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Low-Cost, Multi-Wavelength, Camera System that Incorporates Artificial Intelligence for Precision Positioning

Tech ID: 32538 / UC Case 2021-681-0

ABSTRACT

Researchers at the University of California, Davis have developed a system consisting of cameras and multi-wavelength lasers that is capable of precisely locating and inspecting items.

FULL DESCRIPTION

The benefits of factory automation have been limited in many applications by the prohibitive instrumentation costs associated with high-precision, assembly line, optimization. For example, less than 5% of final assembly processes have been automated across the auto industry. An important step in the automation of assembly line tasks is precisely locating relevant parts. The precision required is often measured in microns. Low-cost solutions can locate parts, but are often too inaccurate. Overall, there is a significant, unmet need for a generalized, part location system that can perform required tasks with sufficient accuracy and speed. Availability of a low-cost, precise, and versatile system would allow significant improvements in manufacturing automation and quality control.

Researchers at the University of California Davis have developed an affordable system consisting of pan, zoom, and tilt (PZT), adjustable, cameras and multi-wavelength lasers. This system can quickly identify and locate parts by integrating a wide-angle camera with a deep learning algorithm. Laser projections target points of interest, then the PZT cameras adjust to locate the targeted area with a precision of less than 50 microns. The system integrates machine learning, precision instrumentation and optical design to achieve significant advances in automation at an affordable cost. This enhanced precision is also important for quality control, as each individual part can be automatically inspected for any defects or other quality control issues at the earliest possible production stage.

This adaptable technology can be implemented in a wide range of industrial process applications - without the need for high-cost instrumentation or sensors. As a result, it is far more affordable than alternative methods that possess comparable accuracy and speed. This versatile system can greatly improve the efficiency of automated systems across many industries.

APPLICATIONS

▶ Can be used to automate industrial tasks that require precise positioning of components

▶ Offers automated, real-time quality control

▶ Applicable across multiple industries – including assembly lines

FEATURES/BENEFITS

▶ High precision - can locate an object with an accuracy of less than 50 microns

▶ Fast detection allows the system to be used on an assembly line or other, time-sensitive, applications

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INVENTORS

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OTHER INFORMATION

KEYWORDS

automation, quality control, assembly line optimization, pan, pan, zoom, and tilt (PZT) camera systems, position sensors, vision system

CATEGORIZED AS

▶ **Computer**
  ▶ Hardware
  ▶ Software
▶ **Imaging**
  ▶ 3D/Immersive
  ▶ Remote Sensing
▶ **Sensors & Instrumentation**
  ▶ Physical Measurement
  ▶ Position sensors
▶ **Engineering**

- ▶ Inexpensive compared to systems of similar speed and precision

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20240127568	04/18/2024	2021-681

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ Headset with Incorporated Optical Coherence Tomography (OCT) and Fundus Imaging Capabilities

- ▶ Haptic Smart Phone-Cover: A Real-Time Navigation System for Individuals with Visual Impairment