Midterm Presentation of Project

Traffic Control Modeling Project

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Outline

Brief Intro about Sponsor and Background

The Shanghai Municipal Peoples Government
The Transportation and Highway Administration

1. SMPG is focusing on improving the quality of peoples' lives
2. THA is one of the departments in SMPG, is responsible for improving the quality of roads and highways facilities, as well as solving the traffic congests
3. Shanghai receives more and more attention from society and organizations for its worsening traffic condition
4. THA gathers rich intellectual resources and aims at developing health Transportation Flow Systems

Problem Statement

1. Current Condition:
   - 1.1 traffic congest is now an urgent issue to tackle in the city of Shanghai
   - 1.2 policy constitutor wants to know the suitability of Traffic Control Policy
   - 1.3 only Beijing has relative experience of this kind of policy
2. Analysis of Problem:
   - 2.1 average speed and single line traffic
   - 2.2 combine the theoretical models and real-world statistical data
   - 2.3 focusing on main roads and highways in main districts
3. Difficulties:
   - 3.1 for sponsor: limited capability to conduct such statistical research and modeling with existing data

Basic Principles

1. Use average speed and single line traffic as the standard variables to evaluate clearness of the roads
2. Use the quantitative and qualitative review of Beijing's Traffic Control data as benckmark and base for prediction
3. Use theoretical models and real-world statistical data to find the function between average speed and single line traffic
4. Focusing on main roads and highways in main districts
5. Regard the difference between average daily data and holiday data as white noise
6. Refer to the public data as additional source

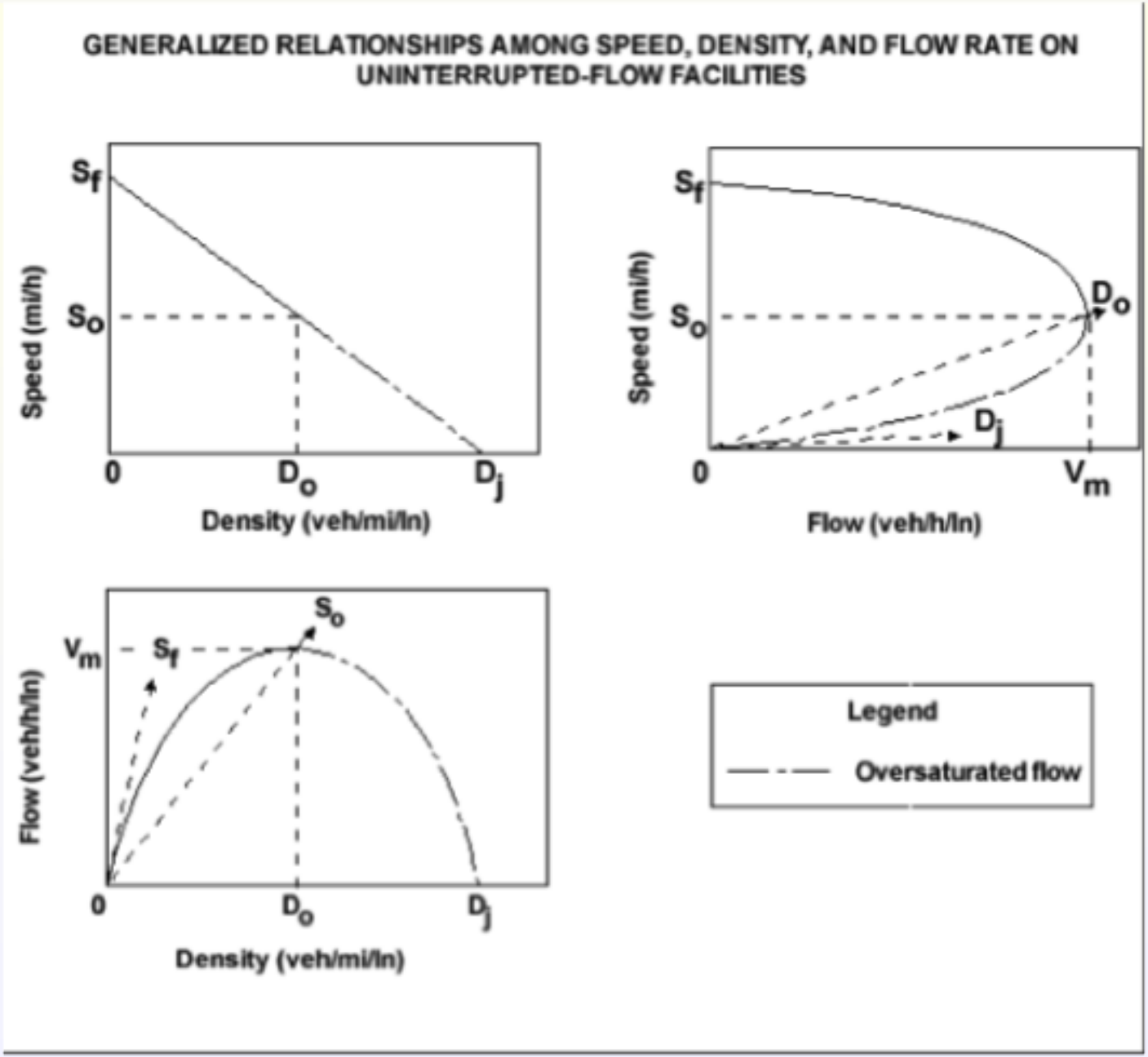
Approaches

- Based on existing data, we will create a mathematical model for us to identify the current traffic condition and make prediction of traffic condition after the action of policy
- Our control strategy will be modeled by data regression, filtering and back tested using historical Traffic Control data from Beijing
- The model is consisted of two parts: the current condition model and the prediction model for action of policy. We plan to use around 5 years data (2007-2012) as current condition model, and the 2008 data of Beijing as the prediction model

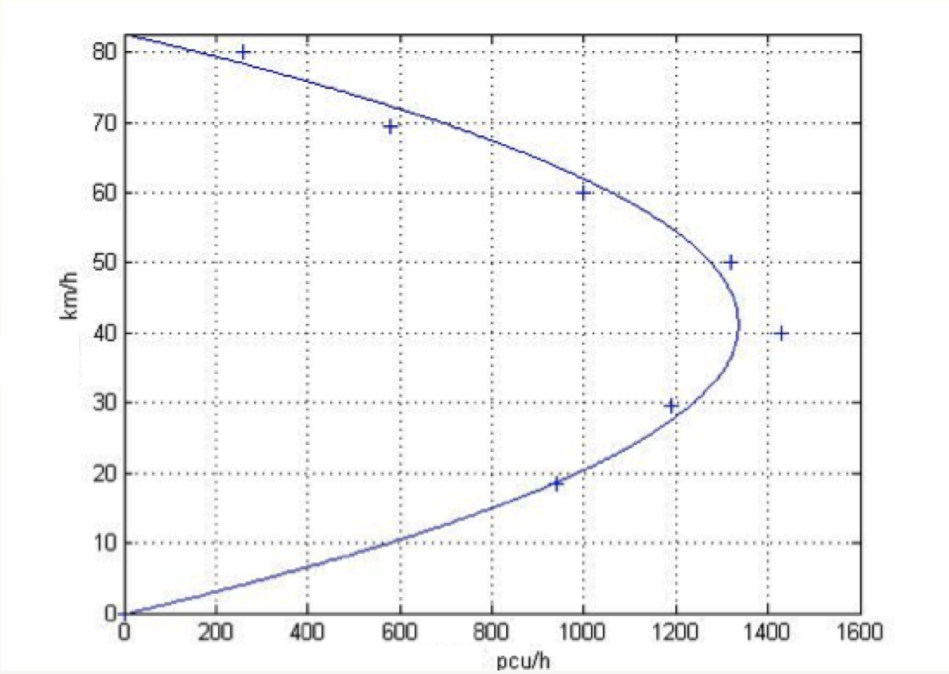
Current Accomplishments

- The Highway-model: the regression function between average speed and traffic flow on highways
- The Mainroad-model: the regression function between average speed and traffic flow on main roads

Current Accomplishments



Current Accomplishments



- The Highway-model: the regression function between average speed and traffic flow on highways
  $q = -0.7794v^2 + 64.2324v + 12.2545$
- The Mainroad-model: the regression function between average speed and traffic flow on main roads
  $q = -4.5455v^2 + 155.1213v + 12.2545$

Schedules

1. Work Statement due date, Sep 28, 2012
2. Midterm Presentation due date, Oct 12, 2012
3. Progress Report due date, Oct 26, 2012
4. Final Presentation due date, Nov 6, 2012
5. Final Report due date, Nov 30, 2012

Conclusions

1. List of Deliverables:
   - 1.1 `We now have the model-based average speed for both highways and main roads`
2. Remaining Work:
   - 2.1 `Prediction model based on the Traffic Control data from Beijing`
   - 2.2 `Comparision between with-policy and without-policy`
   - 2.3 `Further research on long-term strategy that could alleviate the worsening traffic condition`
3. Recommendations:
   - 3.1 `Current Traffic Control Policy is only a temporary solution to the problem, a long-term solution is needed to deal with the worsening traffic condition.`

Acknowledgements and Questions

- Thanks for the instruction of Dr. Nam Lee

- Any questions are welcomed