Transportation and Urban Design Studio (E) for Graduate School of Civil Engineering in 2020 Autumn Semester (A1)

Website on my lab:

Syllabus: http://bin.t.u-tokyo.ac.jp/tuds2020/2020A_tuds_syllabus.pdf

ITC-LMS: https://itc-lms.ecc.u-tokyo.ac.jp/lms/course?idnumber=20203713-0970C01

This class provides information that includes zoom URL, educational material via ITC-LMS.

Place and Time:
Online, on Monday and Thursdays 13:00-14:45 JST, from Sep. 28 to November 9

Transportation and Urban Design Studio (E)

Introduction #1

September 28

By Junji Urata

Purpose and Contents of the Course

This course focuses on learning some of methodologies to analyze transportations and regions, which are sometimes vulnerable to natural hazards. In addition to it, getting used to the essence of the basic way of theoretical and mathematical thinking in planning is another main target. For fulfilling these purposes,
we choose four topics:
1) Traffic flow modelling,
2) Logistics management and analysis,
3) Statistics and Machine Learning,
4) Travel behavior modelling.

Organized by Prof. Hato

Purpose and Contents of the Course

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we choose four topics:

A) Traffic flow theory and Network modelling by Prof. Takamasa Iryo

B) Global logistics management and analysis by Prof. Ryuichi Shibasaki

C) Statistics and Machine Learning by Prof. Muhammad Awais Shafique

D) Travel behavior modelling by Prof. Junji Urata

Schedule

Topic 1: Transportation Modelling and Statistics
Topic 2: Traffic Flow Theory and Network Modelling
Topic 3: Statistics and Machine Learning
Topic 4: Logistics Management and Analysis

01) Sep. 28 Introduction
02) Oct. 1 [Topic 1] Travel Behavior Modelling (1)
03) Oct. 5 [Topic 1] Travel Behavior Modelling (2)
04) Oct. 8 [Topic 2] Traffic Flow Theory and Network Modelling (1)
05) Oct. 12 [Topic 2] Traffic Flow Theory and Network Modelling (2)
06) Oct. 15 [Topic 2] Traffic Flow Theory and Network Modelling (3) and Final Exercise
07) Oct. 19 [Topic 1] Presentation from students
08) Oct. 22 [Topic 3] Introduction to Machine Learning
09) Oct. 26 [Topic 3] Machine Learning vs. Discrete Choice Modelling
10) Oct. 29 [Topic 3] Travel Mode Detection using Machine Learning
11) Nov. 2 [Topic 4] Global Logistics Modelling & Analysis (1)
12) Nov. 5 [Topic 4] Global Logistics Modelling & Analysis (2)
13) Nov. 9 [Topic 4] Presentation from students

We will upload the document of the class to ITC-LMS (on the day before, maybe)

Evaluation and Contact

- Assignments in each of the four topics (22 points @ 4), and attendance points for classes (12 points)

  * Your attendance is confirmed using the history function by zoom.

- Please ask Prof. Urata if you have a question about the class.

- We can provide video which is recorded the talk when your attendance is interrupt by internet-connection problem. Please contact to Prof. Urata as soon as possible when you have a trouble.

You can contact me via ITC-LMS using the message tool, or
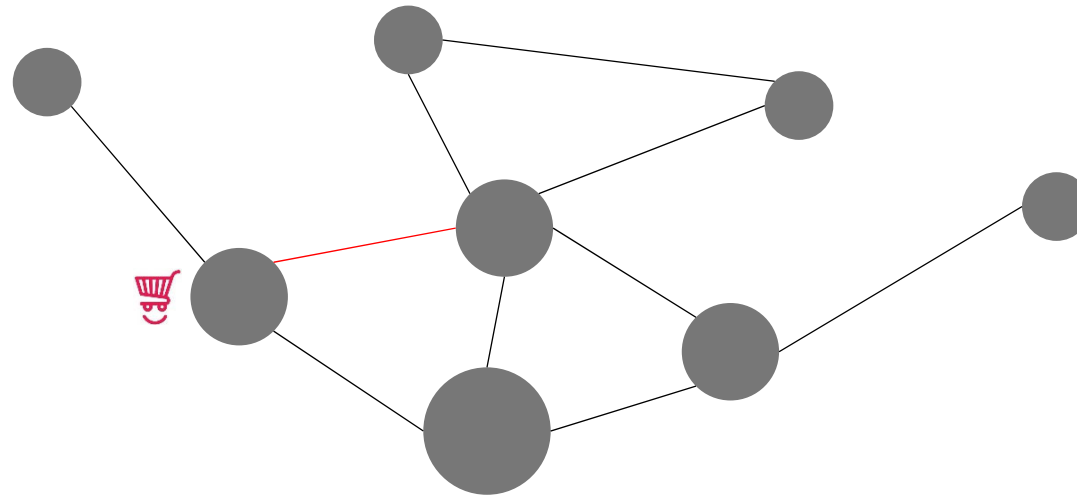
Emai: urata[at]bin.t.u-tokyo.ac.jp

Please send me your information if you take this class after the talk by ITC-LMS (or e-mail)
Contents: Your Name, E-mail address, your lab's name

What is Transportation & Urban Design?

Network Planning: Road, Railway, Metro,…
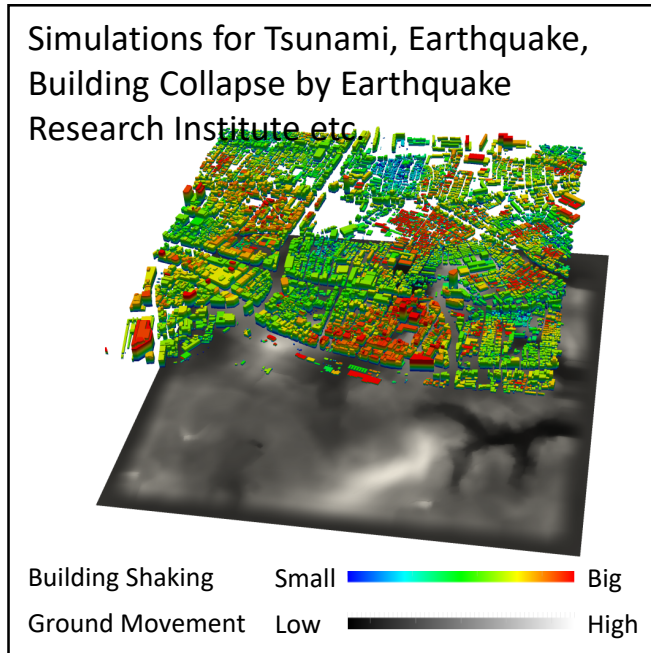Facility location: Shopping center, parking spot, logistic depot,..

For what?

- Efficient network?

fast transportation?, More accessible to ?, More reliable connection?

Complicated design is needed for practical project.

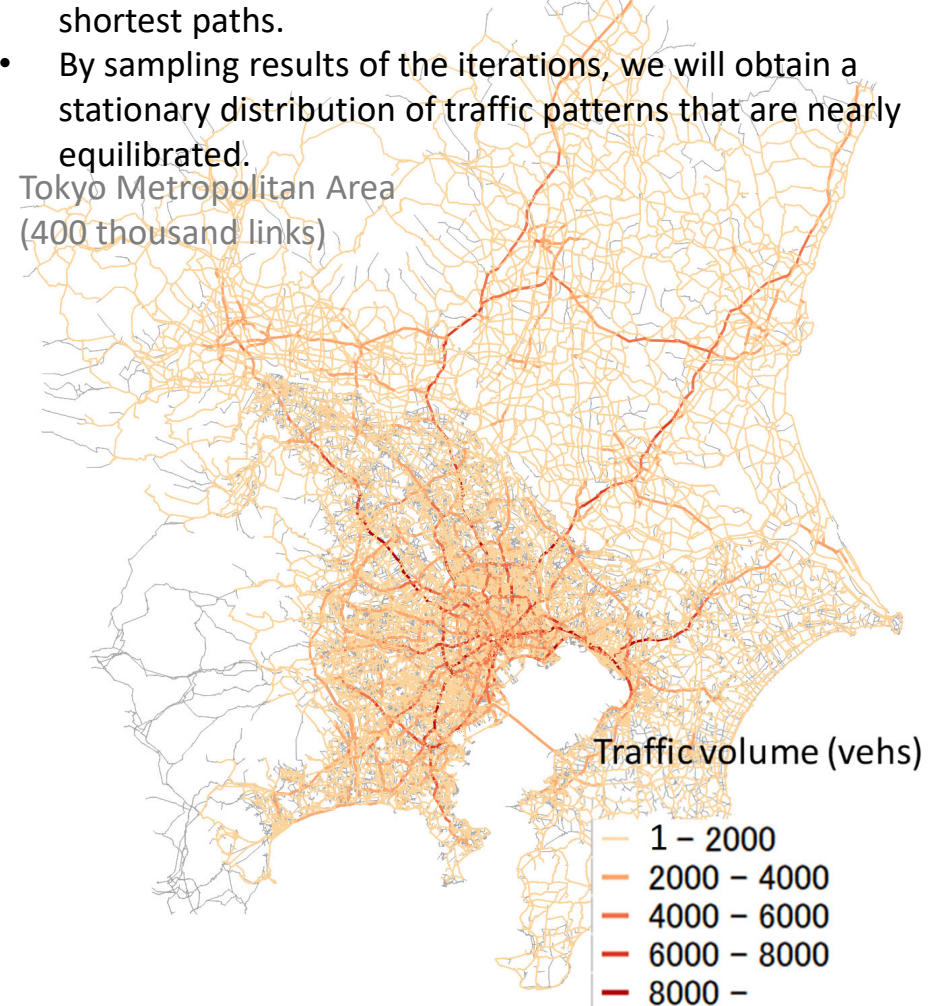# (Advanced Project) Development of Traffic Demand and Flow simulator for a Road Network Damaged by a Disaster

Simulations for Tsunami, Earthquake, Building Collapse by Earthquake Research Institute etc.

Building Shaking — Small [blue→red] Big
Ground Movement — Low [black→white] High

Road damage →

↓ Collapse of buildings
Damage of infrastructure for lifeline

Demand Simulator：
Obtain a set of OD demand pattern

	Dest. 1	Dest. 2	..		
Orig. 1	1003	512	391	408	..
Orig. 2	454	896	402	413	369
:	344	385	786	812	397
	:	365	371	803	

← Travel Time

Traffic Demand →

Traffic Flow Simulation:
- Iterative calculations (Shortest Path calculator->Traffic Flow calculator->SP->TF...) are made to find near-equilibrium solutions, in which most vehicles select their shortest paths.
- By sampling results of the iterations, we will obtain a stationary distribution of traffic patterns that are nearly equilibrated.

Tokyo Metropolitan Area
(400 thousand links)

Traffic volume (vehs)
- 1 – 2000
- 2000 – 4000
- 4000 – 6000
- 6000 – 8000
- 8000 –

Until next Lecture (Oct. 1)

1.

- Please send me your information if you take this class after the talk by ITC-LMS (or e-mail)
- Contents: Your name, E-mail address, your lab's name

2.

- Please download R on your computer from the R's official website: https://cran.r-project.org/
- You will uses R for easy exercises on next lecture
- If you have a trouble on the install, please let me know. I can discuss and check your installation from 11:30 am to 1 pm JST on Sep. 30