1 Robotics and Spatial Intelligence

1.1 Use your favorite search engine to locate at least two different instances of the sensor available for sale. (That is, find two different IMUs or two different sonars, etc.) In you answer, mention the sensor type and the names of the two devices you chose. Paste links to the product listings.

The Sensor I selected is LiDaR (Light Detection and Ranging). The manufacturers I selected are Velodyne and Quanergy The links to Product Listings of each of the above manufacturers for Lidars are as followed:

1. Velodyne- Product Listing Link
2. Quanergy - Product Listing Link

1.2 Compare and contrast the specifications for those sensors, as listed in the product descriptions or data sheets. How would their expected performance be similar? How would it differ?

I am going to compare the following products:

- Velodyne- Alpha Prime, Puck, Puck-Lite.
- Quanergy- Q-Track, M1-Edge, M8-Prime.

Table 1 shows the comparison among these models of Velodyne and Quanergy in terms of specifications as mentioned in their respective Data Sheets. I have only selected a few specific Product features to compare and contrast so that we can identify its applications well. Adding to the specifications, I would like to discuss few more interesting points here.

Dissimilarities-

- As we can see from the table, the Velodyne lidars generally have higher vertical FOV than Quanergy indicating the fact that Velodyne Lidars are more suitable and apt when our situation demands scanning the entire surrounding rather than only surface level scanning.
- Also we can see that the weight range of Velodyne sensors is more than that of Quanergy lidars indicating that the former can find its way in various different kinds of applications.

- Moreover, the Quanergy lidars use only Time-of-Flight(ToF) as their measurement techniques giving us information about the position of existence of the objects surrounding it. However, Velodyne Lidar sensors use both ToF and Calibrated Reflectivity Measurement gives us extra information about the type of surface of the object as well.

Similarity-We can find that both the companies manufacture lidars of almost similar laser wavelength indicating the fact that the strength of detection from laser might be similar.

	Velodyne			Quanergy		
Products	Alpha Prime	Puck	Puck-Lite	Q-Track	M1-Edge	M8-Prime
FOV (Field of View)	Vertical: 40deg Horizontal: 360deg	Vertical: 30deg Horizontal: 360deg	Vertical: 30 deg Horizontal: 360deg	Vertical: 12.43deg Horizontal: 360deg	Horizontal: 360deg	Vertical: 20deg Horizontal: 360deg
Weight	3.5kg	830g	590g	1.4kg	900g	850g
Laser Wavelength	903nm	903nm	903nm	905nm	905nm	905nm
Measurement technique	Calibrated Reflectivity Measurement and Time of Flight	Calibrated Reflectivity Measurement and Time of Flight	Calibrated Reflectivity Measurement and Time of Flight	Time of Flight	Time of Flight	Time of Flight

Table 1: Comparison Table

1.3 For each of the two devices, suggest a scenario or application in which that sensor would be a suitable choice to include in a robot.

Applications of the above servos would be in the following areas:

- **Velodyne**- The Velodyne Lidars enable autonomous driving in a variety of environments, including urban and highway environments, by providing long-range identification of low reflectance items including tire pieces, dark vehicles, asphalt, and pedestrians and thereby, powering safe autonomy.
- **Quanergy** - For stationary and dynamic applications that call for straightforward alerting when an object enters a monitored region, Quanergy Lidars are appropriate. For level and height sensing applications such as tank level monitoring, item stacking, fill level detection, and more, it is the perfect answer. It provides dependable collision avoidance for safer, more intelligent navigation in mobile equipment applications.

When mounted on an robots or autonomous vehicles, the sensor scans the surroundings, alerting the driver to identify potential hazards and impediments in its path. The detection zones being watched can alter dynamically.Quanergy Lidars also have their industrial applications in monitoring restricted locations. An alarm is set off when someone enters a secured area, alerting security professionals to the intrusion.

References

1. https://quanergy.com/downloads/
2. https://velodynelidar.com/product-comparison/
3. https://quanergy.com/products/
4. https://velodynelidar.com/surround-lidar/