



# CONVERGENCE

A NEWSLETTER

BY

IIT MANDI IHUB AND HCI FOUNDATION



September - December 2022

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Product/ Technologies developed by iHub in the domain of Human-Computer Interaction (HCI)

## LOW-COST ECG & HRV DETECTION & ANALYSIS SYSTEM

Developed a low-cost ECG & HRV detection and analysis system, which can be used among local communities to assess heart health and stress.



DST Official experiencing the HRV Detection System

## HUMAN PERFORMANCE MODELLING (HPM) FRAMEWORK

Developed cognitive profiling and enhancement tools using bleeding-edge HCI-based solutions for assessing and enhancing decision-making among military personnel. In addition, developed various training protocols based on well-founded psychological theories for enhancing cognitive performance.



Demonstration of HK416VR Rifle at iHub office





## HCI-BASED HEAD-MOUNTED DISPLAY FOR UNDERWATER SIMULATION

Developed HCI-based solutions using a head-mounted display (HMD) for assessing & enhancing cognitive performance & decision-making in unmanned underwater vehicle (UUV) operators.



DST Official experiencing Driving Simulator

## MENTAL ENHANCEMENT: LOW-COST SOCIAL ROBOT DESIGNED TO IDENTIFY MENTAL HEALTH CONDITIONS

In this product, participants interact with a low-cost social robot. Participants play with a robot with predefined protocols and enjoyable interactions, increasing happiness and reducing stress levels in participants. Social Robot will be used to measure stress levels in participants.



KOICA team member interacting with a Social Robot



## Webinar on Medical Image Processing and Analysis

- The webinar was organized by iHub on 22nd September 2022.
- Dr. Bathula spoke about the concept of medical images, namely X-rays, CT, and MRI scans, and their analysis and interpretation.



Dr. Deepthi R. Bathula  
IIT, Ropar

## Workshop on Functional Magnetic Resonance Imaging(fMRI)/ Neurocognitive Modeling

- The workshop was organized from 16th-18th October 2022 during the Winter School.
- fMRI is the most widely used technique for investigating the functioning of the living brain. Prof. Mistry provided in-depth knowledge and understanding of the concept and fundamentals of fMRI/ Neurocognitive Modeling to participants.



Prof. Percy Mistry  
Stanford University, California

## Workshop on Foundational ideas in Cognitive Modeling and Mindfulness

- The workshop was organized from 17th-18th October 2022 during the Winter School.
- Prof. Vugt explained the concept of mindfulness and how mindfulness activities affect cognitive systems and their consequences on the behavior of humans.



Prof. Marieke Van Vugt  
University of Groningen  
Netherlands

## Webinar On Human-Robot Interaction For Co-Learning

The webinar was organized on 2nd November 2022 with the aim of building awareness towards Human-Robots Interaction and what are the recent trends and challenges in this regard.



Dr. Wafa Johal  
University of Melbourne  
Australia





## SKILL DEVELOPMENT

### Workshop on Internet of Things (IoT), Its Security Measures, And Advances

- It was a two-day workshop from 9th-10th December 2022.
- The speakers explained the concept of the Internet of Things (IoT), the security aspects of IoT infrastructure, and its advances.



Dr. Geetha Kumari  
BITS Pilani, Hyderabad Campus,  
India



Dr. Ashutosh Bhatia  
BITS Pilani,  
Pilani campus, India



Dr. Barsha Mitra  
BITS Pilani,  
Hyderabad Campus, India



Dr. Rashmi Sahay  
ICFAI Hyderabad, India

### Workshop on Consciousness and Indian Knowledge System

- IIT Mandi iHub and HCI Foundation, in collaboration with the Indian Knowledge System & Mental Health Applications (IKSMHA) Center, IIT Mandi, organized a one-day workshop on 14th December 2022.
- A deep understanding of the concept and philosophy of consciousness and how it relates to the Indian Knowledge System was shared by the speakers in the workshop.



Prof. Arun K Pati  
Quantum Information & Computation Group,  
HRI Allahabad



Dr. Arun Shashidharn  
Center for Consciousness Studies,  
NIMHANS, Bangalore



Mr. Hide Saegusa  
University of Tokyo



Prof. Laxmidhar Behera  
IIT Mandi



Prof. Stuart Hameroff  
University of Arizona



Prof. Nithin Nagaraj  
NIAS, IISc Bangalore



# SKILL DEVELOPMENT

## Fourth Edition Of Winter School On Cognitive Modeling (WSCM), 2022

The 4th edition of WSCM was organized from 16th-18th October 2022 at the IIT Mandi campus in Hybrid mode. The event was sponsored by Hospimedica Group of Companies, New Delhi, India.



Around 75+ participants joined the Winter School from different parts of the country. In the three-day long event, speakers from IIT Mandi, IIT Delhi, and IIT Roorkee, and international speakers from the University of Groningen, Stanford University, University of Waterloo, and Carnegie Mellon University trained and guided students on the best practices in the field of Cognitive Modeling.



### Glimpses of Winter School





IIT Mandi iHub and HCI Foundation is progressing toward the Center of Excellence (CoE) in Human-Computer Interaction (HCI). Center of Excellence will include innovation, research, development, and collaboration in the domain of Human-Computer Interaction (HCI). The iHub is continuously working to support start-ups in the field of HCI, and one such success story is of Embright Infotech.



### EMBRIGHT INFOTECH

- Embright Infotech Private Limited is a technology-driven startup supported by IIT Mandi iHub and HCI Foundation.
- The startup was incorporated in the year 2017.
- Being recognized by Govt. of India's Startup Policy, the startup specializes in products and services related to Virtual Reality, Augmented Reality, Mixed Reality, AI, and IoT.
- Main focus of the company is on the Healthcare and Education sector to provide incredible VR/AR experiences.
- Auticare is the main product of Embright Infotech that was commercially launched in the year 2020. It is an XR-AI-based assistive technology learning platform for Autism Spectrum Disorder (ASD) and Special Education.



Demonstration of product by Startup - Embright Infotech to DST officials





# COLLABORATIONS

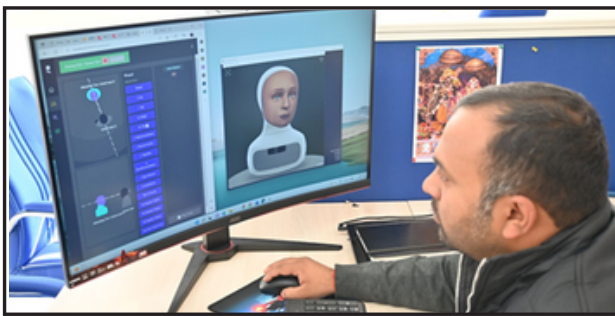
## Memorandum of Understanding (MOU) with Furhat Robotics

- IIT Mandi iHub and HCI Foundation and Furhat Robotics signed an MOU on 14th October 2022.
- Furhat Robotics is a conversational AI and Social Robotics company based in Stockholm, Sweden.
- The company is building the world's first social robotics and conversational system platform and is pioneering the industry by giving a Human face to Robot.

## Furhat Robotics



Collaboration established between IIT Mandi iHub and Furhat Robotics



iHub researcher interacting with Furhat robot

### The Key highlights of the MOU are:

- To strengthen research and collaboration between IIT Mandi iHub and HCI Foundation & Furhat Robotics.
- To design Social Robots for the Indian Population to educate students and screen mental health conditions.

## Memorandum of Understanding (MOU) with ICURO

- IIT Mandi iHub and HCI Foundation and ICURO signed an MOU on 12th December 2022.
- ICURO company is based in Santa Clara, California.



### The key highlights of the MOU are:

- Executing R&D projects for technology solution development that are feasible with AI-HCI technology hardware and software stack and industry best practices provided by ICURO.
- Partnering (ICURO & iHub) in setting up a sandbox environment within the premises of iHub to develop and deploy the AI-HCI use case-specific industry products, platforms, and solutions. The sandbox environment would include the Computer Vision Platform and other associated resources (Hardware/Software) from ICURO.

## Upcoming Collaborations



**PGIMER, Chandigarh**



**AIIMS, Bilaspur**

# DEPARTMENT OF SCIENCE AND TECHNOLOGY (DST), GOVERNMENT OF INDIA VISIT TO IHUB OFFICE



विज्ञान एवं प्रौद्योगिकी विभाग  
DEPARTMENT OF  
**SCIENCE & TECHNOLOGY**

- Dr. Akhilesh Gupta, Secretary, Science and Engineering Research Board (SERB), Government of India, and Dr. Ekta Kapoor, Mission Director, National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS), DST, Government of India, visited IIT Mandi iHub and HCI Foundation office to evaluate the technological advances made by the Innovation Hub in the field of Human-Computer Interaction (HCI).
- The overview of the domain of HCI, being Interdisciplinary, Interactive, and Intelligence, was presented, followed by a detailed view of the four verticals of Research & Development, Skill Development, Incubation and Acceleration, and Collaboration was shared.
- Dr. Gupta and Dr. Kapoor interacted with the iHub team, researchers, and start-ups supported by iHub in the Human-Computer Interaction (HCI) domain.
- A demonstration of the YogiFi smart fitness mat was given. It is the product of iHub supported Start-up- WELLNESYS. The fitness mat is already sold across 18 countries over the last year, with the start-up achieving profitability.



3 Defining features of an HCI project



Group photograph of iHub team with DST officials



Welcoming the esteemed officials from DST



With DST officials, during the presentation of iHub's activities



One of the successful startup of iHub showcasing the product

# OUTREACH EXERCISES - Visits To iHub Office



## Visit of National Institute of Fashion Technology-Kangra Faculty to the iHub office

- Dr. Manoj Kumar Paras, Dr. Sourabh Chaturvedi, and Dr. Deepa Xaxa from the National Institute of Fashion Technology, Kangra, visited the IIT Mandi iHub and HCI Foundation office on 7th September 2022.
- The discussion was done for future collaborations and possibilities between both institutes in the domain of HCI and Fashion Technology.



iHub leadership team with NIFT-Kangra faculty

## Visit of Indian Institute of Technology - Delhi Faculty to iHub office



IIT-D Faculty experiencing HTC Vive Pro device

- Professor James Gomes (School of Biological Sciences) and Associate Professor Jyoti Kumar (Department of Design), IIT Delhi, visited the IIT Mandi iHub and HCI Foundation office on 14th October 2022.
- They experienced different equipment like Oculus quest 2 and HTC VIVE Pro Virtual Reality System, and discussions were held on a variety of important issues related to HCI.



## Visit of Dr.Kingshuk Banerjee, Director and Head, R&D Centre, Hitachi India to the iHub office

- Dr. Kingshuk Banerjee and his research & development center team visited the iHub office on 19th October 2022.
- During the visit, the discussion was done to perform collaborative research in the field of Human-Computer Interaction (HCI) and social innovation.



iHub leadership team with Hitachi R&D Centre team



# OUTREACH EXERCISES - Visits To iHub Office



## Visit of Dr. Rajesh Kumar, Scientific Officer-H, Bhabha Atomic Research Centre, to the iHub office

- Dr. Rajesh Kumar from Bhabha Atomic Research Centre (BARC), Mumbai, visited the iHub office on 1st November 2022.
- During the visit, the equipment present in the office premises, such as Oculus Quest, HTC Vive Pro, and HK416VR Rifle, was demonstrated.
- The discussion was done for future collaboration between IIT Mandi iHub and BARC in the field of Nuclear Energy and HCI.



BARC Official experiencing the Oculus quest device

## Visit of Prof. Stuart Hameroff, Co-Founder, Director of the Center for Consciousness, University of Arizona to the iHub office



Dr. Dutt in conversation with Prof. Hameroff

- Prof. Stuart Hameroff, along with Mr. Hide Saegusa, University of Tokyo, visited the IIT Mandi iHub and HCI Foundation office on 9th December 2022.
- During the visit, Prof. Hameroff took a first-hand experience of immersive guided meditation and driving simulator stationed at the Experience Center of iHub.
- The interactive discussion was also done on the concept of Consciousness and the Indian Knowledge System.



## Visit of Mr. Woochan Chang, Director of Korean International Cooperation Agency (KOICA), India, to the iHub office.

- The Korean International Cooperation Agency (KOICA) team, led by Woochan Chang, Director of KOICA India, paid a visit to the IIT Mandi iHub and the HCI Foundation on 14th December 2022.
- KOICA was established in the year 1991 by the Ministry of Foreign Affairs of South Korea.
- KOICA is the main institution providing grant aid programs of South Korea.
- The team from KOICA also experienced the driver simulator and immersive guided meditation tools at the iHub's Experience Centre. Furhat Robot's functionality and applicability were also demonstrated.



iHub Leadership team with KOICA team



## 9th CSR Summit at New Delhi



A woman at CSR-Summit experiencing the Oculus quest device

- IIT Mandi iHub and HCI Foundation team participated in the 9th edition of the India CSR Summit.
- The country's largest CSR forum brings together businesses, CSR foundations, government agencies, nonprofits, and social enterprises to network and collaborate in the development and impact sectors.
- The iHub team demonstrated Oculus quest 2 and HTC VIVE Pro Virtual Reality System during the summit and attracted technology-driven organizations for collaborative research work.



Industrial Training Institute

## Visit to Industrial Training Institute (ITI - Grade - A), Mandi

- IIT Mandi iHub and the HCI Foundation team visited the Industrial Training Institute (ITI - Grade - A), Mandi.
- ITI, Mandi is the oldest training institute in the state of Himachal Pradesh.
- The purpose of the visit was to create a sizable scale in skill development with ITI, Mandi and to create the necessary influence on employment creation in the field of Human-Computer Interaction (HCI).



iHub team interacting with the Principal, ITI Mandi

## Felicitation Of Dr. Varun Dutt For Delivering a Speech On Human-Machine Teaming



- Dr. Varun Dutt, Project Director, IIT Mandi iHub and HCI Foundation, and Associate Professor, SCEE, IIT Mandi, was felicitated for delivering his keynote speech and chairing a special session in the three-day Indo-US joint task group (JTG) workshop.
- It was organized by the Institute of Nuclear Medicine & Allied Sciences (INMAS) - DRDO
- The workshop was held from 13th -15th December 2022 at the Sardar Vallabhbhai Chest Institute in Delhi, and it covered the current developments and challenges in Human-Machine Teaming.
- Dr. Dutt represented the IIT Mandi iHub and HCI Foundation and talked about the various collaborative research opportunities available in the field of HCI.
- As a result, the Office of Naval Research (ONR), Department of Defense (DoD), Govt. of USA, and the Defence Institute of Psychological Research (DIPR) have expressed their immediate interest in collaborating with iHub in the near future.



Dr. Dutt receiving award and medal during Indo-US JTG Workshop



# MEDIA OUTREACH

A light-hearted take on Human-Computer Interaction, described by Mr. Somjit Amrit, CEO, IIT Mandi iHub and HCI Foundation, published in Times of India

# TOI



To read the full article

<https://timesofindia.indiatimes.com/blogs/worldly-wise/the-teeth-the-nuts-and-the-nutcracker/>

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