



विज्ञान एवं प्रौद्योगिकी विभाग
DEPARTMENT OF
SCIENCE & TECHNOLOGY

सत्यमेव जयते



National Mission On
**Interdisciplinary Cyber-Physical
Systems (NM-ICPS)**

National Mission On Interdisciplinary Cyber-Physical Systems

Quarterly Bulletin - July 2024

www.nmicps.in | www.dst.gov.in

IIT Jodhpur Technology Innovation Hub - iHub Drishti Foundation

Theme: **Infrastructure**

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TIH
iHub Drishti



Hub Overview

The TIH on Computer Vision and Augmented and Virtual Reality (CV and ARVR), named as iHub Drishti Foundation focuses on the core research areas of Seeing and Sensing, Dependability, Real-time Computer Vision Systems, and Data Collection, Curation, and Annotation. iHub Drishti has identified the following application areas for developing technologies: Computer Vision for Autonomous Systems; Computer Vision for Better Living; Healthcare and Biosphere; Imaging for Document Analysis; CV and VR for Industry 4.0; Dependable AR-VR for X (including games).

Project Updates:

Concealed Object Detection and Recognition System

The TIH is working on advanced Terahertz (THz) imaging systems, which combine high-resolution sensors and advanced algorithms to improve concealed object detection accuracy and reliability. THz imaging is ideal for security applications such as airport screening and public safety, where detection of hidden weapons, explosives, and contraband is critical.



Initial Impressions of the Proposed System

Spindle-mounted Vision-based On-machine Inspection System for CNC Milling

The TIH is developing a hardware setup with a spindle-mounted vision probe that is integrated in a 3-axis CNC milling machine for manufacturing inspection. The TIH has developed an image-based deep-learning model to estimate end mill wear parameters & provide tool state feedback to the machine operator. The algorithm estimates the Remaining Useful Life (RUL) and tool wear state from the mobile camera images, viz. initial, intermediate, and worn. A mobile application is developed to display the wear state and RUL for assisting machine operators in replacing/regrinding decisions.



(a) New tool; (b) initial state; (c) intermediate state; (d) worn tool

Deployment:

MIRE: Mixed Reality based Interactive platform for Robotics Education

Mixed Reality (MR) platform termed MIRE has been designed to introduce school students to the fundamentals of robotics. MIRE is a unique, interactive, and engaging educational platform that makes an introduction to robotics both engaging and accessible, particularly for school students. MIRE provides holistic information about four different types of robots in a single, cost-effective, interactive setup.





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**Department of Science and Technology
Ministry of Science and Technology
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