

# Hasan Mahmud

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## Research Profile

My research area focuses on the design and development of interactive systems integrated with machine learning approaches. Specifically, I work in Gesture-based Interactions for different HCI applications following both vision-based and sensor-based approaches. Currently, I am interested to do research on sensor-based human activity recognition, human intention and emotion detection, emotion controlled gaming content adjustment, gesture-based interaction through depth information.

## Education

- 2013–Present **Ph.D. in Computer Science and Engineering**, *Islamic University of Technology (IUT), a subsidiary organ of OIC, Dhaka, Bangladesh*,  
Thesis: Depth-aware hand gesture recognition system for Human-Computer Interactoin.  
Supervisor: Dr. Md. Kamrul Hasan, Professor, Department of Computer Science and Engineering (CSE), Islamic University of Technology (IUT), OIC, Dhaka, Bangladesh.
- 2007–2009 **M. Sc. in Computer Science**, *University of Trento (UniTN), Department of Information Engineering and Computer Science (DISI), Faculty of Science, Trento, Italy*.  
Duration: 2 Years  
Total Credits: 120  
Thesis: Assessment and Rehabilitation System for Cognitive Deficits  
Supervisor: Prof. Fausto Giunchiglia, UniTN, Trento, Italy  
Co-Supervisor: Massimo Zancanaro, Head, I3 research Unit of Fondazione Bruno Kessler (FBK), Trento, Italy
- 2000–2004 **B.Sc. in Computer Science and Information Technology (CIT)**, *Islamic University of Technology (IUT), Dhaka, Bangladesh*.  
CGPA: 4.73 out of 5.00, First Class with Honors  
Duration: 4 Years  
Total Credits: 179  
Thesis: Development of Infrastructure for supporting seamless town  
Supervisors: Fahim Kawsar, Md. Kamrul Hasan
- 1999 **Higher Secondary Certificate (HSC)**, *K.B. Intermediate College, Mymensingh, Bangladesh*,  
First Division with Marks 848 (84.8%).  
Dhaka Education Board, Science Group

1997 **Secondary School Certificate (SSC)**, *Mymensingh Zilla School*, Mymensingh, Bangladesh,  
First Division with Marks 855 (85.5%).  
Dhaka Education Board, Science Group

## Employment

- 12/2009– Present **Assistant Professor**, *Department of Computer Science and Engineering (CSE)*, Islamic University of Technology (IUT), a subsidiary organ of the Organisation of Islamic Cooperation (OIC), Board Bazar, Dhaka, Bangladesh.
- Responsibilities:
- Teaching undergraduate and graduate level courses
  - Supervise undergraduate thesis works
  - Member of different committees like, question moderation, course distribution, class schedule, tabulation etc.
  - Organizing workshops, seminars, and ICT related conferences
- 03/2005– 09/2007 **Lecturer**, *Department of Computer Science and Engineering (CSE)*, Stamford University Bangladesh, Shiddheshwari, Dhaka, Bangladesh.
- 12/2004– 03/2005 **Lecturer**, *Department of Computer Science and Engineering (CSE)*, University of Development Alternative (UODA), Dhanmondi, Dhaka, Bangladesh.

## Other Experience

- 03/2009– 07/2009 **Intern**, *Intelligent Interfaces and Interaction (I3) research unit*, Fondazione Bruno Kessler (FBK), Trento, Italy.
- My internship work was on a project of Interactive surfaces for neuro-cognitive rehabilitation under User-centered Design (UCD) approach. UCD is an approach to interactive system development which focuses specifically on making systems usable and safe for their users. It implies: early focus on users, tasks and environment, the active involvement of users in the design process, allocation of functions between user and system, the incorporation of user-derived feedbacks into system design, iterative design whereby a prototype is designed, tested and modified. I3 unit cooperated with the Centre for Neurocognitive Rehabilitation (CERIN) in Rovereto, in developing a system to support therapists with their work of assessing and rehabilitating people with cognitive impairments. We have done a preliminary study to understand how technology may affect Neurocognitive therapy.
- 03/2005– 04/2005 **Faculty Development Program under Center for Excellence-Stamford Awards Program**, *Stamford University Bangladesh*, Dhaka, Bangladesh.
- I have successfully completed one month teacher training program on effective teaching methodologies, classroom management, uses of different teaching aids, presentation skills, stress management etc.
- 11/2013 **Member of Jury Board**, *EATL-Prothom Alo Apps Contest 2014*, Dhaka, Bangladesh.
- Ethics Advanced Technology Ltd (EATL) Prthomo Alo App Contest organizes competitive event to develop high quality and innovative mobile applications through engagement of brightest talents from students, ICT professional, private companies and individuals in Bangladesh. I was the judge of concept presentation and evaluation session.

- 2012–2015 **Member of Chief Judge Panel, Software/Hardware Project Showcasing Event, IUT national ICT Fest, Islamic University of Technology (IUT), Dhaka, Bangladesh.**  
IUT national ICT Fest organized by IUT Computer Society (IUTCS) encourages knowledge exchange, research, development, ICT awareness, identify prospective fields and collaborations among the various parties involved for the overall development of the ICT sector. I was one of the chief judges to evaluate the usefulness, future prospective, technical feasibility, implementation techniques, cost effectiveness etc. of the ICT projects.
- 09/2016 **Judge of Final Selection Round, Huawei-Seeds for the Future 2016, Huawei Technologies Bangladesh Ltd, Dhaka, Bangladesh.**  
I was the judge in this talent development and idea generation programme, "Seeds for the Future" organized by Huawei, Bangladesh, a leading global ICT solution provider. The program seeks to develop local ICT talent, enhance knowledge transfer, and improve young generation's understanding of ICT and interest in the telecommunications industry. The theme of the event was. "Enriching the daily life of Bangladeshi people through ICT innovations". The final selected teams got the chance to visit Huawei Head Quarters at China and got training on Next Generation IT solutions by Huawei.
- 11/2016 **Member of Chief Judge Panel, IT Business Idea Challenge event, IUT national ICT Fest, Islamic University of Technology (IUT), Dhaka, Bangladesh.**  
The judgment criteria of the IT business idea challenge were, problem formulation, solution approach, financial and technical feasibility study, business models, sustainability plan etc.
- 10/2017 **Member of Chief Judge Panel, Hackathon event, IUT national ICT Fest, Islamic University of Technology (IUT), Dhaka, Bangladesh.**  
The Hackathon was a day long event where the participants were tasked to design and develop an Android, iOS, Web based solution from any of the four different topics (agriculture, health, education, and travel). They were groomed to prepare different low/high fidelity prototypes. At last they are asked to present their solutions in front of Chief judge panel.

## Publications

### Book Chapters:

- [B.1] S.M. Shahnewaz, Md. Asikur Rahman, Hasan Mahmud, "A Self Acting Initial Seed Selection Algorithm for K-means Clustering Based on Convex-Hull". In: Abd Manaf A., Zeki A., Zamani M., Chuprat S., El-Qawasmeh E. (eds) Informatics Engineering and Information Science. ICIEIS 2011. Communications in Computer and Information Science, vol 252. Springer, Berlin, Heidelberg.

### Referred Journal Articles:

- [J.18] Mohsinul Kabir, Quazi Fahim Faisal Dhruva, Hasan Mahmud, Md. Kamrul Hasan and Ahsan Rejwan Zaman (2020) Gaming Insight: Conversion of Popular Sedentary Games into Motion-Based Form, International Journal of Human–Computer Interaction, 36:13, 1205-1215, DOI: 10.1080/10447318.2020.1726597 [SCI/SCIE/SSCI Web of Science Indexed]
- [J.17] Ahmed Al Marouf, Md. Kamrul Hasan and Hasan Mahmud, "Comparative Analysis of Feature Selection Algorithms for Computational Personality Prediction From Social Media," in IEEE Transactions on Computational Social Systems, vol. 7, no. 3, pp. 587-599, June 2020. [Web of Science Indexed]

- [J.16] Hasan Mahmud, Md. Kamrul Hasan, Abdullah-Al-Tariq, Md. Hasanul Kabir, and M. A. Mottalib, "Recognition of Symbolic Gestures Using Depth Information," *Advances in Human-Computer Interaction*, vol. 2018, Article ID 1069823, 13 pages, 2018. <https://doi.org/10.1155/2018/1069823>. [ESCI/ISI Web of Science Indexed]
- [J.15] Md. Mamunur Rashid, Kazi Wasif Ahmed, Hasan Mahmud, Md. Kamrul Hasan, Husne Ara Rubaiyeat, "Cohesion Based Personalized Community Recommendation System", *International Journal of Advanced Computer Science and Applications (IJACSA)*, Volume 7, Issue 8, pp. 320-326, August, 2016. [ESCI/ISI Web of Science Indexed]
- [J.14] Aboubakar Mountapmbeme, Hasan Mahmud and Md. Kamrul Hasan, "Hand Gesture Recognition using Depth Information and DTW," *Journal of Engineering and Technology (JET)*, vol. 12, no. 2, pp. 1-8, December 2015.
- [J.13] Md. Nafiz Hamid, Md. Abu Naser, Md. Kamrul Hasan, Hasan Mahmud, "A cohesion-based friend-recommendation system," *Social Network Analysis and Mining (SNAM)*, vol. 4, no. 1, pp. 1-11, December 2014. [ESCI/ISI Web of Science Indexed]
- [J.12] Mefta Sadat, Rasam Bin Hossain, Hasan Mahmud, "Recognizing Human Affection: Smartphone Perspective," *Global Journal of Computer Science and Technology (GJCST)*, vol. 14, no. 6, pp. 9-15, 2014.
- [J.11] A.F.M. Nazmul Haque Nahin, Jawad Mohammad Alam, Hasan Mahmud, Md. Kamrul Hasan, "Identifying emotion by keystroke dynamics and," *Journal of Behaviour and Information Technology (BIT)*, vol. 33, no. 9, p. 987-996, July 2014. [SCIE/ISI Web of Science indexed]
- [J.10] Fayaz Shahdib, Md. Wali Ullah Bhuiyan, Md. Kamrul Hasan, Hasan Mahmud, "Obstacle Detection and Object Size Measurement for Autonomous Mobile Robot using Sensor," *International Journal of Computer Applications*, vol. 66, no. 9, p. 0975-8887, 2013.
- [J.9] Moumie Soulemane, Mohammad Rafiuzzaman, Hasan Mahmud, "Crawling the Hidden Web: An Approach to," *International Journal of Computer Applications*, vol. 55, no. 1, pp. 7-15, October 2012.
- [J.8] Md. Sami Uddin, Jahidul Islam Khan, Hasan Mahmud, "Designing and Implementing Tele-rehabilitation on Hand Skill Development for the Disabled People in Bangladesh," *International Journal of Software Engineering (IJSE)*, vol. 5, no. 2, pp. 37-49, 2012
- [J.7] Hasan Mahmud, Md. Obaidul Haque, Md. Kamrul Hasan, A.H.M. Aminul Ahsan and M. Mostafizur Rahman, "An Overview of KLAIM family as a model of computation," *Daffodil International University Journal of Science and Technology*, vol. 7, no. 2, pp. 42-50, 2012.
- [J.6] Hasan Mahmud, Moumie Soulemane and Mohammad Rafiuzzaman, "A framework for dynamic indexing from hidden web," *International Journal of Computer Science Issues*, vol. 8, no. 5, pp. 249-258, 2011.

- [J.5] S. M. Didar-Al-Alam, Hasan Mahmud and Md. Abdul Mottalib, "Modifications in Proximity Based Access Control for Multiple User Support," *International Journal of Engineering Science and Technology*, vol. 2, no. 8, pp. 3603-3613, 2010.
- [J.4] Hasan Mahmud, S. M. Didar-Al-Alam, Md. Sarwar Morshed, Md. Obaidul Haque and Md. Kamrul Hasan, "Designing access control model and enforcing security policies using PERMIS for a smart item e-health scenario," *International Journal of Engineering Science and Technology*, vol. 2, no. 8, pp. 3777-3787, 2010.
- [J.3] Md. Sarwar Morshed, Hasan Mahmud and S. M. Didar-Al-Alam, "Evaluation of nonlinearity effects on performance of DVB-H transmission link," *International Journal of Engineering Science and Technology*, vol. 2, no. 8, pp. 3854-3864, 2010.
- [J.2] Hasan Mahmud, Md. Arifur Rahman Molla, Md. Mahbubul Haque and Md. Kamrul Hasan, "Developing an Infrastructure of Seamless Town," *Asian Journal of Information Technology*, vol. 4, no. 2, pp. 172-177, 2005.
- [J.1] Md. Kamrul Hasan, Hasan Mahmud, Md. Arifur Rahman Molla, Md. Mahbubul Haque and A. Fatema, "Design and Development of Middle Layer for a Seamless Town," *Asian Journal of Information Technology*, vol. 4, no. 4, pp. 399-405, 2005.

#### **Referred Conference Papers:**

- [C.19] A. S. M. Towfique Hasan, Mubin Mohammad, Hasan Mahmud, and Md. Kamrul Hasan. 2020. Mutual Context-based Word Prediction for Internet Messenger Chat. In *Proceedings of the International Conference on Computing Advancements (ICCA 2020)*. Association for Computing Machinery, New York, NY, USA, Article 30, 1–6. DOI:<https://doi.org/10.1145/3377049.3377071>
- [C.18] A. B. M. Fahim Shahriar, Mahedee Zaman Moon, Hasan Mahmud, and Kamrul Hasan. 2020. Online Product Recommendation System by Using Eye Gaze Data. In *Proceedings of the International Conference on Computing Advancements (ICCA 2020)*. Association for Computing Machinery, New York, NY, USA, Article 61, 1–7. DOI:<https://doi.org/10.1145/3377049.3377108>
- [C.17] Masrur Sobhan, Mehrab Zaman Chowdhury, Imamul Ahsan, Hasan Mahmud, and Md. Kamrul Hasan. A Communication Aid System for Deaf and Mute using Vibrotactile and Visual Feedback. 2019 International Seminar on Application for Technology of Information and Communication (iSemantic) DOI: 10.1109/ISEMANTIC.2019.8884323
- [C.16] Ahmed Al Marouf, Md. Kamrul Hasan, Hasan Mahmud, "Identifying Neuroticism from User Generated Content of Social Media based on Psycholinguistic Cues", 2nd International Conference on Electrical, Computer and Communication Engineering (ECCE), Cox's Bazar, Bangladesh, 2019.
- [C.15] Ishrak Hayet, Tanveer Fahad Haq, Hasan Mahmud, Dr. Md. Kamrul Hasan, "Designing a Hierarchical Keyboard Layout for Brain Computer Interface Based Text Entry", 2nd International Conference on Electrical, Computer and Communication Engineering (ECCE), Cox's Bazar, Bangladesh, 2019.

- [C.14] Usama Islam, Hasan Mahmud, Faisal Ashraf, Iqbal Hasan Opu, "Yoga Posture Recognition By Detecting Human Joint Points In Real Time Using Microsoft Kinect", 5th IEEE Region 10 Humanitarian Technology Conference, Dhaka, December 2017.
- [C.13] Md. Ariful Islam Anik, Mehedi Hassan, Hasan Mahmud, Md. Kamrul Hasan, "Activity Recognition of a Badminton Game Through Accelerometer and Gyroscope", 19th International Conference on Computer and Information Technology (ICCIT), Dhaka, pp. 213-217, December 2016. DOI: 10.1109/ICCITECHN.2016.7860197
- [C.12] Md. Zubair Ibne Alam, Arnab Rahman Chowdhury, Mehedi Hassan, Hasan Mahmud, Md. Kamrul Hasan, "EXPRESit: Interactive messaging via gestures", 19th International Conference on Computer and Information Technology (ICCIT), Dhaka, pp. 196-200, December 2016. DOI: 10.1109/ICCITECHN.2016.7860194
- [C.11] Hasan Mahmud, Md. Kamrul Hasan, Abdullah-Al-Tariq, Md. Abdul Mottalib, "Hand Gesture Recognition Using SIFT Features on Depth Image", the Ninth International Conference on Advances in Computer-Human Interactions (ACHI), pp. 359-365, 24-28 April, Venice, Italy, 2016.
- [C.10] Shahed Anzarus Sabab, Sayed Rizban Hussain Digonto, Hasan Mahmud, Md. Hasanul Kabir, Md. Kamrul Hasan, "EYE POINTER: A Real Time Cost Effective Computer Controlling System Using Eye and Head Movement", the Ninth International Conference on Advances in Computer-Human Interactions (ACHI), pp. 153-159, 24-28 April, Venice, Italy, 2016.
- [C.9] Muhammad Muhaiminul Islam, Shamsul Arefin, Hasan Mahmud, Md. Kamrul Hasan, "Interactive Gesture Chair", the Ninth International Conference on Advances in Computer-Human Interactions (ACHI), pp. 17-20, 24-28 April, Venice, Italy, 2016.
- [C.8] Shah Md. Shihab Hasan, Mohshi Masnad, Md. Mohiuddin Khan, Hasan Mahmud, Md. Kamrul Hasan, "Human Activity Recognition using Smartphone Sensors with Context Filtering", the Ninth International Conference on Advances in Computer-Human Interactions (ACHI), pp. 67-73, 24-28 April, Venice, Italy, 2016.
- [C.7] Robiul Islam, Hasan Mahmud, Md. Kamrul Hasan, Husne Ara Rubaiyeat, "Alphabet Recognition in Air Writing Using Depth Information", the Ninth International Conference on Advances in Computer-Human Interactions (ACHI), pp. 299-301, 24-28 April, Venice, Italy, 2016.
- [C.6] Md. Amit Hasan Arovi, Md. Nafiz Hasan Khan, Hasan Mahmud, Md. Kamrul Hasan, Husne Ara Rubaiyeat, "Speech based text correction tool for the visual impaired", 18th International Conference on Computer and Information Technology (ICCIT), Page 150-155, December 21-23, 2015, Dhaka, Bangladesh.
- [C.5] Ahmed Iqbal Pritom, Hasan Mahmud, Sanjan Ahmed, Md. Kamrul Hasan, Md. Mohiuddin Khan, "TYPEHEX Keyboard: A virtual keyboard for faster typing in Smartphone", 18th International Conference on Computer and Information Technology (ICCIT), Page 522-526, December 21-23, 2015, Dhaka, Bangladesh.
- [C.4] Kazi Wasif Ahmed, Mamunur Rashid, Md. Kamrul Hasan, Hasan Mahmud, "Cohesion Based Personalized Community Recommendation System", 18th International Conference on Computer and Information Technology (ICCIT), Page 32-37, December 21-23, 2015, Dhaka, Bangladesh.

- [C.3] Mohammed Mehedi Hasan, Noor Hussain Shaon, Ahmed Al Marouf, Md. Kamrul Hasan, Hasan Mahmud, Md. Mohiuddin Khan, "Friend Recommendation Framework for Social Networking Sites using User's Online Behavior", 18th International Conference on Computer and Information Technology (ICCIT), Page 539-543, December 21-23, 2015, Dhaka, Bangladesh.
- [C.2] Ahmed Al Marouf, Shaumic Shondipon, Md. Kamrul Hasan, Hasan Mahmud, "4Y Model: A novel approach for Finger Identification using KINECT", IEEE 2nd International Conference on Recent Trends in Information Systems (ReTIS-15), pages 183-188, July 9-11, 2015, Kolkata, India. DOI: 10.1109/ReTIS.2015.7232875.
- [C.1] Rasam Bin Hossain, Mefta Sadat and Hasan Mahmud, "Recognition of human affection in Smartphone perspective based on accelerometer and user's sitting position," in 17th International Conference on Computer and Information Technology (ICCIT), 2014, Dhaka, 2014. [Best Paper Award]

**Workshop Papers:**

- [c.3] Md. Nafiz Hamid, Md. Abu Naser, Md. Kamrul Hasan, Hasan Mahmud. A Cohesion Based Frind Recommendation System. In the Proceedings of 2nd Workshop on Information and Communication Technology,4th October 2013, pp. 1-8, organized by IUT Computer Society, IUT.
- [c.2] S.M. Shahnewaz, Md. Kamrul Hasan, Hasan Mahmud. A Scenario Based API Recommendation System Using Syntax and Semantics of Client Source Code. In the Proceedings of 1st Workshop on Information and Communication Technology, 21-22 June 2012, pp. 17-30, organized by IUT Computer Society, IUT.
- [c.1] Fayaz Shahdib, Md. Wali Ullah Bhuiyan, Md. Kamrul Hasan, Hasan Mahmud. Obstacle Detection and Object Size Measurement for Autonomous Mobile Robot Using Sensor Fusion. In the Proceedings of 1st Workshop on Information and Communication Technology, 21-22 June 2012, pp. 9-16, organized by IUT Computer Society, IUT.

■■■■■ **Award and Achievements**

- 2007–2009 University Guild Grant Scholarship (Opera Scholarship) for two years Master's study in Computer Science at University of Trento, Italy
- 2009 Early degree scholarship for M.Sc. degree in Computer Science at University of Trento, Italy
- 2000-2004 OIC Scholarship in IUT for four academic years in Bachelor study
- 2001-2004 Dhaka Board Government Scholarship

■■■■■ **Press and Media Coverage**

The publication of [J.11] produced a wave in the technology community and a series of media news was published worldwide:

- o CNET, August 21, 2014, <http://www.cnet.com/news/your-keyboard-might-know-what-youre-feeling/>
- o The daily Prothom Alo, August 26, 2014, <http://www.prothom-alo.com/technology/article/301516>

- o Medical Daily, Dec 16, 2015,

<http://www.medicaldaily.com/you-mad-bro-computer-mouse-may-detect-emotional-state-movement-speed-3655086>

- o Mail online, October 15, 2014,

<http://www.dailymail.co.uk/sciencetech/article-2793797/you-type-computer-guesses-mood-based-typing-style-lead-smarter-ai.html>

## Scholarly Services

### List of Conferences, Short-term Course etc. organized/participated:

- o 18th International Conference on Computer and Information Technology (ICCIT) 2015, Dhaka. (Military Institute of Science and Technology (MIST))
- o 17th International Conference on Computer and Information Technology (ICCIT) 2014, Dhaka. (Daffodil International University)
- o Participated in the International workshop on "Cloud Computing and Big Data - A paradigm shift in ICT" at Islamic University of Technology (IUT), Dhaka, 1-5 December, 2014.
- o Participated in the International workshop on "Video Streaming and Medical informatics" at Islamic University of Technology (IUT), Dhaka, 22-24 February, 2010.
- o Workshop supervisor in the international workshop on, "Software testing and quality assurance: current trends with practical issues" at Islamic University of Technology (IUT), 3-6 December, 2011
- o Workshop supervisor in the international workshop on, "Next generation internet technologies and mobile applications" at Islamic University of Technology (IUT), 6-10 November, 2010

## Course Development

Developed two graduate level course for IUT, named "Advanced Human-Computer Interaction" and "Organizational Information System".

Developed one undergraduate Theory and Lab course for IUT, named, "Web Architecture".



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## Research Group

Co-Founder of the research group named, Systems and Software Lab (SSL) of IUT. The focus SSL is to have the experimental design, implementation, and evaluation of systems, software, and technologies that enable the development of a wide range of emerging applications. The group is interested in sensor data and signals that may help developing interactions with computers. Human-Computer Interaction, Artificial Intelligence, Machine Learning are the theoretical area which we blend. We have been working on inertia sensor-based activity recognition, eye tracking based mouse pointer, human intention and attention detection, hand and body gesture recognition, accelerometer-based chair gesture recognition, etc. We sometimes focus on applications to facilitate special users' groups, for example, speech-based text correction tool, mouse-based interaction for the missing forearm. URL: [http://www.iutoic-dhaka.edu/research\\_group](http://www.iutoic-dhaka.edu/research_group).

