Docket #: S21-409

# **DenseTact: Optical Tactile Sensor**

Inspired by the "last inch" problem in robotic manipulation, the Kennedy group at Stanford has developed a tactile sensor and calibration method for machinelearning-based robotic manipulation. The core of this design is an optical tactile sensor using hemispherical silicone fingertips combined with a camera capable of measuring fingertip surface shape and forces. The camera is used to observe reflective boundaries, which are altered when the fingertip interacts with an object. To help build the calibration model, this has been done for a number of known objects and forms the basis of the machine-learning model.

As object grasping ranges in configurations and stability, the need for grasp planning and execution is critical for successful tactile sensors. The soft-contact nature of this design increases the range of motion and manipulation complexity, making the machine-learning model critical to precise execution and widespread application of this system. Automated manufacturing, assembly robotics, as well as collaborative robotics requiring humanoid manipulation are all possible applications of this system.

#### DenseTact: Optical Tactile Sensor for Dense Shape Reconstruction

Won Kyung Do, Monroe Kennedy Mechanical Engineering, Stanford University





#### **Poster Description:** DenseTact: Optical Tactile Sensor for Dense Shape Reconstruction

Video Description: DenseTact: Optical Tactile Sensor for Dense Shape Reconstruction (ARMLab)

#### Stage of Research

• Prototype

# Applications

- Automated manufacturing and assembly robots: especially small, delicate objects
- Collaborative robotics: robots working in conjunction with humans that need to replicated human tasks

### Advantages

- Quick adaptation to each task
- Large range of motion versatility for manipulation tasks

### **Publications**

• Won Kyung Do, Monroe Kennedy III, <u>"DenseTact: Optical Tactile Sensor for</u> <u>Dense Shape Reconstruction"</u> *arXivLabs*, arXiv:2201.01367 (2022)

### Innovators

- Monroe Kennedy
- Won kyung Do

## **Licensing Contact**

### Chris Tagge

Technology Licensing Program Manager

<u>Email</u>