

U. Sethu Vinayagam

Indian Institute of Technology Madras



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EDUCATION

Program	Institution	%/CGPA	Year of completion
PhD in Civil Engineering	Indian Institute of Technology Madras, Chennai	9.71/10	2024*
B. Tech. in Civil Engineering	National Institute of Technology Tiruchirappalli, Trichy	9.32/10	2019
XII (CBSE)	Kamala Niketan Montessori School (CBSE), Trichy	95.4%	2015
X (CBSE)	Mahatma Gandhi Centenary Vidyalaya, Trichy	10/10	2013

SCHOLASTIC ACHIEVEMENTS

- Awarded the prestigious **Prime Minister's Research Fellowship** for pursuing a PhD at IIT Madras.
- Awarded **B. Tech. with Honors** in Civil Engineering for securing 15 additional credits in advanced level courses with a CGPA of 9.2.
- Selected for an exchange program to complete the final year of bachelor's degree at IIT Madras.
- Secured **academic proficiency prize** for securing the second rank during bachelor's degree at NIT Trichy.

COURSE WORK

- Simulation Modeling and Analysis
- Analytical Techniques in Transportation Engineering
- Fundamentals of Deep Learning
- Linear and Network Optimisation
- Database Management Systems
- Public Transportation
- Transportation Systems Analysis
- Urban Transportation Planning

SKILLS

- Programming languages: Python (Libraries utilised: NumPy, pandas, Matplotlib, seaborn, scikit-learn, TensorFlow, Flask, SQLAlchemy), C++, R
- Software tools: Gurobi Optimizer, MariaDB, Microsoft Office

PROJECTS

- A Sequential Search Journey Planner System for the Indian Rail Network** (Jan – May 2019)
 - Developed a journey planner for travellers on the Indian Rail network to plan an optimal route between any given pair of origin and destination based on several criteria such as no. of transfers, total travel time and waiting time between transfers.

PROFESSIONAL EXPERIENCE

- Teaching Assistant, Python for Data Science (NPTEL)** (Jul – Aug 2024)
 - Conducted live interactive problem-solving sessions to assist the course students with varied academic backgrounds.
- Conference Presentation, Transit Data 2024** (July 2024)
 - Presented research work titled "Joint Forecast of Expected Travel Time and its Reliability for Real-time Transit Applications Based on Sporadic Data" in an oral presentation session.
- Teaching Assistant, Computer Applications in Traffic and Highway Engineering (CE4720)** (Jul – Nov 2023)
 - Assisted undergraduates with **R and Python programming** for transportation and statistical applications.
- Teaching Assistant, Transportation Network Analysis (CE5290)** (Jan – May 2023)
 - Conducted lecture on **data structures** for undergraduates and postgraduates.
 - Conducted tutorial sessions on different network algorithms.

- **Conference Presentation, Traffic & Granular Flow – 2022** (Oct 2022)
 - Presented research work titled “A graphical tool for planning and real-time operation of freight trains” in an oral presentation session.
- **Teaching Assistant, Integrated Waste Management for a Smart City (NPTEL)** (Jul – Oct 2022)
 - Conducted live interactive problem-solving sessions to assist the course students with varied academic backgrounds.
- **Teaching Assistant, Analytical Techniques in Transportation Engineering (CE5390)** (Jul – Nov 2022)
 - Taught the basics of R programming language to a class of undergraduates and postgraduates.
- **Teaching Assistant, Urban Transportation Systems Planning (NPTEL)** (Feb – Apr 2022)
 - Conducted live interactive problem-solving sessions to assist the course students with varied academic backgrounds.
- **Conference Presentation, 6th Conference of the Transportation Research Group of India (CTRG-2021)** (Dec 2021)
 - Presented research work titled “An efficient graph reduction based label-setting heuristic to find K simple shortest paths on directed networks” in an oral presentation session.
- **Conference Presentation, 6th Conference of the Transportation Research Group of India (CTRG-2021)** (Dec 2021)
 - Presented research work titled “Application of deep learning models to forecast bus transit passenger demand” in an oral presentation session.
- **Conference Presentation, 7th TransitData international workshop (TransitData2021)** (Oct 2021)
 - Presented research work titled “An integrated deep learning and regression modelling framework to predict transit demand” in an online webinar session.
- **Conference Presentation, Transportation Research Board 99th Annual Meeting, 2020** (Jan 2020)
 - Presented research work titled “A Sequential Search Journey Planner System for the Indian Rail Network” in a lecture session.
- **Summer Trainee, Larsen & Toubro Construction – Buildings & Factories IC** (May – July 2018)
 - Worked on enhancing coordination between site and stores to expedite material receipt and vendor/supplier payment
 - Involved in a detailed study of the company’s existing material procurement processes and learnt some of the process optimisation tools and techniques.

VISIBLE RESEARCH OUTPUT

- **Journal Publications**
 - Udhayasekar, S. V., K. K. Srinivasan, P. Kumar, and B. R. Chilukuri. 2024. “Label-Setting Algorithm for Multi-Destination K Simple Shortest Paths Problem and Application.” *Algorithms*, 17 (8): 325. <https://doi.org/10.3390/a17080325>.
- **Book Chapters**
 - Raj, A., U. S. Vinayagam, and B. R. Chilukuri. 2024. “A Graphical Tool for Planning and Real-Time Operation of Freight Trains.” *Traffic and Granular Flow '22*, K. R. Rao, A. Seyfried, and A. Schadschneider, eds., 399-406. Springer Nature Singapore. https://doi.org/10.1007/978-981-99-7976-9_49.

INTELLECTUAL PROPERTY

- **Copyright**
 - Granted a copyright entitled “**Software for Personalized Transit Route Guidance System (PTRGS)**” by the Copyright Office, Government of India, with registration no. SW-17056/2023 on 08/08/2023.

EXTRA-CURRICULAR AND CO-CURRICULAR ACTIVITIES

- **Cricket and Coding Challenge**
 - Emerged in the **top 50 among 300+ teams** in the coding competition for prediction of cricket match scores during IPL 2023 using machine learning models conducted by the IIT Madras BS program and NPTEL.

- **Technical and Scientific Writing Workshop**
 - Learnt essential tools and techniques for effective technical and scientific writing through a training workshop conducted by IIT Madras.
- **National Service Scheme**
 - NSS Member for the year 2015-2016
 - Participated in a sapling plantation at the NIT Trichy campus and made a camp in a nearby village to spread awareness about health and hygiene.