Surjya Ghosh

Centrum Wiskunde & Informatica (CWI) Amsterdam, The Netherlands
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Research Interests

Affective Computing, Human-Computer Interaction.

Work Experience

Postdoctoral Researcher Aug 2019 - to date.
- *Centrum Wiskunde & Informatica*, Amsterdam, The Netherlands
- Group: Distributed & Interactive Systems

Manager 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.

Key Achievements

- Selected for 8th Heidelberg Laureate Forum 2020.
- 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

Articles in Peer-reviewed Journals

[1] **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: 7.512)**

[2] **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: 3.163)**

[3] **Surjya Ghosh** et al., "Emotion Detection from Smartphone Keyboard Interactions: Role of Temporal vs Spectral Features", Proceedings of the ACM on Human-Computer Interaction (PACM HCI). **(Under revision)**.

Articles in Peer-reviewed Conferences

[4] **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 2020), Honolulu, USA (Late-breaking Works). pp. 1 - 8. DOI:10.1145/3334480.3383019.

[5] 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 2020), Honolulu, USA (Late-breaking Works). pp. 1 - 9. DOI:10.1145/3334480.3382895.

[6] 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 (PerCom 2020), Austin, USA. pp. 1 - 8. DOI:10.1109/PerCom45495.2020.9127359

[7] **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.

[8] **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.

[9] **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)**

[10] 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 (2018) Natal, Brazil. pp. 01096-01101. DOI:10.1109/ISCC.2018.8538637. **(Best Paper Award)**

[11] **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.

[12] 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.

[13] **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.

[14] **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.

[15] 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 GIS 2017) California, USA. pp. 1-10. DOI:10.1145/3139958.3140005.

[16] **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.

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

[18] 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 GIS 2016) California, USA. pp. 1-4. DOI:10.1145/2996913.2996942.

[19] **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 - to date
  – The goal of the project is to develop a multi-modal emotion inference technology for a leading automotive organization. I am working in this project as a HCI researcher to design prototype, perform user studies, collect dataset, validate the proposed solution using quantitative and qualitative approaches. I am unable to disclose further information at this stage due to NDA (Non-disclosure agreement).

- *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.

Projects

- *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.

- *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 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.

- *EmoKey: Smartphone Keyboard for Mental Health Monitoring* Jul 2017 - Dec 2018
  – In this project, the aim was to develop an emotion-aware keyboard for mental health monitoring. My contribution in the project was to design, develop, and implement an on-device Deep Neural Network model for emotion inference with low resource consumption. The system also included a feature to track the user emotion based on the keyboard interactions and notify the stakeholder for tracking the mental state.

- *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.

Teaching Experience

- 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 under revision, one paper under preparation.
- 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.
- 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 $\approx 5\%$).

Invited Talks

This list does not contain the conference talks.

- 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 2021.
- PC member of IEEE AIVR 2020.
- Reviewer of ACM CHI Late-breaking Works 2020, ACM MobileHCI 2020.
- Reviewer of IEEE Transactions on Multimedia (TMM) 2020, PACM IMWUT 2020.
- 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.