11.522 – Research Seminar on Urban Information Systems

Instructor: Joe Ferreira, jf@mit.edu
Monday, 6-8 PM in Room 9-451

• Opportunity for students to build on basic skills in GIS and urban analytics in order to explore urban planning implications of improved urban information systems
• Students present structured discussion of journal articles and undertake small research projects
• Helpful in formulating research project, thesis exploration, ...

Class homepage: http://mit.edu/11.522
11.522 – Research Seminar on Urban Information Systems

• Modern information and communication technologies (ICT) provide new opportunities for urban sensing and analytics that can impact all aspects of urban planning.
• 11.522 provides a setting in which to discuss and investigate the urban planning and policy implications of ICT advancements.
• Much of this research involves geographic information systems (GIS), location-based computing, visualization methods, and the design and prototyping of urban planning tools and metrics for accumulating and using 'city knowledge'.
• Some of the work also involves institutional analysis, new theories about planning strategies, collaborative urban design, the economics of place, urban information infrastructure, and land use and transportation interactions.

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11.522 – Research Seminar on Urban Information Systems

• Seminar topics are usually tied to ongoing Urban Information Systems (UIS) research in DUSP.
  – Urban analytics, urban indicators and performance measures
  – Urban modeling: from back-of-the-envelope to complex land use and transportation models
  – PSS, PPGIS, VGI, urban information infrastructure
  – Not always highly quantitative: e.g., technology adoption, comparative study of ‘smart city’ efforts, ...

• Examples from recent theses and student papers

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Examples from Recent Theses & Projects

• Vehicle miles travelled patterns:
  – Jingsi Xu, class project & Transactions in GIS paper
• A day in the life of Singapore
  – Shan Jiang, Singapore ‘Future Urban Mobility’ project and Data Mining & Knowledge Discovery paper
• ‘Smart City’ strategies
• Implementation of planning support systems technology
• ‘Big Data’ analyses of transit card data

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Estimated VMT per Vehicle per Year

- **VMT per vehicle** average for each 250x250m grid cell
  - Data for 2.8 million vehicles
  - Grid cells with 12+ cars
    - Average annual mileage of all “good” cars in grid cell.
  - Grid cells with few/no vehicles
    - Spatial interpolation
    - Inverse distance weighted average of the VMT of 12 closest “good” cars

- VMT is more sensitive to built environment than indicated in earlier studies

Singapore Temporal Activity Patterns: (a weekday)

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