

# ENGR 4421: Robotics II

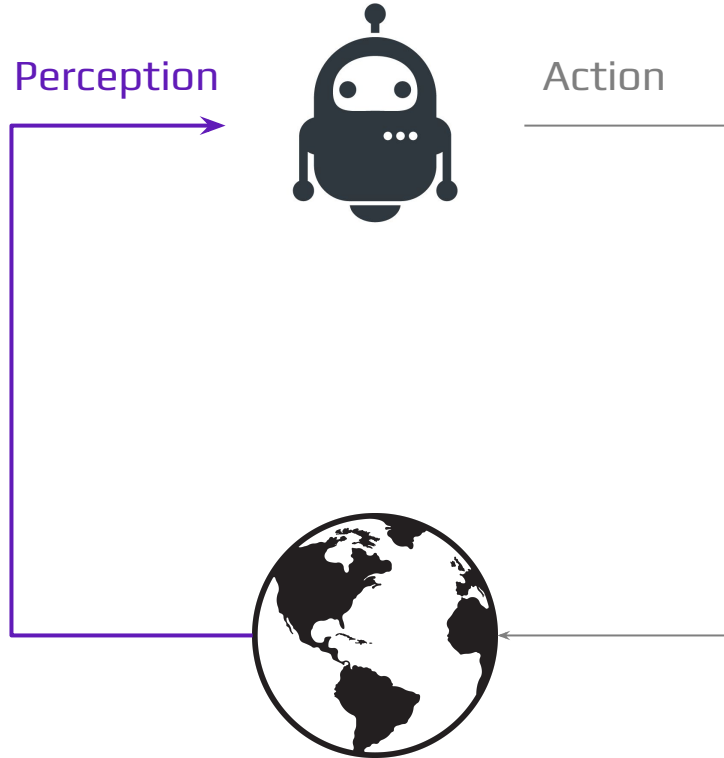
LiDAR

10/13/2022

# Outline

- LiDAR Introduction
- RPLIDAR A1

# What does A Robot Do



# What is LiDAR

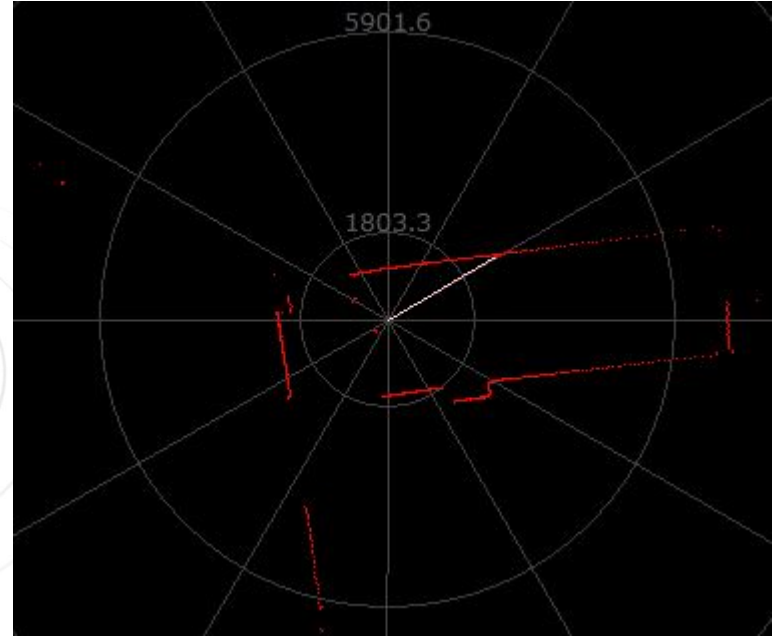
- Is the acronym of “light detection and ranging”.
- Is a method to determine the ranges.
- Functions by sending out light beams and measuring the reflected signal.

# LIDAR Applications

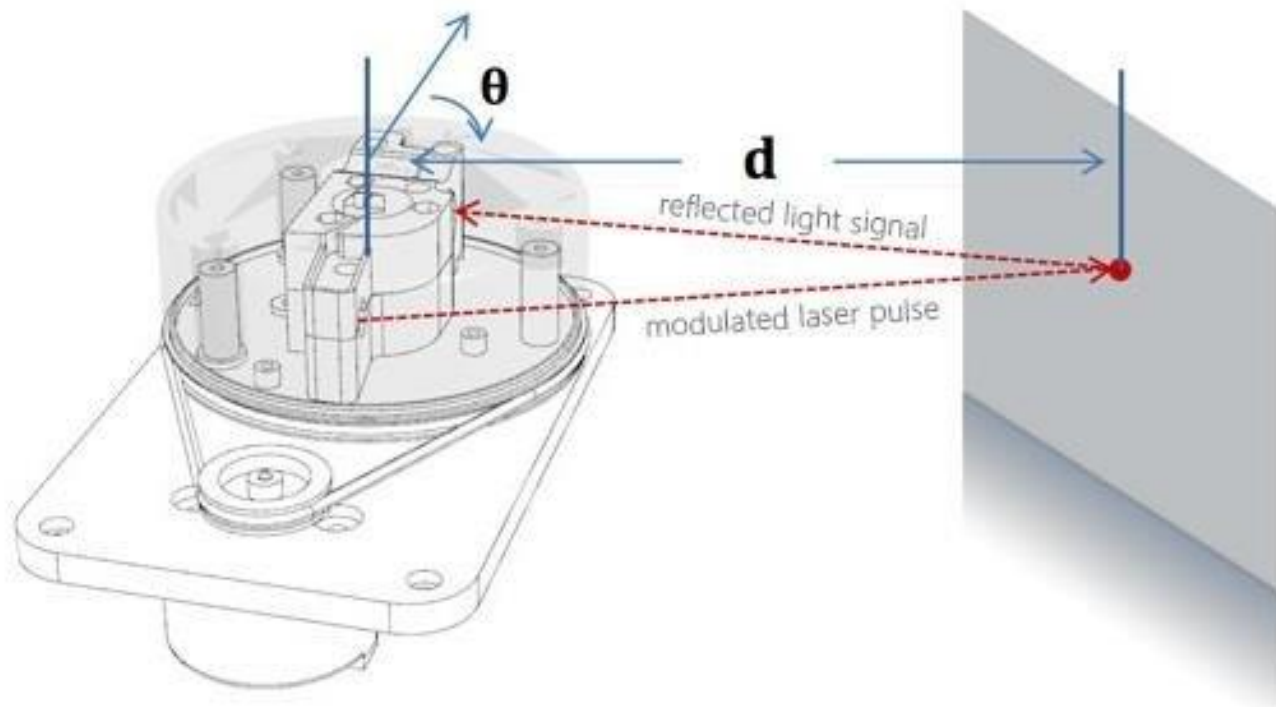
- Surveying
- Archaeology
- Forestry
- Farming
- Mining
- [Autonomous Driving](#)

...

# RPLIDAR A1



# RPLIDAR A1



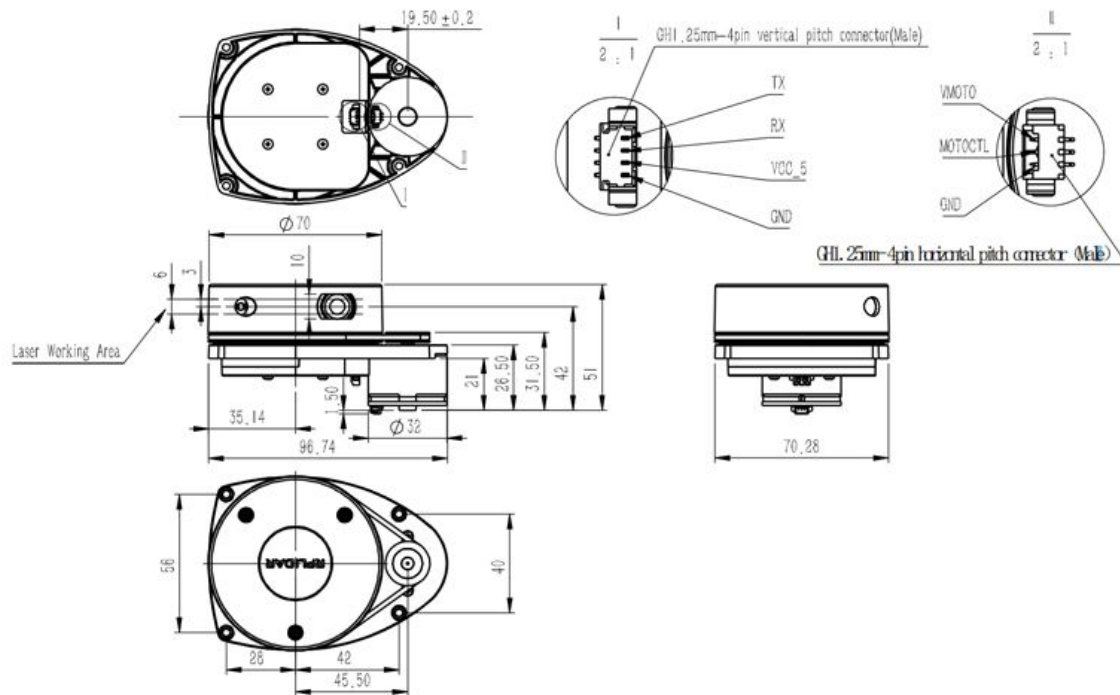
# RPLIDAR A1 Specifications

Measuring Range	0.15m - 12m
Sampling Frequency	8K
Rotational Speed	5.5Hz
Angular Resolution	$\leq 1^\circ$
System Voltage	5V
System Current	100mA
Output	UART Serial (3.3 voltage level)
Temperature Range	0°C-40°C
Accuracy	1% of the range ( $\leq 3$ m) 2% of the range (3-5 m) 2.5% of the range (5-25m)



# RPLIDAR A1 Dimension

## Size

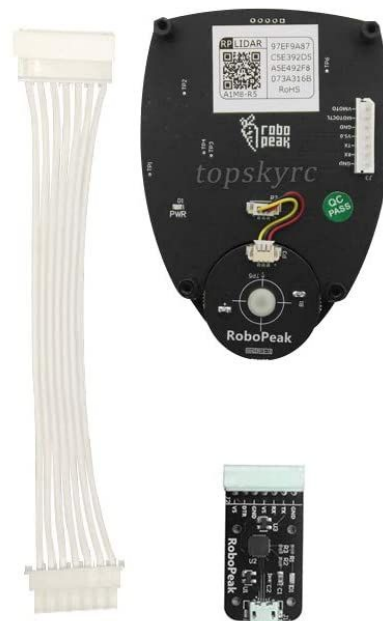


# RPLIDAR A1 Pinout

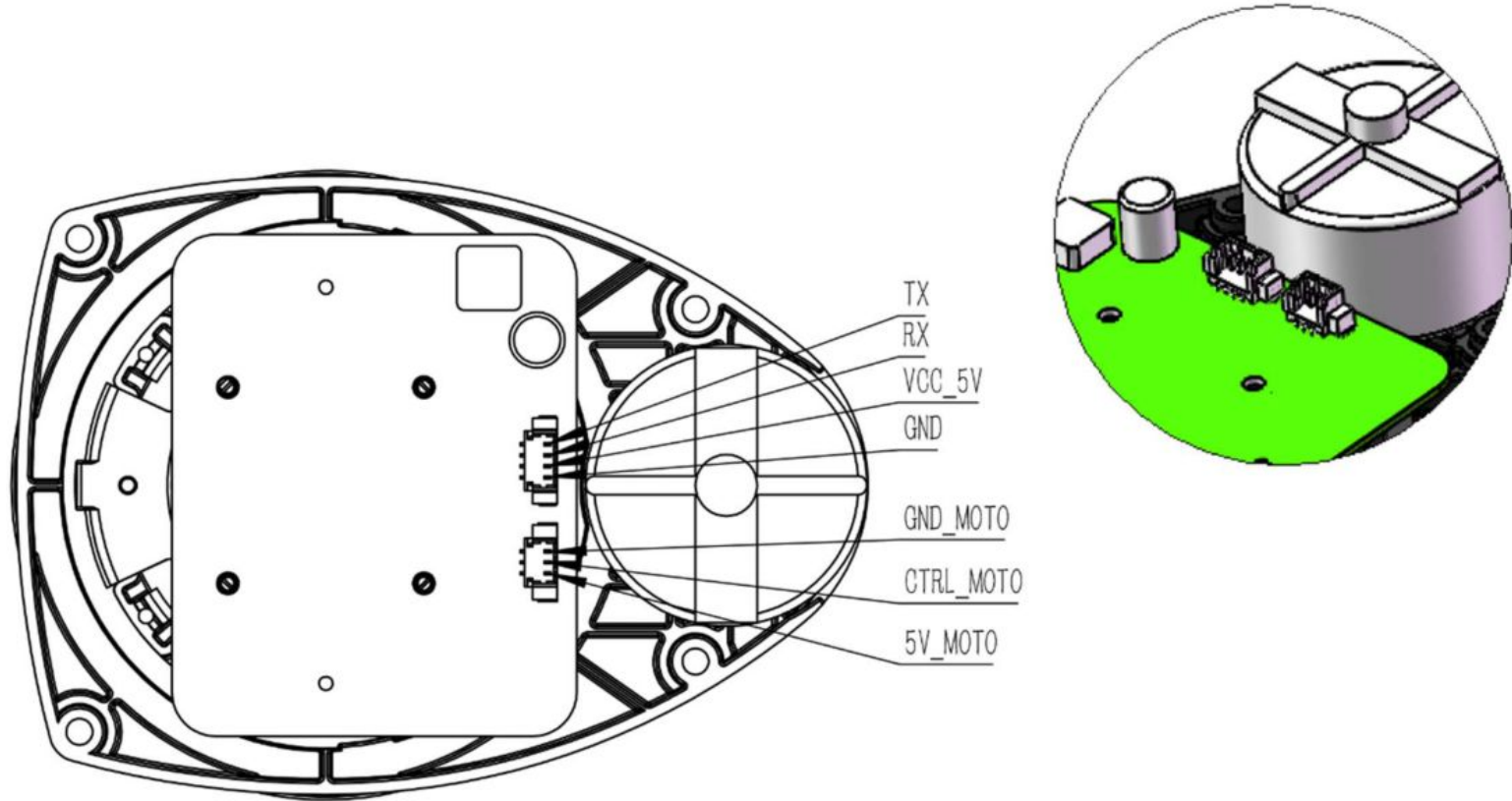
New(A1M8-R6)



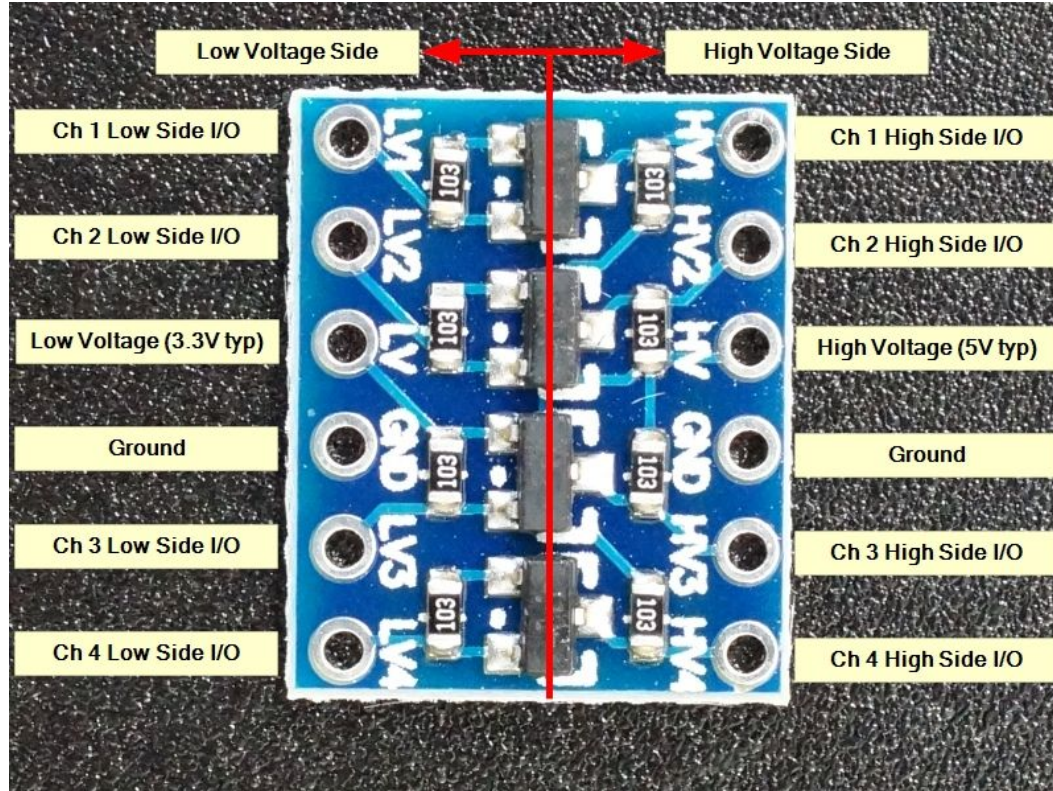
Old(A1M8-R5)



# RPLIDAR A1 Pinout



# Bidirectional Level Shifter



# Adafruit\_CircuitPython\_RPLIDAR

```
from math import floor
from adafruit_rplidar import RPLidar

# Setup the RPLidar
lidar = RPLidar(None, '/dev/ttyUSB0', timeout=3)
scan_data = [0]*360
# Print ranges
try:
    for scan in lidar.iter_scans():
        for (_, angle, distance) in scan:
            scan_data[min([359, floor(angle)])] = distance
        print(scan_data)
except KeyboardInterrupt:
    print('Stopping.')
lidar.stop()
lidar.disconnect()
```