University of Colorado
Boulder

FINAL PROJECT

MAGIC WAND

EMBEDDED INTERFACE DESIGN (ECEN 5783)

FALL 2019

REPORT BY:

OM RAHEJA

MOHIT RANE

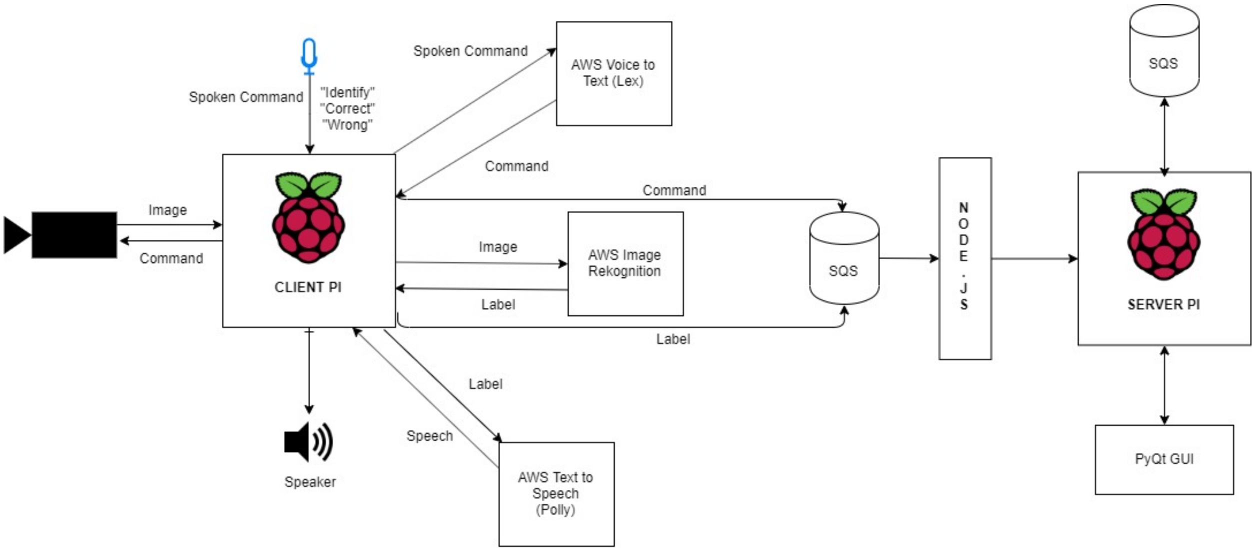
PROJECT TITLE

MAGIC WAND

NAMES OF TEAM MEMBERS

OM RAHEJA
MOHIT RANE

FINAL SYSTEM ARCHITECTURE DIAGRAM AND STATEMENT



Sequential steps in which code works:

Microphone records the input command.

Recorded audio sent to AWS Lex service that converts voice to text.

Text sent back to Raspberry Pi.

If text is Identifio, then camera captures the image of an object.

Image clicked is sent to AWS Image rekogniton service which returns the label of the image.

User records either correct or wrong based on what the AWS image recognition service returned.

All the data (commands) is sent to AWS SQS queue.

Through Node.js, these commands are stored in SQL database. The application running on server pi, examines the data in the SQL and displays them on the GUI accordingly.

PROJECT DEVIATION STATEMENT

The project remains the same as proposed with just a couple of changes. The command that was originally proposed to be sent between AWS service directly are being sent through the raspberry pi. Meaning, command from AWS Lex is being sent via Raspberry pi to the SQS queue. Also, the label sent from AWS image rekogniton to AWS polly is being sent via the raspberry pi.

PROJECT OBSERVATIONS STATEMENT

Three things that went better than expected:

1. Using AWS Image rekogniton went better than we expected it to go.
2. Parts of the project implemented in the previous projects were easy to implement
3. SQL setup was easy as we had experience dealing with it earlier.

Things that did not go according to our expectations:

1. Making use of Node.js took a lot of time.
2. Entire integration of the project from end to end took us more time than expected.
3. Understanding how to make use of AWS services was a time-consuming task in the start. After spending some time with it, was easy to play with.

THIRD PARTY CODE USED STATEMENT

1. Draw.io for drawing the work breakdown structures, UML sequences, UML Use cases: https://www.draw.io/
2. Balsamiq to draw the UI wireframe: https://balsamiq.com/
3. Geeks for Geeks was referred for the UML sequential diagram: https://www.geeksforgeeks.org/unified-modeling-language-uml-sequence-diagrams/
4. References for Code [How to Upload a file in S3 Bucket]: https://www.edureka.co/community/31884/how-to-upload-a-file-in-s3-bucket-using-boto3-in-python
5. References for Code [Image Recognition]: https://docs.aws.amazon.com/code-samples/latest/catalog/python-rekognition-rekognition-image-python-detect-labels.py.html
6. References for Code [Amazon Lex]: https://docs.aws.amazon.com/lex/latest/dg/API_Operations.html , https://www.youtube.com/watch?v=KTa1T14nkbw
7. Reference for GPIO interrupt: https://raspi.tv/2013/how-to-use-interrupts-with-python-on-the-raspberry-pi-and-rpi-gpio
8. Reference for text to speech conversion: (https://docs.aws.amazon.com/polly/latest/dg/get-started-what-next.html)
9. MySQL + PyQT + Python: https://www.youtube.com/watch?v=2TibG64zLeA