Distance Measurement

Instrumentation
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Overview
LVDTs

- Converts rectilinear motion into a corresponding signal
- Can measure from a few millionths up to +/- 30 inches

Applications

- Can be used to measure weight, force, and pressure
- Some used to calculate load
- Mostly used in servomechanisms
- Other applications include power turbines, hydraulics, and automation
Lasers

Measurement Techniques:

- Time of Flight
- Phase shift
- Interferometer
- Triangulation

Disadvantage:

- Noise

Applications
Electronic Distance Measuring

- Emits infrared light at a controlled rate
- Difference in phase of returning beam is used to calculate the distance
- Accuracy of ⅛ inch in ¼ mile

Applications

- Civil engineering surveying equipment
- Touchless faucets
Calipers

- Take measurements from a series of capacitance sensors
- Underside of movable jaw has a circuit board
- As the jaw moves, rectangular plates align and misalign, causing the capacitance to change

Applications

- Measure thickness of small objects
- Overall measurements of smallish measurements
Conclusion

Questions?

Sources:
- https://www.wonkeedonkeetools.co.uk/calipers/how-does-a-digital-caliper-work/
- https://news.voyage.auto/an-introduction-to-lidar-the-key-self-driving-car-sensor-a7e405590cff