Kshitij Srivastava

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Summary

Data Engineer and PhD student in Electronics & Communication with experience in designing and managing data pipelines and real-time data integration for public transit systems. Strong expertise in data cleaning, standardization, and system optimization, with a focus on GTFS, Python, SQL, and cloud-based infrastructures. Interested in developing scalable solutions to enhance public transit operations and exploring evaluation methods for the impact of policies on urban transit networks.

Education

Indraprastha Institute of Information Technology, Delhi **Aug 2024 – Present**
Doctor of Philosophy, Electronics & Communication ***(ongoing)***

Coursework: Probability and Random Processes

Indraprastha Institute of Information Technology, Delhi **Aug 2018 – July 2020**
Master of Technology, Computer Science *CGPA: 8.33/ 10*

Coursework: Data Mining, Artificial Intelligence, Speech Processing

APJ Abdul Kalam Technical University, Lucknow **Aug 2013 – July 2017**
Bachelors of Technology, Computer Science *74.44%*

Technical Skills

Languages/Databases: Python, SQL, Shell Scripting, PostgreSQL, RethinkDB, Redis
Technologies: Pandas, Jupyter, Streamlit, Git, Numpy, Matplotlib, Plotly, Flask, Django, HTML, CSS, JavaScript
Tools & Frameworks: Docker, AWS, Kubernetes, Celery
English Proficiency: TOEFL Score 113/120 (Advanced Level)

Experience

Chartr **July 2022 – Present**
Founding Engineer, Consultant *Delhi*

- Spearhead the data cleaning, standardization, and integration efforts for the Open Transit Data Platform ensuring GTFS compliance.
- Architect and manage a highly scalable data pipeline that powers the public transit apps, for over 4 million daily commuters across 3 major Indian cities (Delhi, Pune, Kalaburagi).
- Collaborated with city transit authorities and technical teams to ensure seamless data integration and uptime, significantly enhancing the reliability and accuracy of transit information.

Centre for Sustainable Mobility, IIIT Delhi **Aug 2021 – Present**
Tech Lead - Data *Delhi*

- Oversee the data framework for Delhi's Open Transit Data Platform, standardizing, updating and integration with key stakeholders.
- Engineered an algorithm to identify the real-time route of buses using trajectory and timetable data. Successfully deployed for 7000+ buses in Delhi.
- Implemented the Open EV database for Delhi, offering public access to 2500+ EV charging locations across Delhi.
- Manage the data infrastructure for the One Delhi app for live location of buses and status of EV stations.

Mobility and Optimisation Lab, IIIT Delhi **Aug 2020 – Jul 2021**
Research Assistant *Delhi*

- Developed a tool for transit agencies to assess GPS data quality in real-time.
- Led the development and deployment of depot management portal for all 55+ depot across Delhi helping them digitize their operations.
- Integral member of the Open Transit Data Platform team, standardizing and cleaning data for 7000+ public transport buses.

Publications

Lessons in Building an Open Transit Data Platform for Delhi, India | *Publication link* **TRB, Jan 2022**

- Authored a comprehensive case study on developing India's first real-time Open Transit Data (OTD) platform for New Delhi buses.
- Analyzed the technical and administrative framework required to build an OTD platform, focusing on the unique challenges and opportunities in developing countries.
- Provided key insights into data collection processes, monitoring data quality, and deploying tools and dashboards to ensure seamless integration with mobile applications.
- Discussed the impact of OTD in enhancing public transit use, with real-time data being leveraged by hundreds of third-party applications to provide accurate transit information to millions of daily commuters.

Contactless E-ticketing in Public Transport Buses | *Publication link* **COMSNETS, May 2021**

- Collaborated on the development of a contactless e-ticketing system for public transport buses, enabling passengers to purchase tickets through a secure, touch-free process.
- The system, initially trialed in September 2019, has scaled significantly, selling over 100 million contactless e-tickets to date in Delhi.

Applications of Open Transit Data, Masters' Thesis (partly funded by PCRA) | *Publication link* **Jun 2020**

- Utilized spatio-temporal DBSCAN clustering to identify bus breakdowns. Estimated significant fuel wastage due to breakdown-caused congestion. Analyzed effects of Delhi's odd-even scheme on traffic speeds.
- Gathered actual breakdown records from one of the depots. Identified bus breakdowns using a spatio-temporal DBSCAN clustering on GPS data of buses.
- Using a fuel consumption model, estimated an annual fuel wastage of eight crores due to breakdown-induced congestion.
- Studied the effects of the odd-even scheme on traffic movement and congestion in Delhi using Open Transit Data.

Select Projects

Segmented Traffic Speed | *Python, Flask, SQL* **Ongoing**

- Developed and deployed a segmented traffic speed algorithm that estimates bus speeds using historical trip data and real-time vehicle information, achieving an ETA accuracy of $\pm$ 1 minute.
- The solution operates by dividing routes into road segments and using the latest speed data from vehicles traversing a segment to estimate speeds for upcoming vehicles.
- Currently live in Delhi and Pune, covering over 8.5k buses across both cities, with ongoing expansion.
- Integrated Flask API with SQL backend to handle real-time data ingestion and processing.

Public Information System | *Python, Flask, SQL, HTML/CSS Link* **Ongoing**

- Designed a real-time public information system displaying estimated arrival times for bus stops across a city.
- Developed a web-based application requiring minimal hardware to display real-time traffic and transit information for commuters.
- Currently deployed in three cities (Delhi, Pune, Kalaburagi), the system makes use of real-time bus movements to estimate ETA.

Effects of Odd-Even Policy on Traffic Speeds in Delhi | *Policy Evaluation, Open Transit Data Link* **Completed**

- Conducted a study on the impact of Delhi's Odd-Even road rationing policy (2019) on traffic conditions, leveraging open transit data to evaluate traffic speeds and patterns.
- Analyzed traffic data across various routes, revealing a consistent 15-20% reduction in travel times during the Odd-Even policy, demonstrating the policy's positive effects on reducing congestion.

Achievements & Extra curriculars

- Qualified for Stage 3 - Transport4All Challenge (ongoing) - Network Digitisation & Passenger Information System
- Member of Toastmasters International, currently serving as Vice President - Membership
- Member of IEEE and IEEE-ITSS
- Part of the team that won the *THE Awards Asia 2023 - Outstanding Contribution to Regional Development* award for the project Open Transit Data (OTD) at IIIT-Delhi (link)
- Student Mentor for 2019-20 - mentored a group of 10 Masters students
- Awarded the Dean's R&D award for engineering 2019-20

References

Dr. Pravesh Biyani — **Professor, IIIT Delhi**
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