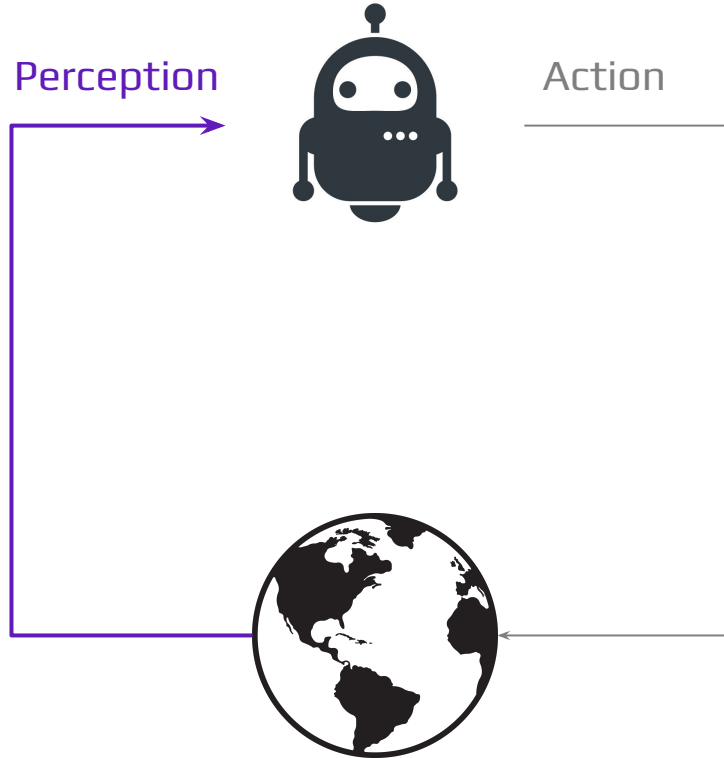# ENGR 3421:Robotics I

LiDAR

11/07/2023

Outline

- LiDAR Introduction
- RPLIDAR A1

A Robot Needs to Perceive

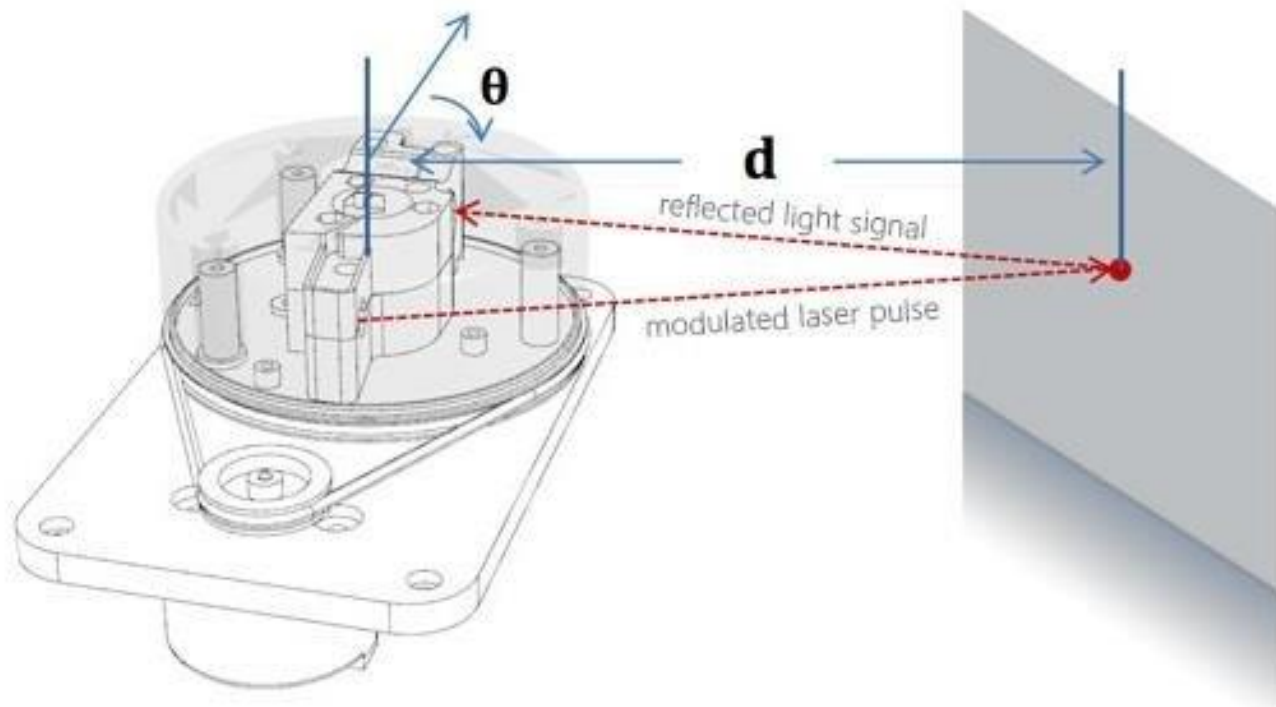Perception

Action

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.
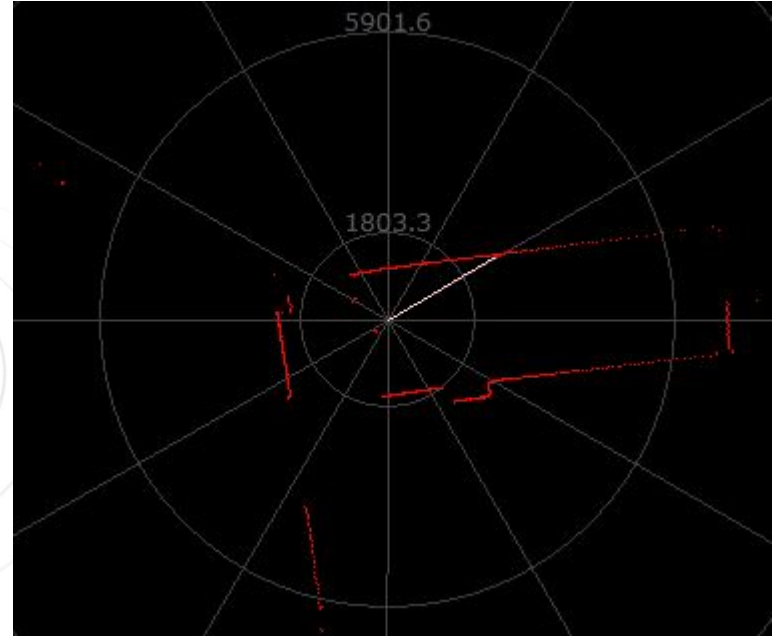
LiDAR Applications

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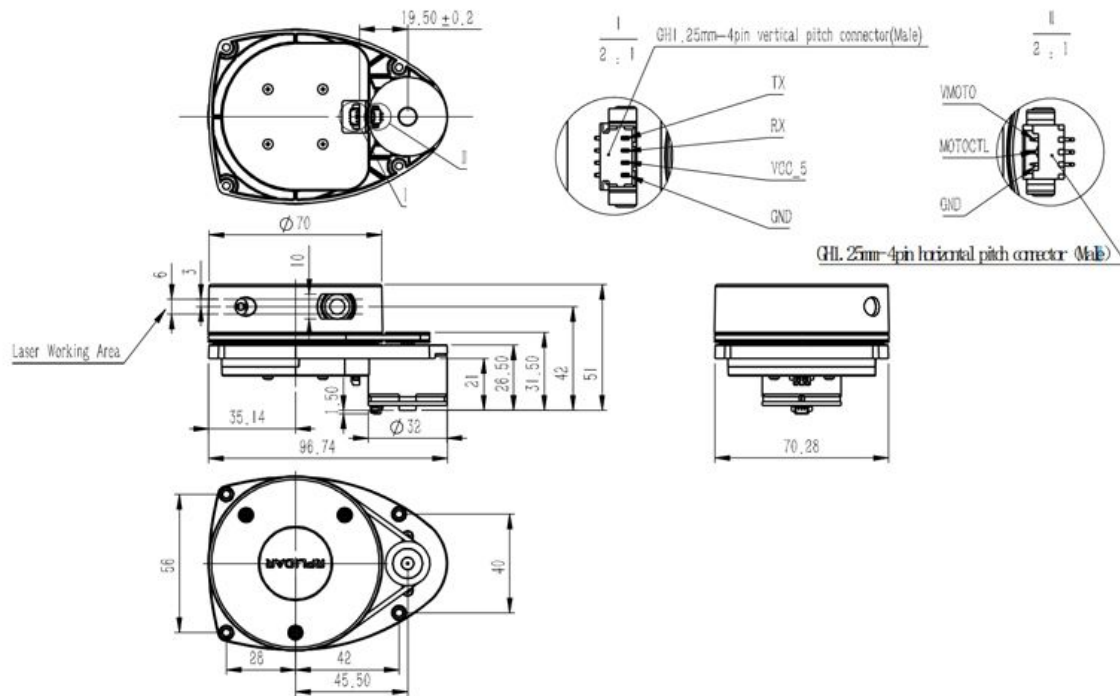- [Autonomous Driving](#)

  …

Laser Triangulation

RPLIDAR A1

RPLIDAR A1 Specifications

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

RPLIDAR A1 Dimension

Size

RPLIDAR A1 Pinout
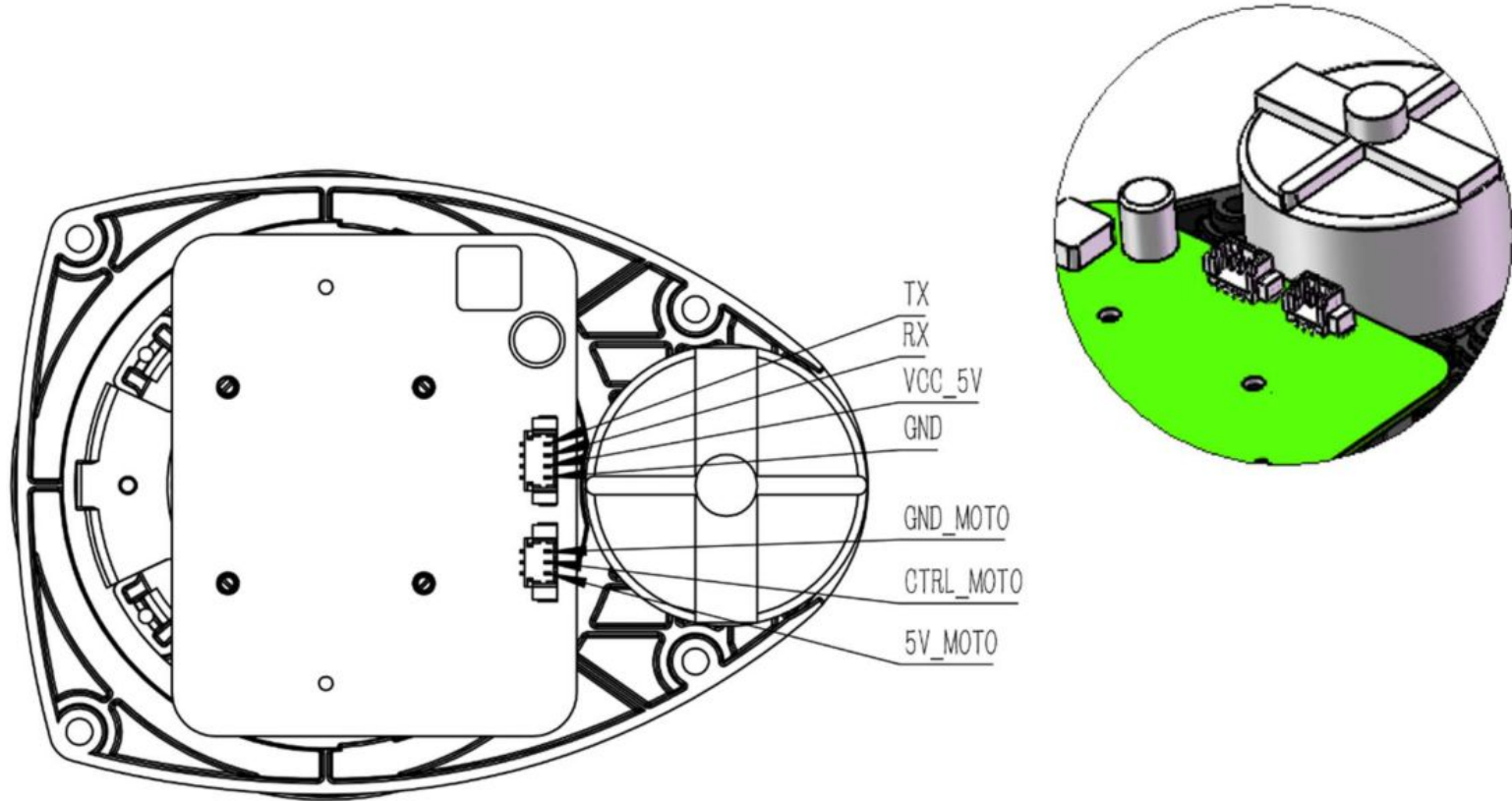
New(A1M8-R6) | **Old(A1M8-R5)**

RPLIDAR A1 Pinout

TX
RX
VCC_5V
GND

GND_MOTO
CTRL_MOTO
5V_MOTO

Adafruit_CircuitPython_RPLIDAR

```python
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()
```