OSW Semestral work

Public transport use in the capital and its effect on park+ride occupancy and traffic events

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Motivation

It is in any city's best interest to decrease congestion and road accidents as much as possible. One way to do so is to create parking facilities near major public transport centers on the edge of the city (commonly referred to as "park+ride") - so that travelers can conveniently park and use public transport, thereby easing on traffic and pollution in the centre.

Studying data concerning park+ride occupancy, traffic events near the park+rides and the usage of public transport can reveal just how significant the link between the three is. This can be useful for the city's public transport and road network authorities, since they can determine whether building park+rides is worth it at all, whether they add choke points/traffic accidents to the roads in the city, or if there are other locations where they ought to be built.

Data sources

We are going to use the following 4 data sources for this project:

Public transport coupon sales

Provider: Dopravní podnik hl. m. Prahy
Source: http://opendata.praha.eu/dataset/dpp-statistiky-prodanych-kuponu
Datatype: CSV

DPP offer other ways of tracking usage of its services, but this one is the most granular out of them all, as the data is updated each day. Some "stitching" will be required, as the data is separated into different files by type of sale (e-shop, card or paper) and by month. Park+ride users are very likely to commute, and as such use coupons rather than tickets.

_id	kategorie	platnost	pocet
1	Dítě	1M	31
2	Dítě	3M	267
3	Dítě 6-10	1M	5
4	Dítě 6-10	3M	48
5	Hmot.no…	1M	19
6	Hmot.no…	3M	6
7	Hmot.no…	5M	2
8	Junior	1M	963
9	Junior	10M	674
10	Junior	3M	626
11	Junior	5M	502
12	Občanská	1M	9808
13	Občanská	1RS	7216
14	Občanská	10M	25

Park+ride occupancy data

Provider: Operátor ICT, a.s.
Source: http://opendata.praha.eu/dataset/parkovani_pr
Datatype: CSV

Provides information about the usage of park+rides every few minutes (how many spots are full/available at each location). Such detail is unnecessary for our purposes; therefore the data will be condensed.

Datum_a_cas	Parkoviste	Vjezd	Vyjezd	Obsazenost	Stav	Volna_mista	Kapacita
01.01.2016 0:00:13	P+R Zličín 1	0	0	36	volno	47	83
01.01.2016 0:00:20	P+R Černý Most 2	0	0	15	volno	116	131
01.01.2016 0:00:24	P+R Opatov	0	0	11	volno	170	181
01.01.2016 0:00:25	P+R Rajská zahrada	0	0	17	volno	71	88
01.01.2016 0:00:43	P+R Zličín 1	0	0	36	volno	47	83
01.01.2016 0:00:50	P+R Černý Most 2	0	0	15	volno	116	131
01.01.2016 0:00:54	P+R Opatov	0	0	11	volno	170	181
01.01.2016 0:00:55	P+R Rajská zahrada	0	0	17	volno	71	88
01.01.2016 0:01:14	P+R Zličín 1	0	0	36	volno	47	83
01.01.2016 0:01:21	P+R Černý Most 2	0	0	15	volno	116	131
01.01.2016 0:01:26	P+R Rajská zahrada	0	0	17	volno	71	88
01.01.2016 0:01:45	P+R Zličín 1	0	0	36	volno	47	83
01.01.2016 0:01:52	P+R Černý Most 2	0	0	15	volno	116	131
01.01.2016 0:01:57	P+R Rajská zahrada	0	0	17	volno	71	88

Parking locations

Provider: Technická správa komunikací
Source: http://opendata.praha.eu/dataset/parkoviste
Datatype: CSV

This is a short file that connects parking facilities operated by the TSK authority with their geographical locations. We will use the locations of just the park+rides.

_id	name	lat	lng	pr	totalNu...
1	Běchovice	50.0808	14.597429	True	92
2	Chodov	50.032074	14.492015	True	653
3	Depo Hostivař	50.076397	14.517204	True	169
4	Holešovice	50.109318	14.441252	True	74
5	Kongresové centrum Praha	50.060696	14.428616	True	260
6	Kotlářka	50.06858	14.358078	True	181
7	Letňany	50.125168	14.514741	True	633
8	Ládví	50.126156	14.472344	True	78
9	Nové Butovice	50.05053	14.350451	True	57

List of traffic events

Provider: Ředitelství silnic a dálnic
Source: http://kbss.felk.cvut.cz/dopravni-info.zip
Datatype: XML

Details all traffic events for the entire Czech Republic, including type, location, and date. Only accidents and traffic jams in and around Prague will be of our interest, so we will focus solely on those.

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1   <?xml version="1.0" encoding="utf-8"?>
2   <DOC version="3.0" id="f7e95454-ce09-425c-b473-41081dacef92" country="CZ" DataSet="extended">
3       <INF sender="JSDI_NDIC" receiver="CVUT_FEL" transmission="HTTP">
4           <DAT>
5               <EVTT version="2.01" language="CZ" />
6               <SNET type="GN" version="16.12" country="CZ" />
7               <UIRADR structure="4.2" version="1020" />
8           </DAT>
9       </INF>
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11          <MSG id="{ff808181-5bf3-922d-015c-0b2382024b28}" version="2" type="TI" planned="false">
12              <MTIME format="YYYY-MM-DDThh:mm:ssTZD">
13                  <TGEN>2017-05-15T10:05:23+02:00</TGEN>
14                  <TSTA>2017-05-15T10:00:00+02:00</TSTA>
15                  <TSTO>2017-05-15T12:05:00+02:00</TSTO>
16              </MTIME>
17              <MTXT language="CZ">Od 15.5.2017 10:00 do 12:05; v ulici Dobřichovická v obci Černošice okres Praha-západ; nehoda; havárie OA ,</MTXT>
18              <MEVT>
19                  <TMCE urgencyvalue="N" directionalityvalue="1" timescalevalue="(D)" diversion="false">
20                      <EVI eventcode="201" updateclass="3" eventorder="1">
21                          <TXUCL language="CZ">Nehody</TXUCL>
22                          <TXEVC language="CZ">nehoda</TXEVC>
23                      </EVI>
24                      <TXTMCE language="CZ">nehoda   </TXTMCE>
25                  </TMCE>
26                  <OTXT>nehoda; havárie OA ,</OTXT>
27              </MEVT>
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