Train delay propagation on Swedish railways

Train delays are both annoying and costly

Let's help do something about them!

We have data on every train departure in Sweden

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Tåguppdrag;Datum_PAU;Tågslag;Tågsort;UppehållstypAvgång;UppehållstypAnkomst;AktivitetskodAvgång;Ak
itetskodBeskrivningAvgång;AktivitetskodAnkomst;AktivitetskodBeskrivningAnkomst;DelSträckanummer;Fö
aplatssignatur_för_Uppdrag;Sistaplatssignatur_för_Uppdrag;Avgångsplats;Avgångsplatssignatur;Ankoms
ats;Ankomstplatssignatur;PlanAvgTid;PlanAnkTid;UtfAnkTid;UtfAvgTid;PlanAnkTid_vid_AvgPlats;UtfAnkT
vid_AvgPlats;PlanUppehållstidAvgång;UtfUppehållstidAvgång;PlanGångtid;UtfGångtid;FörseningGångtid;
Försening;AnkFörsening;FörseningUppehållAvgång
1710;2019-03-23;RST;PENDEL;Uppehåll;Sista;11;Av- och påstigande av resande;10;Avstigande av
resande;25;Trg;Hb;Helsingborg godsbangård;Hbgb;Helsingborg c;Hb;2019-03-23 10:34:00.000;2019-03-23
10:38:00.000;2019-03-23 10:36:00.000;2019-03-23 10:33:00.0
10:32:00.000;1;1;4;3;-1;-1;-2;0
1710;2019-03-27;RST;PENDEL;Uppehåll;Sista;11;Av- och påsti
resande;25;Trg;Hb;Helsingborg godsbangård;Hbgb;Helsingborg
10:38:00.000;2019-03-27 10:36:00.000;2019-03-27 10:33:00.0
10:32:00.000;1;1;4;3;-1;-1;-2;0
1710;2019-03-16;RST;PENDEL;Uppehåll;Sista;11;Av- och påsti
resande;25;Trg;Hb;Helsingborg godsbangård;Hbgb;Helsingborg
10:38:00.000;2019-03-16 10:36:00.000;2019-03-16 10:33:00.0
10:32:00.000;1;1;4;3;-1;-1;-2;0
546;2019-03-31;RST;SNABB;Uppehåll;Passage;11;Av- och påsti
c;M;Malmö Godsbangård;Mgb;2019-03-31 17:11:00.000;2019-03-
17:14:00.000;2019-03-31 17:11:00.000;2019-03-31 16:59:00.0
16:55:00.000;12;16;2;3;1;0;1;4
7445;2019-03-04;RST;REGION;Passage;Passage;0;-;0;-;3;Uå;Ök
07:57:00.000;2019-03-04 08:00:00.000;2019-03-04 08:16:00.0
07:57:00.000;2019-03-04 08:13:00.000;0;0;3;3;0;16;16;0
7583;2019-03-30;RST;REGION;Passage;Uppehåll;0;-;11;Av- och
Södra;Dis;2019-03-30 11:21:00.000;2019-03-30 11:22:00.000;
11:20:00.000;2019-03-30 11:21:00.000;2019-03-30 11:20:00.000;0;0;1;1;0;-1;-1;0
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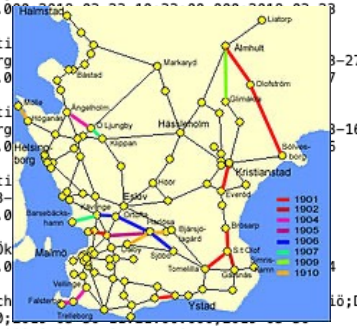

Possible projects/research questions:

1. "What is really the problem?" — identify primary vs secondary (=propagated) delays
2. "How late will my train be?" — model for predicting delays
3. "How can they plan better?" — Optimal allocation of time margins and buffers

You'll get to use network dynamics / optimization / learning / statistical modeling / programming / …

Jump on board!

- Advisors from Automatic Control, Division of Transport and Roads, and the Swedish Transport Authority
- Contact emma.tegling@control.lth.se

Network epidemiology: The preschool case

Preschoolers are sick ***all the time****!

*38% of preschoolers have symtoms at least half the time, those who don't attend preschool much less (Hedin et al. Acta Pediatrica, 2007)

During the COVID pandemic we learned to limit our social contacts to a small bubble

Yet preschool groups are quite big! How does that impact infection spread?

We will **model** infection spread in preschools and analyze the role of the kids' contact networks (e.g. group size!)!

For example: Can expected number of sick days be reduced by making smaller groups?

Highly interdisciplinary project: You'll use network dynamics / modeling / (hobby) epidemiology / programming / literature study

- Contact emma.tegling@control.lth.se