

Bharatesh Chakravarthi, Ph.D.,

Postdoc Fellow, Active Perception Group, SCAI, Ira A. Fulton Schools of Engineering, Arizona State University, USA






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Summary

- Currently, I am Fulton Entrepreneurial PostDoc Research Associate at Active Perception Group, School of Computing and Augmented Intelligence (SCAI), Ira A. Fulton Schools of Engineering, Arizona State University, United States. I continue my research on Human activity recognition, Human movement analysis, Sensors and 3D Tracking, and AR/VR at SCAI Motion capture lab.





Work Experience

- 2022 – Till date  **Postdoc Research Associate**, Active Perception Group, SCAI, Arizona State University, United States.
- 2018 – 2022  **Research Scholar**, Virtual Environments Lab, Department of CG/VR, GSAIM, Chung Ang University, Seoul, South Korea.
 - Successfully defended PhD dissertation in Computer Graphics and Virtual Reality.
 - Contributed to a research project “Proxemics based pervasive Interactions for the wide-area and high-speed serial motion recognition”, supported by Institute of Information and Communication Technology Planning and Evaluation grant funded by the Republic of Korea government.
 - Have developed an indigenous human motion authoring and editing system.
 - Have made contributions to open-source projects (Github) such as Visualization Toolkit (VTK) supported by Kitware Technologies®
 - Have actively involved in research article reviews.
- 2021 – Till date  **Teaching Assistant** for Data Visualization and Interpretation course of M. Tech Data Science and Engineering Program, WILP of BITS [Online], pilani, India.
- 2015 – 2018  **Assistant Professor**, Department of Information Science and Engineering, Jyothy Institute of Technology, Bengaluru, India.
 - Immaculately led and coordinated a technical forum - “Graphics Day”. Also, organized several technical talks, workshops and faculty development programs.
 - Have played a key role in developing and maintaining Jyothy group websites.
- 2013 – 2015  **Assistant Professor**, Department of Information Science and Engineering, APS College of Engineering, Bengaluru, India.
 - Led and organized technical forum of ISE department – “Tech-Spark” and “SPARKUP-2014”
 - Worked as a placement co-ordinator at department of placement and training, and gained experience in conducting various on campus and pool campus drives.


Education

- 2018 – 2022  **Ph.D., Computer Graphics and Virtual Reality.**
GSAIM, Chung-Ang University, Seoul, South Korea. (Aug 2018 - May 2022)
Thesis title: *A Modular Open-source Framework for Human Motion Synthesis and Sensed Motion Editing*
- 2011 – 2013  **M.Tech. Computer Network Engineering.**
The Oxford College of Engineering, VTU, Bangalore, India (2011 - 2013)
Thesis title: *"Interoperability between WiMAX and LTE"*. Secured First Class with Distinction. (74.25 %)
- 2007 – 2011  **B.E. Information Science and Engineering.**
APS College of Engineering, VTU, Bangalore, India (2007 - 2011)
Thesis title: *"Design and Implementation of an Energy aware routing protocol for Wireless Sensor Networks"*. Secured First Class. (64.5 %)







Projects

-  **IMU Sensor based Human Motion Synthesis Framework.**
Objective: A GUI-based application system to interactively author realistic human motion, kinetically edit sensed motion data, and motion reconstruction using 3D humanoid models.
Development Environment: C++, Qt, VTK, Xsens Awinda IMU sensors.
-  **Design and Development of an Open-Source Tool for Human Motion Analysis.**
Objective: A Visual means to represent human motion as trajectory over a 3D-Sphere and human motion decomposition.
Development Environment: C++, OpenGL, VTK, Xsens Awinda IMU sensors, and Perception Neuron 3.
-  **Pilot Experiment on Quaternion-Based 3D Gesture Tracking.**
Objective: An Intuitive means to represent human motion as equirectangular projection over a 2D-plane using UV-mapping technique.
Development Environment: C++, VTK, and Xsens Awinda IMU sensors
-  **An Open-Source Platform for Human Pose Estimation.**
Objective: Heterogeneous Multi-Sensor system for pose tracking and estimation
Development Environment: C++, VTK, and Xsens Awinda IMU sensors, Ouster OS1 Lidar

Research Interest

-  Human Activity Recognition (HAR), Human Computer Interaction (HCI), Human Motion Analysis, Motion Capture Systems (MoCap), Computer Vision, Virtual Reality (VR), Pose estimation, Sensors, and Visualization techniques.

Skills

- | | |
|-----------------|---|
| Programming |  C/C++, Java, python and R. |
| SDK's/API's |  VTK, Qt, Autodesk FBX, and Octave |
| Tools |  Tableau, Tableau Prep Builder, 3ds Max (Biped Animation). |
| Hardware System |  MoCAP System - Xsens MTw Awinda, Perception Neuron Arduino uno, Raspberry Pi. |
| Databases |  MySQL. |
| Web Development |  HTML, PHP, Javascript, FileZilla FTP Server. |

Research Publications

Journal Articles

- B. Chakravarthi, A. K. Patil, J. Y. Ryu, A. Balasubramanyam and Y. H. Chai, "Scenario-Based Sensed Human Motion Editing and Validation Through the Motion-Sphere," in **IEEE Access**, vol. 10, pp. 28295-28307, **2022**, doi: 10.1109/ACCESS.2022.3157939.
- J. Ryu, A. K. Patil, B. Chakravarthi, A. Balasubramanyam, S. Park and Y. Chai, "Angular Features-Based Human Action Recognition System for a Real Application With Subtle Unit Actions," in **IEEE Access**, vol. 10, pp. 9645-9657, **2022**, doi: 10.1109/ACCESS.2022.3144456.
- Patil, A.K.; Balasubramanyam, A.; Ryu, J.Y.; Chakravarthi, B.; Chai, Y.H. An Open-Source Platform for Human Pose Estimation and Tracking Using a Heterogeneous Multi-Sensor System. **Sensors** **2021**, 21, 2340. <https://doi.org/10.3390/s21072340>.
- Patil, A.K.; Balasubramanyam, A.; Ryu, J.Y.; B N, P.K.; Chakravarthi, B.; Chai, Y.H. Fusion of Multiple Lidars and Inertial Sensors for the Real-Time Pose Tracking of Human Motion. **Sensors** **2020**, 20, 5342. <https://doi.org/10.3390/s20185342>
- Balasubramanyam, A.; Patil, A.K.; Chakravarthi, B.; Ryu, J.Y.; Chai, Y.H. Motion-Sphere: Visual Representation of the Subtle Motion of Human Joints. **Appl. Sci.** **2020**, 10, 6462. <https://doi.org/10.3390/app10186462>
- Bharatesh Chakravarthi S. B., Prof. D. Jayaramaiah, 2013, Seamless Interoperability Across LTE And WiMAX Using Vertical Handover Mechanism, **IJERT June 2013** Volume 02, Issue 06.

Conference Proceedings

- Chakravarthi, B., Prasad, B.P., Chethana, B. and Kumar, B.P., **2022**, July. Real-time Human Motion Tracking and Reconstruction using IMU Sensors. In 2022 International Conference on Electrical, Computer and Energy Technologies (ICECET) (pp. 1-5). IEEE.
- A. Balasubramanyam, A. K. Patil, B. Chakravarthi, J. Ryu and Y. H. Chai, "Kinematically Admissible Editing of the Measured Sensor Motion Data for Virtual Reconstruction of Plausible Human Movements," 2021 IEEE International Conference on Systems, Man, and Cybernetics (SMC), **2021**, pp. 283-288, doi: 10.1109/SMC52423.2021.9658750.
- Chakravarthi, B., Patil, A.K., Balasubramanyam, A., Ryu, J.Y. and Chai, Y.H., **2020**. Sensed Unit Motion based Authoring for the Precise Human Movements. Korean Society of Mechanical Engineers Spring Conference, 2020.12, pp 1242-1247.
- D. Kim, B. Chakravarthi, S. H. Kim, A. Balasubramanyam, Y. H. Chai and A. K. Patil, "MotionNote: A Novel Human Pose Representation," 2020 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW), **2020**, pp. 696-697, doi: 10.1109/VRW50115.2020.00199.
- Chakravarthi, B., Joseph, M., Shuai, C., Kim, S.H. and Chai, Y.H., 2019. Quaternions Based Intuitive Visualization for Tracking Weightlifting Exercises. The Korean Institute of Information Scientists and Engineers, **2019**, pp.1052-1054
- Patil, A.K., Chakravarthi, B., Kim, S.H., Balasubramanyam, A., Ryu, J.Y. and Chai, Y.H., **2019**. Pilot Experiment of a 2D Trajectory Representation of Quaternion-Based 3D Gesture Tracking
- Lohith J J and Bharatesh Chakravarthi S B, "Intensifying the lifetime of Wireless Sensor Network using a centralized energy accumulator node with RF energy transmission," 2015 IEEE International Advance Computing Conference (IACC), **2015**, pp. 180-184, doi: 10.1109/IADCC.2015.7154694.

Peer Review

Journals

- **Elsevier** - ISPRS Journal of Photogrammetry and Remote Sensing.

Peer Review (continued)

- 📖 **IEEE Access.**
- 📖 **Springer Nature** - BMC Musculoskeletal Disorders.
- 📖 **MDPI** - Remote Sensing, Sensors, Applied Science, Sustainability, Applied System Innovation, Vehicles, AI, Processes.
- 📖 **Taylor and Francis**- The Imaging Science Journal

Conferences

- 📖 **IEEE** - ICECCME 2021.
- 📖 **ACM** - VRST 2022, VRST 2021.
- 📖 **AAAI** - AAAI-23
- 📖 **ICLR** - ICLR-23

Invited Talk

- 📖 **Human Pose Estimation - A Fascinating Aspect of Computer Vision**, The Research, Innovation and Consultancy Committee of the IT Department, College of Computing and Information Sciences, University of Technology and Applied Sciences - Ibri Sultanate of Oman on 10th November 2022.
- 📖 **Blockchain and Internet of Things**, AICTE Training and Learning (ATAL) Academy Sponsored Faculty Development Program, organized by Department of Computer Science and Engineering, UIT-RGPV, Bhopal, Madhya Pradesh, India on 31st July 2021.
- 📖 **Blockchain of Things**, AICTE Training and Learning (ATAL) Academy Sponsored Faculty Development Program, organized by Department of Computer Science and Engineering, BNMIT, Bengaluru, Karnataka, India on 18th January 2021.
- 📖 **Challenges and Research Directions for Blockchains**, AICTE Sponsored Faculty Development Program, organized by Department of Computer Science and Engineering, Sona College of Technology, Salem, Tamilnadu, India on 10th February 2021.
- 📖 **Human Computer Interaction in Virtual Environments**, Faculty Development Program, organized by Department of Computer Science and Information Science Engineering, R R Institute of Technology, Bengaluru, Karnataka, India on 17th August 2020.
- 📖 **Mobile App Development using Android Studio - Hands-on Session**, Indian Society For Technical Education sponsored Student Development Program, organized by Department of Computer Science and Engineering, Sri Venkateshwara College of Engineering, Bengaluru, Karnataka, India on 24th February 2018.
- 📖 **IoT and its Applications**, Student Development Program, organized by Department of Computer Applications, Dr. Ambedkar Institute of Technology, Bengaluru, Karnataka, India on 1st March 2017.
- 📖 **Opportunities in the field of IoT**, Technical Education Quality Improvement Programme of Government of India Sponsored Student Development Program, organized by Department of Computer Science and Engineering, BMS College of Engineering, Bengaluru, Karnataka, India on 6th March 2017.
- 📖 **Programming and Application Development using Python**, Student Development Program Organized by Department of Computer Applications, Sir MVIT, Bengaluru, Karnataka, India on 11th March 2017.

Certifications

- 2022 **Google Data Analytics Professional Certificate**, Course certification authorized by Google® and Coursera.
- 2021 **Python Programming**, Course certification authorized by University of michigan and Coursera.
First Step korean and learn to Speak korean 1, Course certification authorized by Yonsei University and Coursera.
- 2018 **Advanced Android Development and Designing Thinking**, Certification authorized by Google®
- 2017 **Android Fundamentals Faculty Training**, Certification authorized by Koenig Solutions Ltd and Google®.
- 2015 **Intel HPC Code Modernization**, Certification authorized by Center for Development of Advanced Computing®.
- 2014 **Faculty Enablement Program (FEP) on Foundation Program 4.0**, Certification authorized by Infosys Limited®
Microsoft Faculty Fellow, Certification authorized by Microsoft® and CITech.

Awards, Achievements, and Funding

Achievements

- 2018 **Convener**, “Graphics Day 2017”, An Intercollegiate Project Exhibition, Bengaluru, India
- 2017 **Co-Convener**, Faculty Development Program on “OOP with Java for DAA lab and ARM Programming”, Bengaluru, India.
- 2016 **Convener**, 5th National Conference on Emerging Trends in Engineering Technologies (ETET-2016), Bengaluru, India.

Student Collaborations and Awards

- 2018 **1st Place**, Project Exhibition, The 10th Annual Conference of Karnataka Science and Technology Academy held at REVA University.
2nd Place, Project Exhibition, State level Engineering Project Exhibition held at BGS Institute of Technology.
- 2017 **Certificate of Merit**, Project Exhibition, Unisys Cloud 20/20 V8.
- 2016 **Best Project**, Project Exhibition, “TECH-STORM 2016” organized at GSSSET in association with IETE.
Certificate of Merit, Project Exhibition, Unisys Cloud 20/20 V7.

Funding

- 2022 **ORKG Curation Grants 2022**, Research fund awarded under 2nd ORKG Curation Grant Competition from TIB Leibniz Information Centre for Science and Technology, Hannover, Germany. Fund awarded: 2400 EUR, Duration: June 2022 to November 2022.
- 2018 **VTU**, Financial Assistance sanctioned by the Visvesvaraya Technological University (VTU) for a project entitled “An IoT Based Smart Trash Bin and Automated Garbage Monitoring System for Smart Cities in India”.
- 2017 **KSCST**, Project Funding Sanctioned under the 41st series of student project programme: 2017-18 (41st Series of SPP), from Karnataka State Council for Science and Technology. Project Title - “An IoT Based Smart Trash Bin and Automated Garbage Monitoring System for Smart Cities in India”.

Awards, Achievements, and Funding (continued)

Scholarship

- 2021 **Chung Ang University**, Won a scholarship (300,000 KRW) to Chung Ang University, being at Department of Imaging Science and Arts in the Graduate School of Advanced Imaging Science, Multimedia and Film.
- 2020 **Chung Ang University**, Won a scholarship (5,538,000 KRW) to Chung Ang University, being at Department of Imaging Science and Arts in the Graduate School of Advanced Imaging Science, Multimedia and Film.
- 2019 **Chung Ang University**, Won a scholarship (13,252,440 KRW) to Chung Ang University, being at Department of Imaging Science and Arts in the Graduate School of Advanced Imaging Science, Multimedia and Film.
- 2018 **Chung Ang University**, Won a scholarship (7,650,000 KRW) to Chung Ang University, being at Department of Imaging Science and Arts in the Graduate School of Advanced Imaging Science, Multimedia and Film.

Courses of Interest

Programming Languages	C/C++, Java, Python.
Data Analytics	Data Visualization using Tableau, Data Analysis with R Programming
Machine Learning	Neural Networks, Support Vector Machines
Virtual Reality	3D Models, 3D Interaction, AR/VR/MR/XR Technologies and Applications
Networks/Database	Data Communication, Computer Networks, IoT, WSN, Blockchain, Smart Contracts, Dapps, Blockchain platforms
Computer Graphics	Interactive Computer Graphics with WebGL, OpenGL, Visualization Toolkit (VTK)

Professional Body Membership

- ISTE International Society for Technology in Education - Lifetime member.
- CSI Computer Society of India - Lifetime member.

Personal Details

Name	Bharatesh Chakravarthi.
Date of Birth	1989-05-05
Nationality	Indian
Passport Status	Valid until 2031
Marital Status	Married
Languages	English, Kannada, Korean (elementary)
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