

# Imaging Technique for Recognizing Hand Gestures & Other Micromotions in 3-D

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## Technology description

With recent advancements in digital imaging, image sensors have become popular for capturing motion in 3-D. However, measuring small scale motion such as fine hand gestures across a user interface remains challenging. Conventional low-cost cameras can detect motions only down to the millimeter or centimeter scale.

Speckle imaging is a technique currently used to measure microscale motions in a variety of settings, including industrial inspection, scientific imaging and user interfaces (e.g., optical mice). To date, speckle imaging has been limited to measuring 2-D motions of single rigid objects and not suitable for tracking motion toward or away from the sensor (i.e., axial motion). UW–Madison researchers have developed a new imaging technique that analyzes speckle patterns to track extremely small 3-D motions on the order of 10-100 microns. This technique enables, for the first time, precise 3-D measurement of multiple moving objects using low-cost, off-the-shelf components.

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested developing a cost-competitive speckle imaging technique for measuring non-rigid micromotions on smartphones and other devices.

## Application area

Gesture recognition for devices such as smartphones and wearable sensors  
Motion analysis of cells, molecules and other microscopic particles

## Advantages

Measures 3-D micromotions of more than one object  
Motion sensitivity is one to two orders of magnitude better than conventional sensors.  
Uses inexpensive components that can be scaled down

## Institution

[Wisconsin Alumni Research Foundation](#)

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