Abhirup Ghosh

RESEARCH INTERESTS

Distributed machine learning, mobility data analysis, statistical privacy

POSTDOC EXPERIENCE

From Sep-2020	University of Cambridge	Early diagnosis of Alzheimer's Disease using sensing data from mobile phones under Prof. Cecilia Mascolo
Sep-19 – Sep-20	Imperial College London	Spatial data management under Dr. Thomas Heinis

EDUCATION

PhD (Sep 15 – Sep 19)	University of Edinburgh	Analysis and Privacy Preserving Algorithms for Spatio-temporal Sensing (Dr. Rik Sarkar)
M.Tech (2009 – 2011)	IIT, Bombay (9.49/10)	Thesis on Compiler optimization (Prof. D. M. Dhamdhere)
B.Tech (2005 – 2009)	Jadavpur University (9.4/10)	Thesis on Wireless networks (Prof. S. Chattopadhyay)

PUBLISHED PAPERS

- **A. Ghosh**, V. Puthusseryppady, D. Chan, C. Mascolo, M. Hornberger, Machine Learning Detects Altered Spatial Navigation Features in Outdoor Behaviour of Alzheimer's Disease Patients, Nature Scientific Report, 2022
- J. Ding*, **A. Ghosh***, R. Sarkar, Jie Gao, Publishing Asynchronous Event Times with Pufferfish Privacy, DCOSS 2022 [* Equal contribution]
- H. Wang**, A. Ghosh**, R. Sarkar, J. Gao, J. Ding, Heterogeneous interventions reduce the spread of COVID-19 in simulations on real mobility data, Nature Scientific Report, 2021
- **A. Ghosh**, J. Ding, R. Sarkar, J. Gao, Differentially Private Range Counting in Planar Graphs for Spatial Sensing, INFOCOM 2020
- **A. Ghosh**, B. Rozemberczki, S. Ramamoorthy, R. Sarkar, Topological Signatures for Fast Mobility Analysis, SIGSPATIAL 2018
- **A. Ghosh**, C. Lucas, R. Sarkar, Finding Periodic Discrete Events in Noisy Streams, CIKM, 2017
- **A. Ghosh**, T. Xia, Mobility-based Individual POI Recommendation to Control the COVID-19 Spread, workshop on Big Data Analytics for COVID-19 at IEEE BigData, 2021
- G. Evagorou, **A. Ghosh**, T. Heinis, HYPO: Skew-Resilient Partitioning for Trajectory Datasets, workshop at SIGSPATIAL 2021

PAPERS UNDER REVIEW

- A. Ghosh, C. Mascolo, Data-driven Model Aggregation for Faster Convergence in Gossip Learning for Heterogeneous Data
- G. Yang, A. Ghosh, T. Heinis, Approximate Efficient Spatiotemporal Range Queries on Moving Objects
- L. Watson, A. Ghosh, B. Rozemberczki, R. Sarkar, Continual and Sliding Window Release for Private Empirical Risk Minimization
- A. Hasthanasombat, A. Ghosh, C. Mascolo, Less Data Can Be Better for Domain Generalization

PATENTS

- **A. Ghosh**, P. Joshi, S. Shivarudrappa, Automatic Seamless Context Share in Multi-comm Scenario, US Patent Number: 8,880,051, Patent issued in 2014
- **A. Ghosh**, K. Dey Biswas, P. Joshi, Seamless Connectivity Across Devices with Heterogeneous Transports, US patent Application, PCT Number: PCT/US2013/048715, Filed in 2013, Grant pending.

INDUSTRY EXPERIENCE

Senior Software Development Engineer | Intel, India (Aug 2011 – Aug 2015)

- Delivered Bluetooth protocol stack for Intel Android tablet platforms
- Led Intel's first Bluetooth Low Energy protocol stack from ideation to productization
- Represented Intel in Bluetooth SIG to develop new protocols and to test interoperability across industries

TECHNOLOGY STANDARDIZATION

- Represented Intel in Bluetooth SIG (2014) to standardize Bluetooth Low Energy Object Transfer Service Specification (OTS) and its Test Specification (OTS-TS)
- First to demonstrate the feasibility of Object Transfer Service in Bluetooth SIG using commodity Android devices

SHORT RESEARCH CONSULTANCY PROJECTS

- Measuring public transport efficiency in Edinburgh (‘19) and Evaluating spread of COVID-19 in Edinburgh (‘20)
- Both projects were interdisciplinary and sponsored by Data Driven Innovation, Edinburgh

SCHOLARSHIPS AND GRANTS

- Contributed to writing a small research grant to Data Driven Innovation lab, Edinburgh on Evaluating the Spread of Covid-19 and Economic Reopening in Edinburgh (’20)
- Received Principal’s Career Development Scholarship and The Global Research Scholarship (£31.5k/year for 3 years) in Sep ’15 – only student to get both in that year from School of Informatics
- Student travel grants from SIGIR ($700) (’17) and ACM ($500) (’18) (one of four international students)
- Received student travel grant (£800) from the School of Informatics, UoE twice

TEACHING AND PROJECT SUPERVISION

- Project supervisions:
  - Part III thesis (UoC): Implementing an on-Device Gossip Learning Framework (’21-’22)
  - Part II thesis (UoC): Implementation of Differentially private graph publication methods (’21-’22)
  - Masters’ thesis (ICL): Efficient Sub-trajectory Query (’20)
- Teaching assistantship:
  - Mobile and sensors systems, UoC (’21)
  - Social and Technological Network, UoE (’16, ’17, ’18) – designed research-oriented course projects
  - Algorithmic Foundations of Data Science, UoE (’18) – designed course projects; Data science, UoC (’21)
  - Distributed Systems, UoE (’16, ’17), and ICL (’20)
  - Courses on developing Android apps in UoE (CSLP ’17, ’18 and inf-2c ’17)
  - Advanced compilers, Computer Architecture in IIT Bombay

ACADEMIC SERVICES

- PI for Alan Turing Institute data study group (Sep-21): Using machine learning to improve sleep habits in Dementia patients
- Interviewed candidates for admission to Jesus College, University of Cambridge (’21)
- Co-organized the first workshop: “GeoMobility: Geometry and Mobility Mining Workshop” as part of SOCG-21
- Arranged group seminars for LFCS (’16 – ’17) and Netsys (’17 – ’19) at UoE
- Reviewed papers for Journals (ACM TOSN, IJCGA, TKDE, ACM health), and conferences (CIKM, WoWMoM, COMSNETS, IEEE MASS)

RESEARCH PRESENTATIONS

- On Gossip Learning - Samsung AI center, Cambridge - 2022
- On mobility analysis for Covid-19 - MobiUK - 2021
- Differential privacy in spatial data – Coseners ’20 organized by Next Generation Networking group, UK
- Trajectory Analysis – ACM SigSpatial ’18, Scottish Networking Evt ’18, Univ. of Bonn ’19, IIT Kharagpur ’19
- Large Scale Data Mining – Flipkart Pvt. Ltd., India, (’18), Simula Research Laboratory, Norway (’19)
- Periodicity analysis – CIKM ’17, SCONE in Univ. of Glasgow (’17)

OTHER ACHIEVEMENTS

- Received Intel India divisional quarterly recognition award for conceptualizing Intel’s first smart watch (’14)
- Contributed BLE 4.1 features from Intel to Android open source
- Scored 10/10 in master’s research thesis; awarded best student project for undergraduate research thesis
- Ranked 9th out of four hundred thousand students in the state in Higher Secondary (10+2) examination, 2005