# Intelligent robotics I

# VikingBot

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# Overview

Components:

- 2 DC motors
- Raspberry pi 3B
- Raspberry pi camera
- Servo motors
- IR sensor

Robot Features (using ROS):

- Movement (forward, backwards, right, left)
- Bobble head (up and down)
- Speech to text, text to speech

# Software

Tools used:

ROS with:

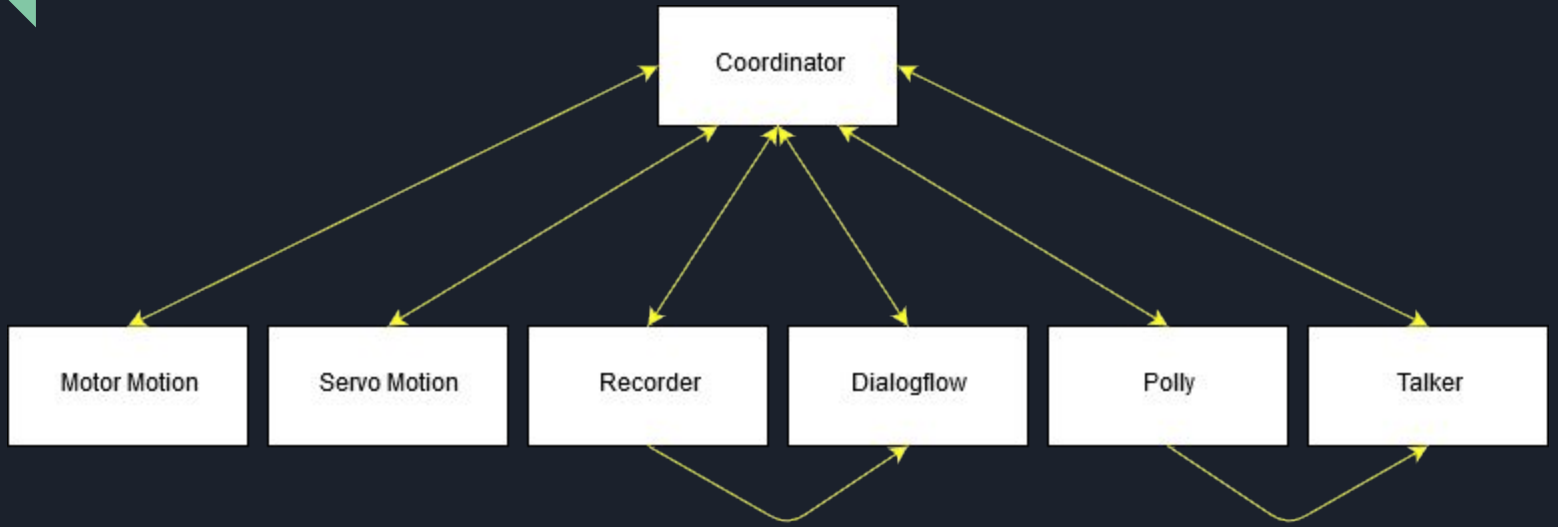
- Python
- OpenCV
- NumPy
- dialog flow
- Amazon Polly

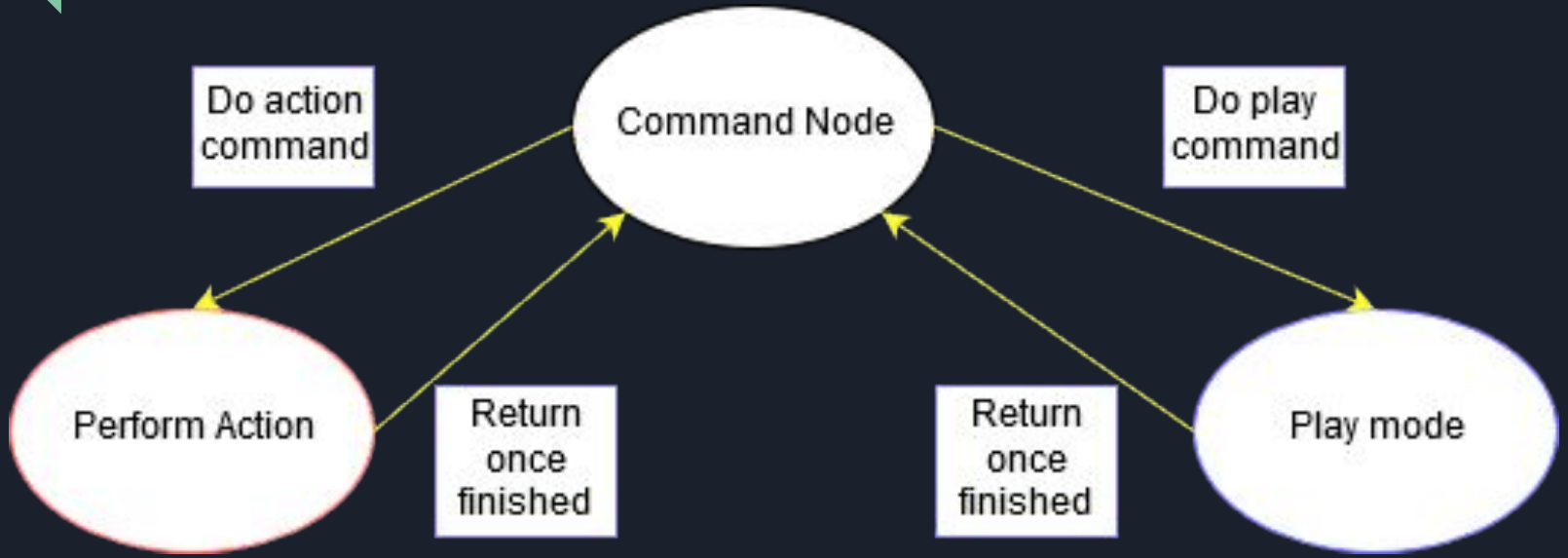
Issues:

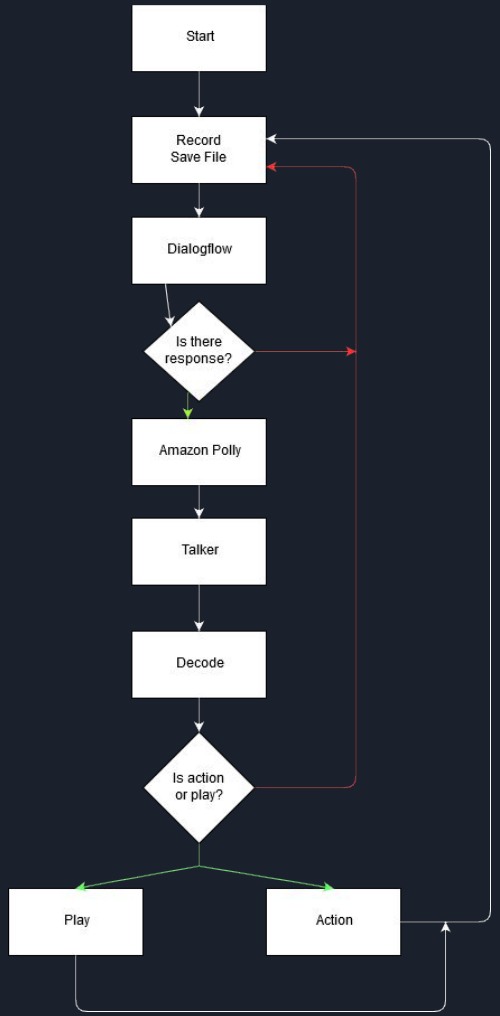
- Finding the right libraries
- Difficulties connecting wirelessly
- Setting up dialog flow
- dialog flow to comprehend speech in a noisy environment

# ROS

- The Robot Operating System (ROS)
- Creates an operating system for tools and libraries to communicate seamlessly
- Aids in creating robust software


Coordinator
Motor Motion
Servo Motion
Recorder
Dialogflow
Polly
Talker


Do action command
Command Node
Do play command
Perform Action
Return once finished
Return once finished
Play mode


Start
Record
Save File
Dialogflow
Is there
response?
Amazon Polly
Talker
Decode
Is action
or play?
Play
Action

# DialogFlow

Parses speech and looks for intents in .wav files it is sent

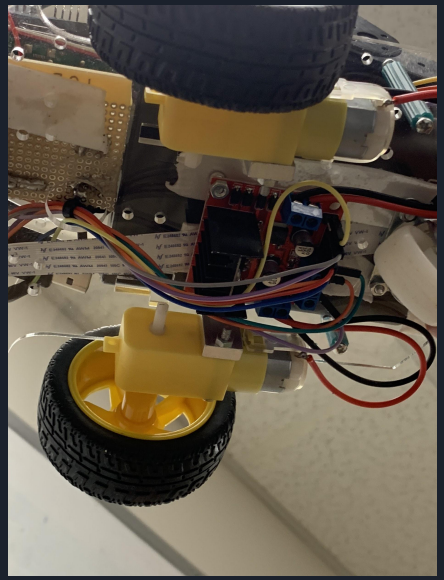
“Intents” are used to find keywords and link them to their appropriate reaction

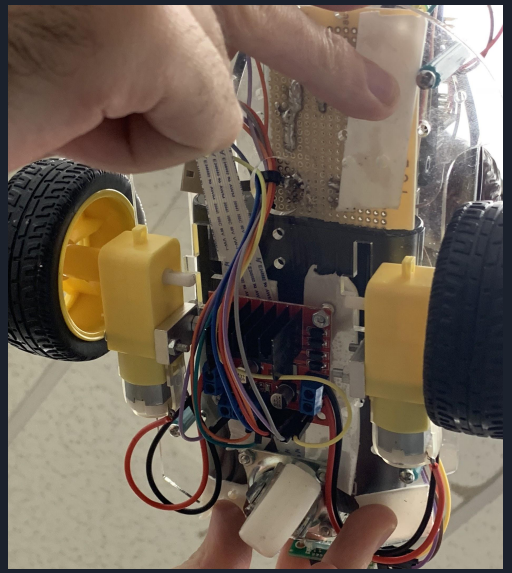
# Amazon Polly

- Use Amazon Polly to convert text to speech
- Allows for multiple languages and accents
- Provides lifelike speech
- Very versatile

# Motor Movement

- Create a driver that is referenced by other modules to move the robot
- L293E H-bridge
- In the future, duty cycles to be added for different speeds





# Servo Movement

Due to singular servo, it is limited to one axis of movement

Since the primary function of the robot is as a car, the servo acts as a mechanism for gestures and is connected to the head

# Improvements

- Connect Pi to internet while using Ros so dialogflow and polly work correctly
  - Or have this done on computer
- Communication with second robot
- When case is printed, more mechanics can be added such as additional servos