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Research Interests

- **Urban Intelligence:** Data-driven understanding and modeling of cities, human mobility, and activities in urban environments.
- **Networked Mobility:** Reliable cellular and multipath communication for connected and teleoperated vehicles.
- **Machine Learning:** Learning from large-scale mobility, search, visual, geographic, and network measurements.
- **Spatial Computing:** Geographic information systems, urban computing, context-aware computing, and computer vision.

Publications

International Journals (refereed)

[1] **Soto Anno**, Kota Tsubouchi, and Masamichi Shimosaka, "Early crowd forecasting away from stations by geographically complemented regression using transit search and mobility logs," *Journal of Big Data*, 2025. DOI: 10.1186/s40537-025-01214-6.

[2] **Soto Anno**, Kota Tsubouchi, and Masamichi Shimosaka, "Forecasting lifespan of crowded events with acoustic synthesis-inspired segmental long short-term memory," *IEEE Access*, vol. 12, pp. 87 309–87 322, 2024. DOI: 10.1109/ACCESS.2024.3417509.

[3] **Soto Anno**, Kota Tsubouchi, and Masamichi Shimosaka, "CityOutlook+: Early crowd dynamics forecast through unbiased regression with importance-based synthetic oversampling," *IEEE Pervasive Computing*, vol. 22, no. 4, pp. 26–34, 2023. DOI: 10.1109/MPRV.2023.3312652.

International Conferences (refereed)

[1] **Soto Anno**, Takuma Tsubaki, Takashi Torii, Akito Suzuki, and Takuya Tojo, "Mobility-aware offline reinforcement learning for optimizing ABR in teleoperated driving," in *2026 IEEE 103rd Vehicular Technology Conference (VTC2026-Spring)*, To appear, Nice, France, Jun. 2026.

[2] Jin Nakazato, Mikio Hasegawa**, Soto Anno**, Taichi Kawano, and Takuya Tojo, "Map-aware V2I handover evaluation using an ns-3 and Sionna RT integrated urban digital twin," in *2026 IEEE 104th Vehicular Technology Conference (VTC2026-Fall), 2nd Workshop on Shaping Future Connectivity: Emerging and Intelligent Technologies for Sustainable Vehicular Networks*, To appear, Boston, MA, USA, Sep. 2026.

[3] Takashi Torii†**, Soto Anno**†, Masaki Okada, Takuma Tsubaki, Nobuhiro Azuma, and Takuya Tojo, "CloudEmu: A trace-driven cloud-native emulation testbed for vehicle video uplink over cellular networks," in *2026 12th IEEE International Conference on Network Softwarization (NetSoft 2026), Demo Track*, arXiv: https://arxiv.org/abs/2605.09910v1., Berlin, Germany, Jun. 2026, pp. 336–338. DOI: 10.1109/NetSoft70012.2026.11603461.

† Equal contribution.

[4] Takuma Tsubaki**, Soto Anno**, Seiya Komatsu, Takashi Torii, and Takuya Tojo, "Scheduler-agnostic adaptive-FEC for MPQUIC: Field evaluation over commercial cellular paths," in *2026 IEEE 104th Vehicular Technology Conference (VTC2026-Fall)*, To appear, Boston, MA, USA, Sep. 2026.

[5] Takuma Tsubaki, Seiya Komatsu, Takashi Torii**, Soto Anno**, and Takuya Tojo, "Efficient and reliable adaptive packet replication for vehicular MPQUIC," in *2026 IEEE 103rd Vehicular Technology Conference (VTC2026-Spring), Workshop on Mission Critical and Emergency Communications*, To appear, Nice, France, Jun. 2026.

[6] Yuki Kubota†, Kota Tsubouchi†**, Soto Anno**, Kaito Ide, and Masamichi Shimosaka, "Omni-CityMood: Vision-based urban atmosphere perception from every angle," in *Proceedings of the 33rd ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, Minneapolis, MN, USA, Nov. 2025, pp. 186–196. DOI: 10.1145/3748636.3762722.

† Equal contribution.

[7] **Soto Anno**, Dario Tenore, Kota Tsubouchi, and Masamichi Shimosaka, "Are crowded events forecastable from promotional announcements with large language models?" In *Proceedings of the 32nd ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, Atlanta, GA, USA, 2024, pp. 529–532. DOI: 10.1145/3678717.3691240.

[8] **Soto Anno**, Kota Tsubouchi, and Masamichi Shimosaka, "Congestion forecast for trains with railroad-graph-based semi-supervised learning using sparse passenger reports," in *Proceedings of the 32nd ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, arXiv: https://arxiv.org/abs/2410.17510, Atlanta, GA, USA, 2024, pp. 525–528. DOI: 10.1145/3678717.3691239.

[9] Kaoru Miyanaga**, Soto Anno**, Kota Tsubouchi, and Masamichi Shimosaka, "Revealing universities' atmosphere from visitor interests using search queries and GPS logs," in *2024 IEEE International Conference on Big Data (BigData)*, Washington, D.C., USA, 2024, pp. 8777–8777. DOI: 10.1109/BigData62323.2024.10825024.

[10] Yuki Kubota**, Soto Anno**, Tomomi Taniguchi, Kosei Miyazaki, Akira Tsujimoto, Hiraki Yasuda, Takayuki Sakamoto, Takaaki Ishikawa, Kota Tsubouchi, and Masamichi Shimosaka, "CityScouter: Exploring the atmosphere of urban landscapes and visitor demands with multimodal data," in *Adjunct Proceedings of the 2023 ACM International Joint Conference on Pervasive and Ubiquitous Computing and the 2023 ACM International Symposium on Wearable Computing*, New York, NY, USA: Association for Computing Machinery, 2023, pp. 157–161. DOI: 10.1145/3594739.3610711.

[11] **Soto Anno**, Kota Tsubouchi, and Masamichi Shimosaka, "CityOutlook: Early crowd dynamics forecast towards irregular events detection with synthetically unbiased regression," in *Proceedings of the 29th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, Seattle, WA, USA, 2021, pp. 207–210. DOI: 10.1145/3474717.3483945.

[12] **Soto Anno**, Kota Tsubouchi, and Masamichi Shimosaka, "Supervised-CityProphet: Towards accurate anomalous crowd prediction," in *Proceedings of the 28th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, Seattle, WA, USA, 2020, pp. 175–178. DOI: 10.1145/3397536.3422219.

[13] **Soto Anno** and Yuichi Sasaki, "GAN-based abnormal detection by recognizing ungeneratable patterns," in *Proceedings of the 5th Asian Conference on Pattern Recognition (ACPR 2019)*, Auckland, New Zealand, 2019, pp. 401–411. DOI: 10.1007/978-3-030-41299-9_31.

Domestic Conferences

[1] Jin Nakazato, Mikio Hasegawa**, Soto Anno**, Taichi Kawano, and Takuya Tojo, "Design of an end-to-end evaluation simulator for digital twin toward 6G mobility network," in 電子情報通信学会スマート無線研究会（*SR*）, *SmartCom2026*, Singapore, Oct. 2026. [Online]. Available: https://ken.ieice.org/ken/paper/20261020scYv/.

[2] 中里仁, 長谷川幹雄**, 安納爽響**, 河野太一, and 東條琢也, "ns-3 と Sionna RT を統合した都市デジタルツイン向け評価基盤の構築," in 電子情報通信学会ネットワークシステム研究会（*NS*）, Oct. 2026. [Online]. Available: https://ken.ieice.org/ken/paper/20261009NcYg/.

[3] **安納爽響**, 鍔木拓磨, 河野太一, and 東條琢也, "エリア適応型 Transformer を用いたデータ未収集地域におけるモバイル網通信品質予測の検討," in 情報処理学会研究報告第 *89* 回 *UBI* 研究発表会, 広島県, Mar. 2026. [Online]. Available: https://ipsj.ixsq.nii.ac.jp/records/2007337.

[4] 鍔木拓磨, 小松聖矢, 鳥井隆史**, 安納爽響**, and 東條琢也, "ミッションクリティカルなサービスのための現在の遅延と将来の遅延悪化リスクに基づく MPQUIC パケットスケジューラの提案," in 電子情報通信学会ネットワークシステム研究会（*NS*）, Jun. 2026. [Online]. Available: https://ken.ieice.org/ken/paper/20251218CcPl/.

[5] 鍔木拓磨, 小松聖矢, 鳥井隆史**, 安納爽響**, and 東條琢也, "自動運転遠隔監視に向けた動的 multipath QUIC-FEC のフィールド評価," in 電子情報通信学会 *2026* 年総合大会, Mar. 2026. [Online]. Available: https://www.ieice.org/publications/conferences/summary.php?id=CONF0000152625.

[6] **安納爽響**, 鍔木拓磨, 鳥井隆史, and 東條琢也, "自動運転遠隔監視における映像高品質化・配信安定化のための強化学習を活用した映像制御最適化の検討," in 電子情報通信学会ネットワークシステム研究会（*NS*）, Oct. 2025. [Online]. Available: https://ken.ieice.org/ken/paper/20251009xcNu/.

[7] 早川季寿, 井手海翔**, 安納爽響**, 坪内孝太, and 下坂正倫, "夜間景観画像の雰囲気評価定量予測," in 情報処理学会研究報告第 *86* 回 *UBI* 研究発表会, 東京都小金井市, 2025.

[8] 鍔木拓磨, 小松聖矢, 鳥井隆史**, 安納爽響**, and 東條琢也, "次世代 ITS 通信における動的パケットレプリケーション方式の提案と性能評価," in 電子情報通信学会ネットワークシステム研究会（*NS*）, Dec. 2025. [Online]. Available: https://ken.ieice.org/ken/paper/20251218CcPl/.

[9] 井手海翔**, 安納爽響**, 坪内孝太, and 下坂正倫, "LLM によるシーン中の物体の形容記述を用いた景観画像の印象予測," in 情報処理学会研究報告第 *84* 回 *UBI* 研究発表会, 兵庫県淡路市, 2024. [Online]. Available: https://ipsj.ixsq.nii.ac.jp/records/240583.

[10] **安納爽響**, 坪内孝太, and 下坂正倫, "イベント告知情報と大規模言語モデルに基づくイベント会場周辺の早期群衆混雑予報," in 情報処理学会研究報告第 *82* 回 *UBI* 研究発表会, 鹿児島県, 2024. [Online]. Available: http://id.nii.ac.jp/1001/00233751/.

[11] 宮永薫**,** **安納爽響**, 坪内孝太, and 下坂正倫, "トピックモデルと大規模位置履歴を用いた地域ごとの興味関心分布の分析," in 情報処理学会研究報告第 *81* 回 *UBI* 研究発表会, 福岡県, 2024. [Online]. Available: http://id.nii.ac.jp/1001/00232521/.

[12] 久保田祐輝**,** **安納爽響**, 坪内孝太, and 下坂正倫, "景観画像と地理的特性を考慮した都市における雰囲気の定量化," in 情報処理学会研究報告第 *78* 回 *UBI* 研究発表会, 東京都, 2023. [Online]. Available: http://www.miubiq.cs.titech.ac.jp/ja/ud-geospatial-scouter-ja/.

[13] **安納爽響**, 坪内孝太, and 下坂正倫, "敵対的生成モデルに基づく活動人口の波形描画を用いた混雑寿命予報," in 情報処理学会研究報告第 *80* 回 *UBI* 研究発表会, 兵庫県, 2023. [Online]. Available: http://id.nii.ac.jp/1001/00229275/.

[14] **安納爽響**, 坪内孝太, and 下坂正倫, "混雑の生起・継続・終了を考慮した状態認識型 RNN に基づく早期群衆混雑予報," in 情報処理学会研究報告第 *78* 回 *UBI* 研究発表会, 東京都, 2023. [Online]. Available: http://www.miubiq.c.titech.ac.jp/lab_bib/pdfs/camerarady/icsAll202304-202312/anno2023Ipsjubi.pdf.

[15] 久保田祐輝**,** **安納爽響**, 谷口智美, 坂本隆之, 辻本顕, 安田啓紀, 宮崎光世, 石川貴明, 坪内孝太, and 下坂正倫, "地域特性理解促進のための画像・検索クエリ・GIS データに基づくデジタルマップアプリケーション," in 情報処理学会研究報告第 *73* 回 *UBI* 研究発表会, Mar. 2022. [Online]. Available: http://id.nii.ac.jp/1001/00216583/.

[16] Jinyuan Li**,** **Soto Anno**, Takayuki Sakamoto, Hiraki Yasuda, Akira Tsujimoto, Kota Tsubouchi, and Masamichi Shimosaka, "Capturing spatial distribution of people interests with web queries and location data: A large scale empirical study of metropolises in japan," in 情報処理学会研究報告第 *71* 回 *UBI* 研究発表会, Sep. 2021. [Online]. Available: http://id.nii.ac.jp/1001/00212409/.

[17] **安納爽響**, 坪内孝太, and 下坂正倫, "Gps 位置履歴情報と鉄道の乗換検索履歴を用いた異常混雑事前予測," in 情報処理学会研究報告第 *66* 回 *UBI* 研究発表会, May 2020. [Online]. Available: http://id.nii.ac.jp/1001/00204522/.

[18] **安納爽響**, 坪内孝太, and 下坂正倫, "地域の幾何的関係を考慮したマルチタスク回帰に基づく高性能な都市動態予報," in 情報処理学会研究報告第 *68* 回 *UBI* 研究発表会, Dec. 2020. [Online]. Available: http://id.nii.ac.jp/1001/00208550/.

Awards

- Best Paper Award at IPSJ-SIGUBI 89th Workshop *Apr. 2026*
- Best Paper Award at IPSJ-SIGUBI 84th Workshop *Dec. 2024*
- Excellent Student Paper Award at the 61st Railway Cybernetics Symposium *Nov. 2024*
- IPSJ Yamashita SIG Research Award 2024 *Jul. 2024*
- Student Paper Award at IPSJ-SIGUBI 82nd Workshop *May 2024*
- Best Paper Award at IPSJ-SIGUBI 80th Workshop *Nov. 2023*
- Best Paper Award at IPSJ-SIGUBI 78th Workshop *Jun. 2023*
- Student Paper Award at IPSJ-SIGUBI 78th Workshop *Jun. 2023*
- Best Presentation Award at TAC-MI International Forum *Dec. 2022*
- Student Paper Award at IPSJ-SIGUBI 66th Workshop *Jun. 2020*

Education

Doctor of Engineering **Apr. 2022 – Mar. 2025**

Tokyo Institute of Technology, Graduate School of Computing, Japan

- Research field: Urban Dynamics Analysis, Urban Computing, Big Data Analysis
- Adviser: Prof. Masamichi Shimosaka

Master of Engineering **Apr. 2020 – Mar. 2022**

Tokyo Institute of Technology, Graduate School of Computing, Japan

- Research field: Urban Dynamics Analysis, Urban Computing, Big Data Analysis
- Adviser: Prof. Masamichi Shimosaka

Bachelor of Engineering **Apr. 2017 – Mar. 2020**

Tokyo Institute of Technology, Undergraduate School of Computing, Japan *(1-year earlier graduation)*

- Bachelor thesis field: Urban Dynamics Analysis, Big Data Analysis
- Adviser: Prof. Masamichi Shimosaka

High School **Apr. 2014 – Mar. 2017**
Utsunomiya High School, Tochigi, Japan

Experience

Researcher **Apr. 2025 – Present**
NTT R&D
Research Fellow (DC1) **Apr. 2022 – Mar. 2025**
Japan Society for the Promotion of Science (JSPS)
Research Internship **Sep. 2020 – Mar. 2024**
Yahoo! JAPAN Research
AI Engineering Internship **Apr. 2019 – Mar. 2022**
Neural Pocket Inc.
AI Engineering Internship **Aug. 2018 – Mar. 2022**
AIQ Co., LTD.

Academic Service

- IPSJ UBI (2025-) *Steering*
- ACM Multimedia 2026; ACM ICMR 2026 *TPC*
- International Journal of Data Science and Analytics, Springer Nature (2026); ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT) (2026); IEEE Transactions on Knowledge and Data Engineering (TKDE) (2025); IPSJ Journal of Information Processing; ACM Multimedia Asia 2026; ACM Multimedia 2025; ACM SIGSPATIAL 2022 *Reviewing*

Last updated: October 9, 2026. Generated from the same structured data and BibTeX source as the website.