Surjya Ghosh

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Research Interests Human-Computer Interaction, Affective Computing, Applied AI, System Development.

Work Experience

Assistant Professor Aug 2021 - to date.
- *BITS Pilani K K Birla Goa Campus*, Goa, India
- Dept: Computer Science & Information Systems

Postdoctoral Researcher Aug 2019 - Jul 2021
- *Centrum Wiskunde & Informatica*, Amsterdam, The Netherlands
- Group: Distributed & Interactive Systems

SAP CRM Consultant Jul 2014 - Jan 2015
- *Capgemini India*, Kolkata, India
- Led the SAP CRM Implementation of SAB Miller Account.

Senior Advisory Consultant Mar 2013 - Mar 2014
- *IBM India*, Kolkata, India
- Worked as a SAP CRM Functional Consultant for Welch Allyn project.

Assistant Consultant Oct 2003 - Mar 2013
- *TATA Consultancy Services Ltd.*, India
- Worked as a SAP CRM Functional Consultant for AGL Energy in Australia.
- Worked as a Business Analyst for CitiGroup, Eli Lilly and Company in USA.

Education

Doctor of Philosophy (Ph.D.) Jan 2015 - Jul 2019

Thesis submitted in Jul 2019, defended in Feb 2020.
- Indian Institute of Technology Kharagpur, WB, India.
- Computer Science & Engineering
- Advisors: Dr. Bivas Mitra & Prof. Niloy Ganguly
- Thesis: Developing Smartphone Keyboard Interaction-based Emotion Detection System

Master of Technology (M.Tech.) 2012 - 2014
- Indian Institute of Technology Kharagpur, WB, India.
- Information and Communication Technology
- CGPA: 9.53/10
- Thesis: Dynamic Community Detection In Evolutionary Network.

Bachelor of Technology (B.Tech.) 1999 - 2003
- Haldia Institute of Technology, Vidyasagar University, WB, India.
- Computer Science & Engineering
- Total Marks: 87.5%
- Thesis: Workflow Implementation in Library Management System.
- Ranked 2nd in the university.

Higher Secondary Examination (10 + 2) 1999
- West Bengal Council of Higher Secondary Education, India
- Total Marks: 88.9%

Secondary Examination (10) 1997
- West Bengal Board of Secondary Education, India
- Total Marks: 87.25%

Key Achievements

- Selected as young researcher for 8th Heidelberg Laureate Forum (HLF) 2021.
- Best poster award (3rd Place) at COMSNETS 2019.
- Best paper award at IEEE ISCC Workshops - ICTS4eHealth 2018.
- Received University Silver Medal for 2nd rank in B.Tech.(Computer Science & Engineering), Vidyasagar University, India.

Publications

DBLP author profile: https://dblp.org/pers/g/Ghosh:Surjya.html
Google Scholar profile: https://scholar.google.com/citations?user=jwQqy80AAAAJ
Total number of citations (as of 15^{th} Oct, 2021): 169, h-index: 9.

Articles in Books

[1] **Surjya Ghosh**, Johanna Lochner, Bivas Mitra, and Pradipta De, "Your Smartphone Knows You Better Than You May Think: Emotional Assessment 'On the Go' via TapSense", Edited book volume Quantifying Quality of Life: Incorporating Daily Life into Medicine, Katarzyna Wac and Sharon Wulfovich (eds.), Springer Nature Switzerland, June 2021. (Book Chapter, in press).

Articles in Peer-reviewed Journals

[2] **Surjya Ghosh**, Niloy Ganguly, Bivas Mitra, and Pradipta De, "Designing An Experience Sampling Method for Smartphone based Emotion Detection", IEEE Transactions on Affective Computing, 2019. DOI:10.1109/TAFFC.2019.2905561. **(Impact Factor: 10.506)**

[3] **Surjya Ghosh**, Kaustubh Hiware, Niloy Ganguly, Bivas Mitra, and Pradipta De, "Emotion Detection from Touch Interactions during Text Entry on Smartphones", International Journal of Human-Computer Studies, Elsevier, 2019. DOI:10.1016/j.ijhcs.2019.04.005. **(Impact Factor: 3.632)**

Articles in Peer-reviewed Conferences

[4] Tejal Karnavat, Jaskaran Bhatia, **Surjya Ghosh**, and Sougata Sen, "Exploring the challenges of using food journaling apps: A case-study with young adults", 18th EAI International Conference on Mobile and Ubiquitous Systems: Computing, Networking and Services (**MobiQuitous 2021**), Beppu, Japan, Nov 2021. **(Accepted)**

[5] **Surjya Ghosh**, and Tanaya Guha, "Towards Autism Screening through Emotion-guided Eye Gaze Response", 43rd International Conference on Engineering in Medicine and Biology (**IEEE EMBC 2021**), Virtual, 2021. **(Accepted)**

[6] **Surjya Ghosh**, Salma Mandi, Bivas Mitra, and Pradipta De, "Exploring Smartphone Keyboard Interactions for Experience Sampling Method driven Probe Generation", 26th International Conference on Intelligent User Interfaces (**ACM IUI 2021**), Texas, USA. pp. 144-149. DOI:10.1145/3397481.3450669.

[7] **Surjya Ghosh**, Bivas Mitra, and Pradipta De, "Towards Improving Emotion Self-report Collection using Self-reflection", ACM CHI Conference on Human Factors in Computing Systems (**ACM CHI EA 2020**), Honolulu, USA (Late-breaking Works). pp. 1 - 8. DOI:10.1145/3334480.3383019.

[8] Tong Xue, **Surjya Ghosh**, Gangyi Ding, Abdallah El Ali, and Pablo Cesar, "Designing Real-time, Continuous Emotion Annotation Techniques for 360° VR Videos", ACM CHI Conference on Human Factors in Computing Systems (**ACM CHI EA 2020**), Honolulu, USA (Late-breaking Works). pp. 1 - 9. DOI:10.1145/3334480.3382895.

[9] Soumyajit Chatterjee, Adrija Bhowmik, Arun Singh, **Surjya Ghosh**, Bivas Mitra, and Sandip Chakraborty, "Detecting Mobility Context over Smartphones using Typing and Smartphone Engagement Patterns", 18th IEEE International Conference on Pervasive Computing & Communications (**IEEE PerCom 2020**), Austin, USA. pp. 1 - 8. DOI:10.1109/PerCom45495.2020.9127359.

[10] **Surjya Ghosh**, Kaustubh Hiware, Niloy Ganguly, Bivas Mitra, and Pradipta De, "Does Emotion Influence the Use of Auto-suggest during Smartphone Typing?", 24th International Conference on Intelligent User Interfaces (**ACM IUI 2019**), Los Angeles, USA. pp. 144-149. DOI:10.1145/3301275.3302329.

[11] **Surjya Ghosh**, Shivam Goenka, Niloy Ganguly, Bivas Mitra, and Pradipta De, "Representation Learning for Emotion Recognition from Smartphone Keyboard Interactions", 8th International Conference on Affective Computing & Intelligent Interaction (**ACII 2019**), Cambridge, UK. pp. 704-710. DOI:10.1109/ACII.2019.8925518.

[12] **Surjya Ghosh**, Sumit Sahu, Niloy Ganguly, Bivas Mitra, and Pradipta De, "EmoKey: An Emotion-aware Smartphone Keyboard for Mental Health Monitoring", 11th International Conference on Communication Systems and Networks (**COMSNETS 2019**), Bangalore, India (Poster). pp. 496-499. DOI:10.1109/COMSNETS.2019.8711078. **(Best Paper Award - 3rd Place)**

[13] Suman Kalyan Maity, Ankan Mullick, **Surjya Ghosh**, Anil Kumar, Sunny Dhamnani, Sudhansu Bahety, and Animesh Mukherjee, "Understanding Psycholinguistic Behavior of Predominant Drunk Texters in Social Media", In IEEE ISCC Workshops - ICTS4eHealth (**IEEE ICTS4eHealth 2018**) Natal, Brazil. pp. 01096-01101. DOI:10.1109/ISCC.2018.8538637. **(Best Paper Award)**

[14] **Surjya Ghosh**, Niloy Ganguly, Bivas Mitra, and Pradipta De, "Effectiveness of Deep Neural Network Model in Typing-based Emotion Detection on Smartphones", 24th Annual International Conference on Mobile Computing and Networking (**ACM Mobicom 2018**), New Delhi, India (Poster). pp. 750-752. DOI:10.1145/3241539.3267761.

[15] Rohit Verma, **Surjya Ghosh**, Saketh Mahankali, Niloy Ganguly, Bivas Mitra, and Sandip Chakraborty, "ComfRide: A Smartphone based System for Comfortable Public Transport Recommendation", 12th ACM Conference on Recommender Systems (**ACM RecSys 2018**), Vancouver, Canada. pp. 181-189. DOI:10.1145/3240323.3240359.

[16] **Surjya Ghosh**, Niloy Ganguly, Bivas Mitra, and Pradipta De, "Evaluating Effectiveness of Smartphone Typing as an Indicator of User Emotion", 7th International Conference on Affective Computing and Intelligent Interaction (**ACII 2017**), San Antonio, Texas, USA. pp. 146-151. DOI:10.1109/ACII.2017.8273592.

[17] **Surjya Ghosh**, Niloy Ganguly, Bivas Mitra, and Pradipta De, "TapSense: Combining Self-Report Patterns and Typing Characteristics for Smartphone based Emotion Detection", 19th International Conference on Human-Computer Interaction with Mobile Devices and Services (**ACM MobileHCI 2017**), Vienna, Austria. pp. 1-12. DOI:10.1145/3098279.3098564.

[18] Rohit Verma, **Surjya Ghosh**, Niloy Ganguly, Bivas Mitra, and Sandip Chakraborty, "Smartphone based Spatio-temporal Sensing for Annotated Transit Map Generation", 25th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (**ACM SIGSPATIAL 2017**) California, USA. pp. 1-10. DOI:10.1145/3139958.3140005.

[19] **Surjya Ghosh**, Niloy Ganguly, Bivas Mitra, and Pradipta De, "Towards Designing an Intelligent Experience Sampling Method for Emotion Detection", 14th Annual IEEE Consumer Communications & Networking Conference (**IEEE CCNC 2017**), Las Vegas, USA. pp. 401-406. DOI:10.1109/CCNC.2017.7983143.

[20] **Surjya Ghosh**, "Emotion-aware Computing using Smartphone", 9th International Conference on COMmunication Systems & NETworkS (**COMSNETS 2017**), Bangalore, India (Graduate Forum). pp. 592-593. DOI:10.1109/COMSNETS.2017.7945464

[21] Rohit Verma, **Surjya Ghosh**, Aviral Shrivastava, Niloy Ganguly, Bivas Mitra, and Sandip Chakraborty, "Unsupervised Annotated City Traffic Map Generation", 24th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (**ACM SIGSPATIAL 2016**) California, USA. pp. 1-4. DOI:10.1145/2996913.2996942.

[22] **Surjya Ghosh**, Vatsalya Chauhan, Niloy Ganguly, Bivas Mitra, and Pradipta De, "Impact of Experience Sampling Methods on Tap Pattern based Emotion Recognition", 4th ACM Workshop on Mobile Systems for Computational Social Science - MCSS (**ACM UbiComp/ISWC.15 Adj**) Osaka, Japan. pp. 713-722. DOI:10.1145/2800835.2804396.

Industry Collaboration

- *Designing Multi-modal Affect Detection Methodology* Jul 2019 - Jul 2021
  – The goal of the project is to develop a multi-modal emotion inference technology for a leading automotive organization in Europe. I worked in this project as a postdoctoral researcher to design prototype, perform user studies, collect dataset, develop AI models, and validate the proposed solution using quantitative and qualitative approaches.

- *Behavior Modeling in Multi-sensor Environments* Aug 2018 - Jul 2019
  – The objective of this project was to leverage different sensor data from the environment for behavior modeling. This was a collaborative project with Indian tech giant TCS (TATA Consultancy Services Ltd.). My role in the project was to investigate the smartphone and wearable usage logs (app usage details, physiological signals) for mental state detection applying state-of-the-art ML models.

Projects

- *Improve User Experience through Emotion-aware Applications* Sep 2018 - to date
  – The broad objective of the project is to improve user experience by developing emotion-aware applications. For example, we have developed an emotion-aware music player, which can play songs conforming to user's mental state. In another application, I concentrated to optimize keyboard layout based on user emotion. As part of this, first, I investigated the correlation between auto-suggest usage and human emotion and made the auto-suggest usage adaptive. As a next step, we are investigating to optimize the layout (enabling dedicated segments, such as numbers, or emojis) further based on user emotion. I am involved in the project to design the layout, implement prototype, develop machine learning models, and perform evaluations.

- *Designing Continuous VR-based Self-report Annotation Method* Oct 2019 - Sep 2020
  – The goal of the project was to develop intelligent emotion self-report annotation method for 360° videos. As the users watch the videos, they continuously provide emotion self-report ratings (valence, arousal). However, the key challenge was to inform the users about their ratings by minimizing the workload and distraction. We solved this problem by designing various prototypes (based on color and position of the feedback mechanism), which ensure divided attention with minimum interruption in viewing experience. I was involved in designing and evaluating the prototypes.

- *Designing Intelligent Smartphone-based Interaction Method* Jul 2016 - Mar 2019
  – The aim of this project was to develop intelligent interaction methods while collecting ESM-based self-reports from the smartphone users so that the survey fatigue can be reduced and high quality self-reports can be collected at the opportune moments. I solved this problem by *developing intelligent machine learning models* and *novel user*

interfaces. I defined the research problems, designed and developed solutions, and performed the evaluations of the proposed approaches in the project.

- *Improve User Experience in Public Transport* Jan 2016 - Aug 2018
  – In this project, we aimed to improve the public transport experience of the commuters. The situation is more applicable to developing nations, which lack proper infrastructure and navigation systems. As a part of this project, we developed annotated maps, which provide information about congestion, road signature, and spatio-temporal traffic patterns. We also developed a smartphone based recommender application, which can recommend the most comfortable route to the passenger based on her preferred comfort criteria and given time constraints. In this project, I was involved to develop the prototype (on Android), collect and analyze user data (from smartphones) from real-world studies in different transport routes.

- *Smartphone-based Emotion Detection* Jan 2015 - Dec 2017
  – The broad objective of this project was to leverage different modalities (facial expression, app usage pattern, keyboard interaction logs, etc.) on smartphone for emotion detection. In specific, I looked at the keyboard interaction pattern for emotion recognition. My role in the project was to develop prototype (in Android), perform user studies, collect & analyze dataset, develop machine learning models, and perform quantitative and qualitative evaluation.

Teaching Experience

- Instructor, BITS Pilani, Goa, India
  – Pervasive Computing (Semester I, 2021-2022)

- Teaching Assistant, IIT Kharagpur, WB, India
  – Information Retrieval (Spring 2019)
  – Machine Learning (Spring 2018)
  – Social Computing (Autumn 2018)
  – Complex Networks (Spring 2017)
  – Smartphone Computing & Applications (Autumn 2017)
  – Operating Systems (Spring 2016)
  – Ubiquitous Computing (Autumn 2016, Autumn 2015)

Mentoring

- Salma Mandi, PhD student at IIT Kharagpur Jan 2020 - to date
  – One paper at IUI 2021, one paper under revision.
- Shivam Goenka, Dual degree student at IIT Kharagpur Jan 2019 - Jul 2020
  – One paper at ACII 2019, one paper under review.
- Kaustubh Hiware, Undergraduate student at IIT Kharagpur Aug 2017 - Apr 2018
  – One paper at IUI 2019, one paper in IJHCS 2019.
- Sumit Sahu, Master's student at IIT Kharagpur Aug 2016 - Apr 2017
  – One paper at COMSNETS 2019.
- Vatsalya Chauhan, Undergraduate student at IIT Kharagpur Aug 2015 - Apr 2016
  – One paper at UbiComp Adj. 2015.

Travel Grants and Awards

- Received Microsoft Research India Travel Grant for attending IUI 2019, MobileHCI 2017, UbiComp 2015.
- LRN India Travel Grant for attending IUI 2019.
- Received Student Travel Grant for attending IUI 2019, Mobicom 2018, and ACII 2017.

- Received COMSNETS Travel Grant for attending COMSNETS 2017, 2018, 2019.
- Ranked 10th in merit panel of Assistant Professor at WBCSC in July 2016.
- Qualified in UGC-NET Exam (Computer Science) for Assistant Professor in Jun 2014 among $\approx 50,000$ candidates (qualify rate $\approx 5\%$) across India.

Invited Talks

This list does not contain the conference talks.

- Leibniz AI Lab, Germany — Jun, 2021
  – Title: Developing Smartphone Keyboard Interaction based Emotion Detection System
- Dutch CHI 2020, Netherlands — Jun, 2020
  – Title: Towards Improving Emotion Self-report Collection using Self-reflection
- India HCI 2019, Hyderabad, India — Nov, 2019
  – Title: Does Emotion Influence the Use of Auto-suggest during Smartphone Typing?
- Cornell Tech, New York City, USA — Mar, 2019
  – Title: Smartphone-based emotion detection: Research Challenges, System Implementation, and Applications

Scientific Community Service

- Reviewer of ACM SIGCHI (2022, 2021, 2020), PACM IMWUT (2021, 2020), ACII 2021, ACM Automotive UI 2021, ACM MobileHCI 2020.
- Reviewer of IEEE Transactions on Multimedia (TMM) 2020, Elsevier Ad Hoc Networks 2021.
- PC member of IEEE AIVR 2020.
- Reviewer of COMSNETS (Graduate Forum, Posters) 2022, CODS-COMAD (Young Researcher Symposium) 2022.
- Reviewer of AffCon workshop, co-located with AAAI 2019.
- TPC member of ACM S^3 workshop, in conjunction with Mobicom 2018.
- Student Volunteer at ACM IUI 2019.