Voice controlled Turtlebot 2i

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Outline of the project

- Speech to Text (NLP)
- Response of the bot based on the command

Speech to Text (NLP)

• Libraries used: Speech Recognition, PyAudio, re

It doesn't have a single fixed API that it uses, but rather, it provides a common interface to work with multiple speech recognition engines and services. I used the **Google Web Speech API**. It will require internet connection for the lib to work.

Grammar for commands recognised:

Command types

Simple direction

- No numerals
- Simple looking out for keywords 'left', 'right', 'straight', 'stop'
- Call the particular function based on keyword

Numerals in command (left by x units)

- Identify the digit (NLP could recognise the spoken command as spelled out or as digit 'one' or 1)
- JSON format of all possible speech-to-text, choose the one with digit
- Convert to float and pass as linear variable

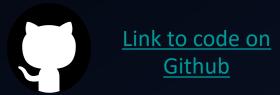
Publishes the final recognized text onto topic: /recognized_text

Response of the bot based on the command

Libraries used: rospy, std_msgs, geometry_msgs

This section of the project focuses on how to move the robot based on the voice commands. The angular, linear speed is varied.

Publishes the required motion onto topic: /cmd_vel



Components of the code

Publisher: text_publisher

Recognises voice command, converts to text and publishes onto /recognized_text topic

Subscriber: text_subscriber

Reads the text messages, runs the relevant motion command

Publisher: motion_publisher

Publishes the motion (linear, angular speeds and distance) onto /cmd_vel topic

Example: Spoken command "Left by 10 units"

```
^Cturtlebot@turtlebot:~/riddhi_ws$ rostopic echo /cmd_vel
linear:
    x: 1.0
    y: 0.0
    z: 0.0
angular:
    x: 0.0
y: 0.0
z: 0.2
```

/cmd vel