Sai Kiran Mayakuntla

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Research Interests

- **Intelligent transportation systems**
  Data-driven modelling of transportation networks, Real-time traffic estimation and prediction, Dynamic ridesharing.

- **Traffic flow modelling and simulation**
  Traffic simulation (macroscopic & microscopic), Dynamic traffic assignment, Cell transmission modelling

Education

- **Doctor of philosophy + Master of Technology (Research)**   Indian Institute of Science, India
  Department of Civil Engineering; CGPA: (6.4/8.0)   *Aug 2013 – July 2019*
  Thesis title: Macroscopic modelling of heterogeneous, disordered road traffic flow

- **Bachelor of Technology in Civil Engineering**   JNTUA, India
  Department of Civil Engineering; Overall score: 75%   *Aug 2008 – July 2013*

Experience

- **Full-time consultant**   Fluentem India Pvt. Ltd.
  Development of a traffic microsimulation software for Indian roads   Dec 2020 - Mar 2021
  The company has been incorporated recently, with the goal of developing realistic microsimulation software for Indian road traffic. To this end, I have reviewed and documented existing literature in the area, worked on an original model, and advised on the scope and design of the software. I have also written code prototypes in Javascript and Julia languages.

- **Senior Research Fellow**   Indian Institute of Science
  Using Bengaluru city bus GPS data to study the impact of utility restoration works   Oct 2019 - Apr 2020
  Road traffic in some major Indian cities are often obstructed by the restoration and reparation works of the utilities like water supply and sewage conducted by government authorities. This is worsened by the lack of complete underground utility maps for the urban regions, which may sometimes increase the duration of the work and the area obstructing traffic. The impact of these works on road traffic is quantified in this study in terms of the increase in vehicle emissions, fuel consumption and travel times of the vehicles. Three example locations in Bengaluru city are used for study and the traffic simulations of alternative scenarios are conducted in PTV Vissim software. This is large project funded by the Principal Accountant General's office of Karnataka aiming to understand the impact of the lack of underground utility maps for Indian cities. My role in it is limited to the aspect of road traffic.

- **Graduate Research Assistant**   Indian Institute of Science
  Dynamic traffic assignment framework for heterogeneous, disordered traffic   Jan 2019 - June 2019
  Developed a node-based dynamic traffic assignment framework for heterogeneous, disordered traffic and formulated both user equilibrium and system optimum problems within this framework.

  Dynamic traffic assignment framework embedded with a FIFO satisfying CTM   June 2018 - Dec 2018
  Developed a node-based dynamic traffic assignment (DTA) framework with an embedded CTM that satisfies the link-level FIFO principle. This is the first DTA model ever to obviate the need for path enumeration, which is a major source of computational complexity in the previous models.

  Methodology for constructing driving cycles for Indian cities   Jan 2018 - June 2018

Introduced the notion of trip segments as a new construction unit of driving cycles to more accurately capture the heterogeneity within microtrips, and described a complete methodology for constructing driving cycles using these units.

Cell transmission modelling of heterogeneous, disordered traffic flow   Jan 2017 - Jan 2018

Developed a cell transmission model for heterogeneous, disordered traffic flows observed in some developing economies like India.

- **Teaching Assistant**   Indian Institute of Science
  CE 267 – Transportation statistics and microsimulation   Spring 2015 2016, 2017, 2018
  Delivered lectures and conducted tutorials on various topics in the syllabus.

Skills

- **Communication**: Excellent written and oral skills in English and Telugu.
- **Progrmming Languages**: C, Java, R, Python. Also, I have experience working with several popular Machine Learning and Data analysis packages in Python including Numpy, Scipy, Pandas, Matplotlib, Tensorflow, Pytorch, Keras, Chainer, etc.
- **Softwares**: PTV Vissim, Jupyter Lab, LaTeX , AutoCAD, MS Word, MS Excel, MS Powerpoint, among others.
- **Operating systems**: MS Windows, Linux, Mac OS.
- **Interpersonal**: Presented my work in front several audiences ranging from my lab colleagues to the attendees of international conferences.
- **Others**: Fast learner and always willing to explore new topics.

Achievements

- Got an All India Rank of 118 in Graduate Aptitude Test in Engineering (GATE) in Civil Engineering discipline in the year 2012, which should place me among the top 0.1 percentile of the participants.

- Won 2nd prize in a workshop on 'Design and Detailing of Beam-Column Joints' that was organised by the Society of Civil Engineers, Dept. of Civil Engineering, College of engineering Guindy, Anna university.

- Presented a paper on 'Plastic bricks' in the National level technical symposium "SOUDHA 2K11" held at Dept. of Civil Engineering, JNTU college of engineering, Kakinada.

Publications

1. Sai Kiran M., Verma, A. (2016). Review of studies on mixed traffic flow: Perspective of developing economies. Transportation in Developing Economies, 2(1), 5.

2. Verma, A., Nagaraja, G., Anusha, C. S., & Mayakuntla, S. K. (2018). Traffic Signal Timing Optimization for Heterogeneous Traffic Conditions Using Modified Webster's Delay Model. Transportation in Developing Economies, 4(2), 13.

3. Mayakuntla, S. K., & Verma, A. (2018). A novel methodology for construction of driving cycles for Indian cities. Transportation research part D: transport and environment, 65, 725-735.

4. Mayakuntla, S. K., & Verma, A. (2019). Cell transmission modeling of heterogeneous disordered traffic. Journal of Transportation Engineering, Part A: Systems, 145(7), 04019027.

5. Verma, A., Chandra, A., Allirani, H., Karthika, P. S., Vajjarapu, H., Nitwal, R. S., ... & Choubey, N. (2020). The Curious Case of Transportation Systems in a Post COVID-19 World: A Summary of Impacts, Strategic Interventions, and Possible Policy Implications.