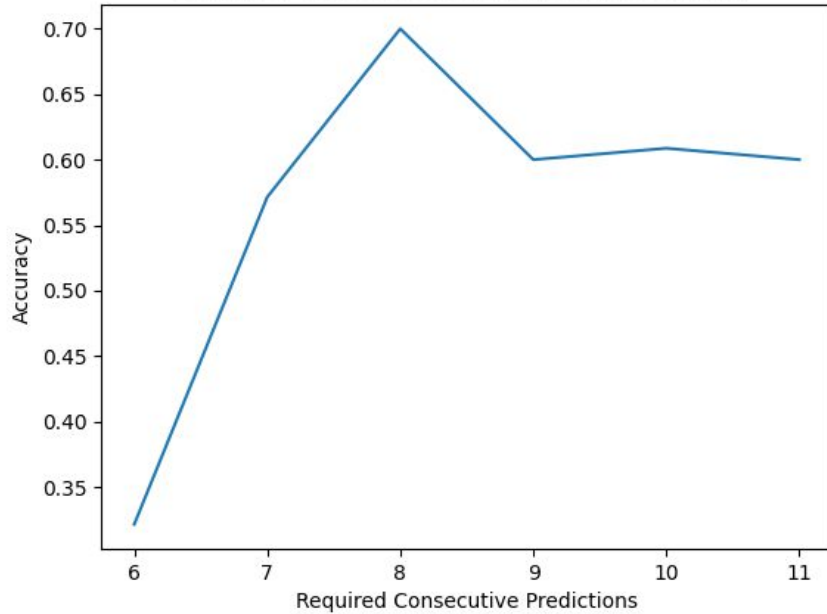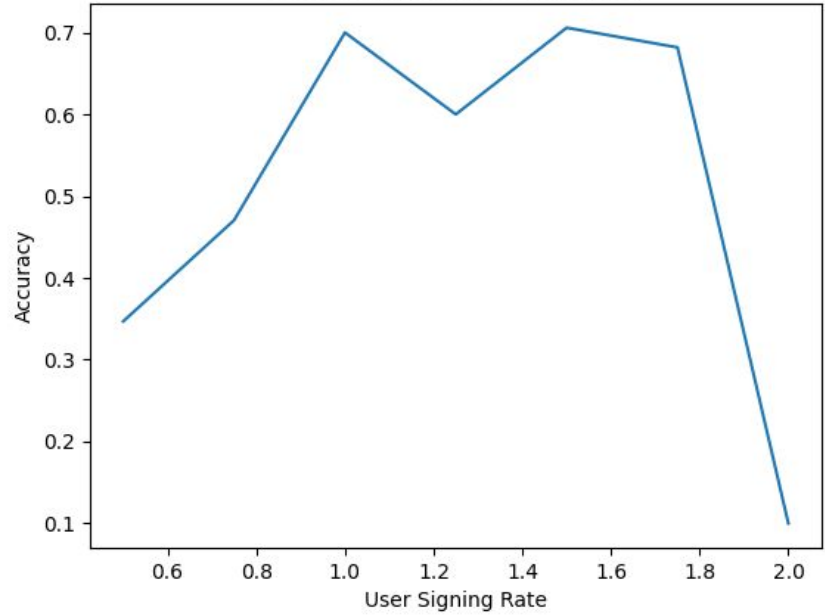# Model and Hyperparameter Comparisons
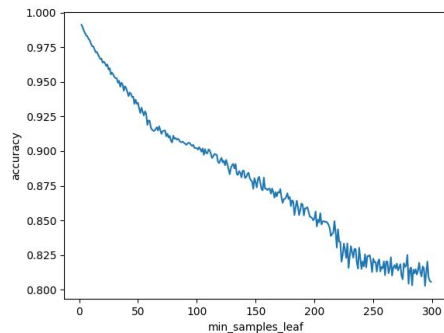
Speed of System

Required Consecutive Predictions vs. Accuracy

User Signing Rate vs. Accuracy

Ethical Considerations

- Mis-translation
- Privacy
    - Audio output can spread information to unintended audience
- Privilege
    - Product potentially only available to subset of society
- Can reduce people's will to learn ASL

Project Management

	9/13	9/20	9/27	10/4	10/11	10/18	10/25	11/1	11/8	11/15	11/22	11/28
Make proposal presentation + website												
Order parts (arrive by 9/27 - expedite shipping if necessary)												
Do proposal presentation												
Build and order PCB												
Write program for serial streaming												
Attach flex sensors												
Test that we get consistent data from flex sensors with each gesture												
Prepare design review												
Do design presentation												
Design report												
Install PCB onto glove												
Attach IMU												
Test that we get consistent data from IMU with each gesture												
Determine ML Model												
Integrate glove with Software side												
Collect data (for training and testing)												
Train model												
Test model ourselves												
Get other people to test (gather survey data)												
Make adjustments as needed from feedback												
Make final presentation												
Final presentation												
Final report												

everyone	
sophia	
stephanie	
rachel	
stephanie + rachel	

Future Work & Applications

- HCI
- Monitoring rehabilitation
- Help novice learners learn ASL