

# An automated demand forecasting model for new railway stations

DAFNI at Southampton :: 08 February 2021

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Transportation Research Group

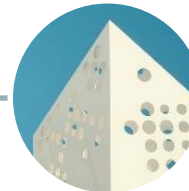
# What does the model do?



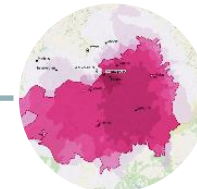
Individual station(s)



New line



Abstraction analysis



Catchment visualisation

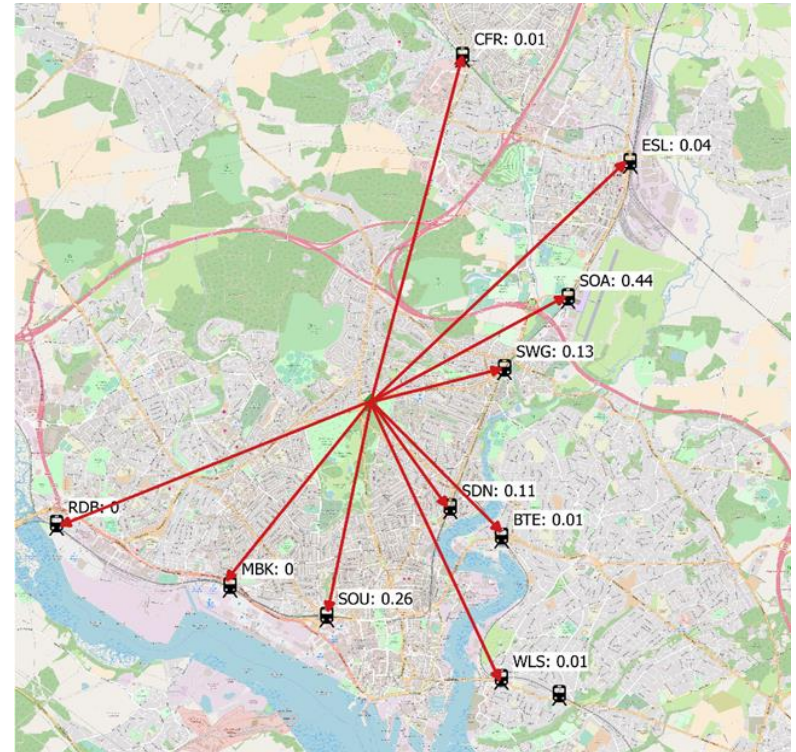
# A national trip end model with probability-based catchments

$$\ln \hat{V}_i = \alpha + \beta \left( \ln \sum_z^Z Pr_{zi} P_z w_{zi} \right) + \gamma \ln F_i + \delta \ln J_{it} + \epsilon \ln Pk_i + \zeta Te_i + \eta El_i + \theta B_i$$

**V** - annual trips

**Pr** - probability of station being chosen  
**P** - population  
**w** - decay function  
**Z** - postcodes with station *i* in choice set  
**z** - postcode

**F** - service frequency  
**J** - jobs (within approx. 0.5 mile)  
**Pk** - parking spaces  
**B** - travelcard boundary (y/n)  
**Te** - terminus station (y/n)  
**El** - served by electric trains (y/n)



# Web app - job creation

DAFNI Pilot 3: Station demand forecasting model LOGOUT

**Station Configuration:**

- ID: HNW1
- Name: Honiton West
- Region: South West
- Station NGR: 3333
- Access NGR: 314371 (6 digit code)
- Frequency: 100
- Frequency group: [Dropdown]
- Parking spaces: 100
- CCTV: Yes
- Ticket machine: Yes
- Bus interchange: Yes
- Terminal station: Yes
- Electric services: Yes
- Travelcard boundary: Yes

**Buttons:** EDIT NGR ON MAP, ADD, RESET

**Model abstraction for these stations:** TR

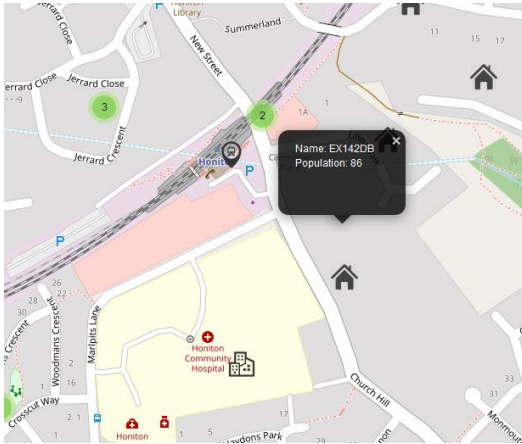
**For 'in isolation' mode only:**  
If sensitivity analysis is required for service frequency or car parking spaces then simply create a new station entry with these fields amended as appropriate. The ID must be unique, but if you use the same name then the model results will be grouped together for this station and processing will be faster as unnecessary duplicate analysis will be avoided. If two or more entries have an identical name they can only differ in the values of the frequency, parking spaces and/or frequency group fields. Remember to define different frequency groups as appropriate for the additional entries.

ID ↑	Name	Region	Station NGR	Access NGR	Frequency	Frequency group	Parking spaces	Ticket Machine	Bus Interchange	CCTV	Terminal	Elect
No data available												

Rows per page: 5

Includes input verification

# Web app – job management



Interactive map

Job submission

Job Name

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CPU Cores

12

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UPLOAD CONFIG FILE

You may upload a pre-prepared configuration file. If you do so any settings c

RUN PRE\_FLIGHT CHECKS

DOWNLOAD CONFIG FILE

SUBMIT JOB

Station Demand Model Runs

DELETE

Select ↑	Job Information	Status	Submission Date	End Date
<input type="checkbox"/>	sa_test	Processed	2019-05-30T15:16:53.249491	2019-05-30T15:45:43.979131
<input type="checkbox"/>	Station Demand Test - new queue	Processed	2019-05-30T16:41:32.050020	2019-05-30T16:44:06.091456
<input type="checkbox"/>	helst_test2_pnz	Processed	2019-05-30T18:25:16.597586	2019-05-30T18:33:14.997332

Rows per page: 5 1-3 of 3

Job management

helst\_test2\_pnz

INFO  ERROR

2019-05-30 18:33:13  
model finished

2019-05-30 18:33:13  
tidying up

2019-05-30 18:33:12  
Creating GeoJSON catchment where at\_risk = 'PNZ' and proposed = 'H

2019-05-30 18:33:12  
Getting probability weighted population for: PNZ, from: probability\_pnz

2019-05-30 18:33:11  
Making frequency group adjustment for: HYL

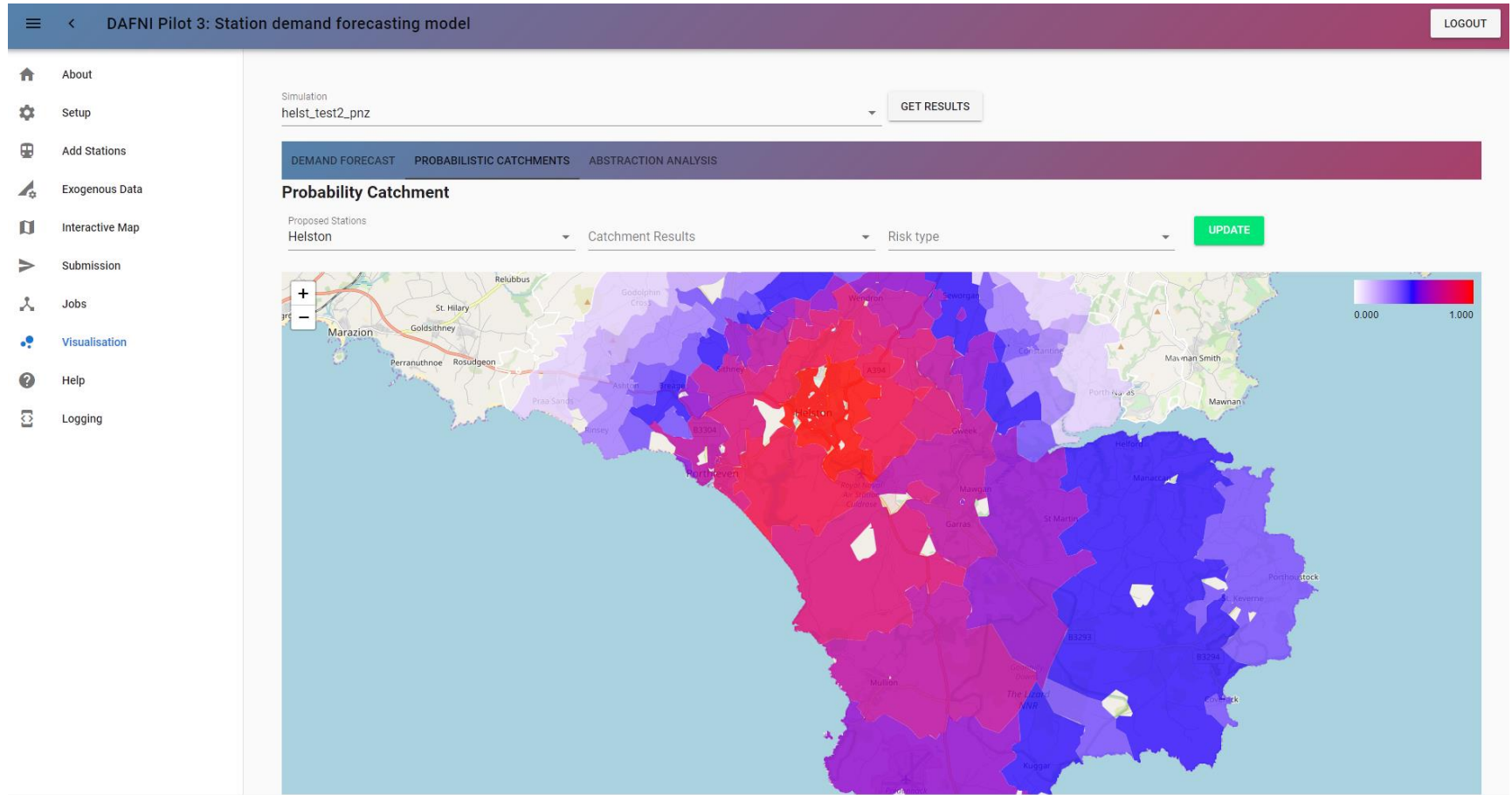
2019-05-30 18:33:11  
Making frequency group adjustment for: PNZ

2019-05-30 18:33:11  
Creating probability table: job\_24\_ofbpc.probability\_pnz\_after\_abs\_hel

2019-05-30 18:33:11  
max choiceset size: 10

Displaying log file

# Web app - visualisation



# DAFNI has enabled rapid and effective sharing of the model

Not another siloed model

Accessible to students and researchers

Potential links to other DAFNI models.

Maximised knowledge exchange and research impact.



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