



IHUB-DRISHTI FOUNDATION, TIH AT IIT JODHPUR NEVSLETTER ISSUE 2



CHAIRMAN'S MESSAGE

I am delighted to present the 2nd edition of the newsletter, which showcases the latest developments and achievements of the Technology Innovation Hub (TIH) at IIT Jodhpur. iHub Drishti has been creating an ecosystem in and around the thematic areas of Computer Vision (CV), Augmented Reality (AR) and Virtual Reality (VR) and collaborated with researchers from 35 academic institutions, including 3 international universities and 17 business enterprises. iHub Drishti ventured into cutting-edge research in collaboration with the National Science Foundation's (NSF) Directorate for Computer and Information Science and Engineering (CISE) and Directorate for Engineering (ENG), United States. iHub Drishti has signed MoU with 3 institutions to implement research and collaboration through hub and spoke model.

IIT Jodhpur and iHub Drishti have created an M.Tech. programme in augmented and virtual reality for working professionals in order to fulfil the growing demand for engineers with a variety of backgrounds in this field and to promote pertinent research and development. The M.Tech. programme offers cross-disciplinary learning possibilities in one of the most difficult fields in advanced technology. Additionally, it is envisioned that this programme will act as a proving ground for cutting-edge concepts in the design, development, and testing of AR and VR systems. 65 executive students are presently enrolled in the programme, started in 2022. The students come from PSUs, government agencies, and startups in the IT industry.

It is very fulfilling to see the successful completion of digitization of five museums of the Rajasthan Government at the cities of Alwar, Chittorgarh, Baran, Bundi and Bharatpur - augmented with 360 degree Interactive, 3D models of the museum artefacts - by iHub Drishti in collaboration with its industry partner Vizara Technologies Pvt. Ltd. These Digital Museums are a step towards the future of digitising India's rich heritage.

We have on-boarded Shri Ashoke Guha as an independent director of iHub Drishti in October 2022. He brings a wealth of experience in financial leadership, with strong exposure in strategic and financial planning. Shri Guha held CFO roles at GMR IGI Airport JVs, FCm Travel (Flight Centre) India and Kuoni Business Travel India, and had enriching stints at DHL Worldwide Express, Philips India, E&Y, and PwC. We welcome him to the team and look forward to working together towards creating robust corporate governance and building a dynamic ecosystem for startups and entrepreneurs.

BOARD MEMBERS



MARCH 2023

Prof. Santanu Chaudhury Director, IIT Jodhpur Chairman, iHub Drishti



Prof. Mayank Vatsa Dean R&D, IIT Jodhpur Project Director, iHub Drishti



Prof. Surajit Ghosh Dean (International Relations, Alumni Relations and Corporate Relations), IIT Jodhpur



Mr. Ashoke Guha Ex CFO, GMR IGI Airport



We had a memorable and proud moment when Shri Kris Gopalakrishanan, Chairman, Mission Governing Board (MGB) of NM-ICPS visited iHub Drishti in November 2022.



Dr. Ekta Kapoor, Mission Director, NM-ICPS visited iHub Drishti to review the progress in November 2022.

- Prof. Santanu Chaudhury



National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS) Ministry of Science & Technology, Department of Science & Technology, Government of India



RESEARCH INITIATIVES

COMPUTER VISION BASED SOLUTIONS FOR HEALTHCARE

<u>Al-Based Risk Stratification Referral models using eye</u> <u>images in a public health setting</u>

The aim of the study is to develop an Al based risk stratification model based on interior and exterior retinal images for early diagnosis and to make referral decision and developing an eye image repository for further research leading to advancement of precision medicine.

<u>Evaluation and development of Machine Learning (ML)</u> <u>models for the automated detection, localisation and</u> <u>characterisation of traumatic rib fractures on CT scans</u>

The key goals of our project are to generate a high-quality expert reviewed annotated dataset of thoracic CT scans, use it to evaluate existing ML models, develop our novel model to detect, localise & characterise rib fractures, and subsequently generate a structured text report similar to a radiologist's.

COMPUTER VISION BASED SOLUTIONS FOR BIOSPHERE

Video Analytics for Wildlife Monitoring and Conservation

The goal is to create an annotated dataset along with a baseline approach and metrics for event understanding in very long videos in the context of wildlife monitoring and conservation. It will enable the non-invasive monitoring of wildlife, which can give environmental researchers insights into the impact of habitat loss, urban development, and climate change on wildlife and ecology.



COMPUTER VISION BASED SOLUTIONS FOR INDUSTRY 4.0

Vision System for Integrating Mass manufacturing Line of Bearing Rollers

The vision-based inspection system can accurately measure and sort parts at higher speeds to improve productivity. In addition, the vision based system can facilitate 100% inspection requirements of manufactured components, ensuring conformance to specifications and customer satisfaction. The present research aims to develop a vision-based inspection system for quality control of tapered rollers used in bearings produced by the centerless grinding operation.

COMPUTER VISION BASED SOLUTIONS FOR AUTONOMOUS SYSTEMS

<u>TrustMe: Explainable Adversarial Attack Detection and</u> <u>Mitigation for Object Recognition Algorithms</u>

This project aims at addressing the challenge of adversarial attacks for deep learning algorithms for object recognition algorithms. In order to ensure dependability of a machine learning algorithm for a given task, is important to ensure that the input data is not attacked. This project aims at designing and developing attack estimation and mitigation algorithms for object recognition in aerial data and satellite data.

AR-VR APPLICATIONS

Digital Museum

Five Rajasthan Government museums at the cities of Alwar, Chittorgarh, Baran, Bundi, and Bharatpur in Rajasthan are digitized and uploaded to the Rajasthan Government server. The key features are-

- Augmented with 360-degree Interactive
- 3D models of the museum artifacts
- Pre-defined tours to take you through a guided experience with enhanced imagery & descriptions, easy-to-navigate controls
- These Digital Museums are a step towards the future of digitizing India's rich heritage.



Haptics-Based Medical Simulators for Palpation and Tele Diagnosis

The palpation training simulator will have two main components

- 1. Custom Haptic Device
- 2. Immersive Environment



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OUTREACH ACTIVITIES

The IDGJ (iHub Drishti Game Jam 2022) was organized in collaboration with INAE-SERB Youth conclave hosted by IIT Jodhpur, to promote technological activities and provide opportunities to Indian youth in engineering activities at national level. This Game Jam was an event where the participants made games from scratch. The event duration was on 16-17 September 2022.

We are pleased to announce the successful completion of the first-ever Indian Conference on Medical Technologies Innovation (ICMI), which was co-hosted by IIT Jodhpur, AIIMS Jodhpur, JCKIF and TIH iHuB Drishti. The conference took place from 24-26 February, and it brought together some of the leading experts in medical-related technologies.

GAME JAM









HASTSHILPA MELA, JODHPUR

EXPLORATORY VISITS BY INTERNATIONAL DELEGATES

TCS VP, COIN, CANADA

Mr. Raju Goteti, VP of Co-Innovation Network (COIN) of TCS, visited iHub Drishti in August 2022. The objective of his visit is to scale up the engagement of TCS with IIT Jodhpur, including iHub Drishti in different areas of TCS's global initiatives in the emerging technology space.



KOREAN DELEGATE

Dr. Y. J. Park, Director, Indo-Korean Center for Research and Innovation (IKCRI), New Delhi, visited iHub Drishti with the aim of forging collaboration in the emerging area including digital gaming.

FOUNDATION DAY, IIT JODHPUR

PROF. GREGORY C. GIBSON FROM GEORGIA TECH

Prof. Gregory C. Gibson, Regents Professor of Biological Sciences at the Georgia Institute of Technology in Atlanta, Georgia, USA visited iHub Drishti in December 2022, his research has largely focused on integrative genomics studies of inflammatory bowel disease & well-being.



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WINTER SCHOOL

The Department of Computer Science and Engineering, IIT Jodhpur of Computer Science and Engineering, in association with TIH iHub Drishti at Indian Institute of Technology Jodhpur, organized "Winter School 2022 (in-person)" - a bouquet of two schools:

- a) "Algorithms for Graphs and Games": December 05-11, 2022
- b) "Responsible AI": December 11-15, 2022, and
- c) A common poster presentation session: December 11, 2022

The school intended for graduate students working or who want to work in the area of Algorithms and related areas, and for motivated undergraduate students who are enthusiastic regarding these areas. People from the industry looking for exposure or those working or planning to work in this area also attended the winter school.



M.TECH AR-VR IMMERSION

Executive M.Tech ARVR (2022) students attended a weeklong immersion programme. Since the programme is for working professionals, all interaction was virtual. The immersion week gave students a zest for the classroom.

AR VR WORKSHOP

HOLOWORLD and Unity hosted a two-day workshop. Dr. Thotreingam Kasar, Chief Research Officer, led a session where each participant created animation assets. The workshop had M.Tech ARVR students, PhD students from IIT Jodhpur, and working professionals from Cognizant, ADA-DRDO, CloudSpectra, and others.





HUB AND SPOKE

IISER Bhopal, FLAME University Pune, and NSUT Delhi have joined iHub Drishti under the Hub and Spoke paradigm. The fundamental objective of the Hub-Spoke model is to codify the intent to collaborate on events and network facilitation to explore potential for CPS for CV and ARVR, as well as associated innovation and partnerships between the Hub and the Spoke. With training in CPS for CV and ARVR as well as new age technologies, this model encourages the growth of entrepreneurship and the startup ecosystem. Additionally, evaluating potential to find high-quality CPS for CV and ARVR-related patents, projects, and articles created by students and professors of Spoke and translating them into actual goods by Hub. Building long-term strategic relationships on activating the overall innovation ecosystem by cultivating HRD and skill development through fellowship-based UG/PG, PhD, Post-Doctoral, and shortterm faculty training, as well as establishing and strengthening international collaborative research for cross-fertilization of ideas, can address societal needs.



Bhopal





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