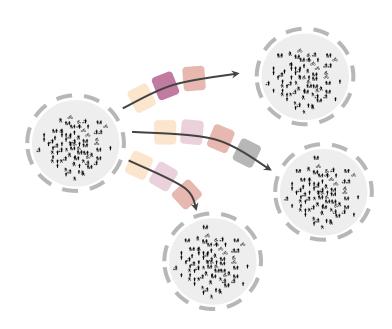
Pandemic Activity Modeller/Modifier (PAM)



MOTIVATION: People are behaving differently, (i) new rules, (ii) new decision making and (iii) changes to employment:

I need to isolate my household.

No way I'm still using the bus.

I'we been furloughed.

I'm a critical worker.

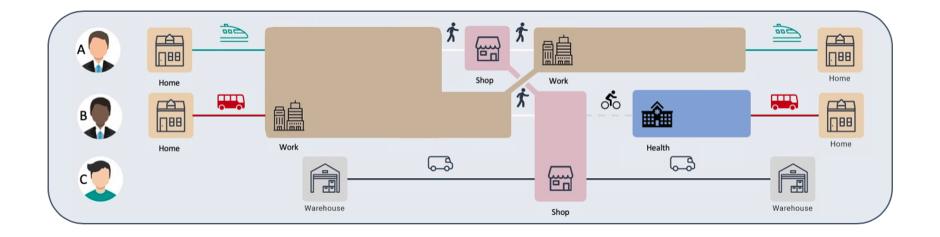
I'm a critical worker.

I'm going to live with my parents.

We're going for a walk.

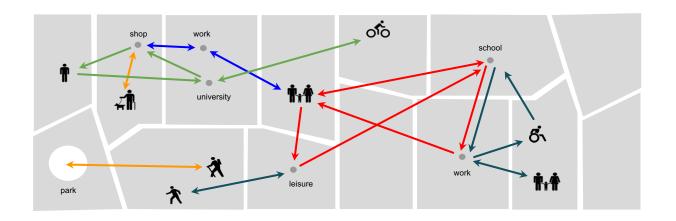
Existing models are out of date and the rules/scenarios are changing rapidly.

We work with **ACTIVITY PLANS**:



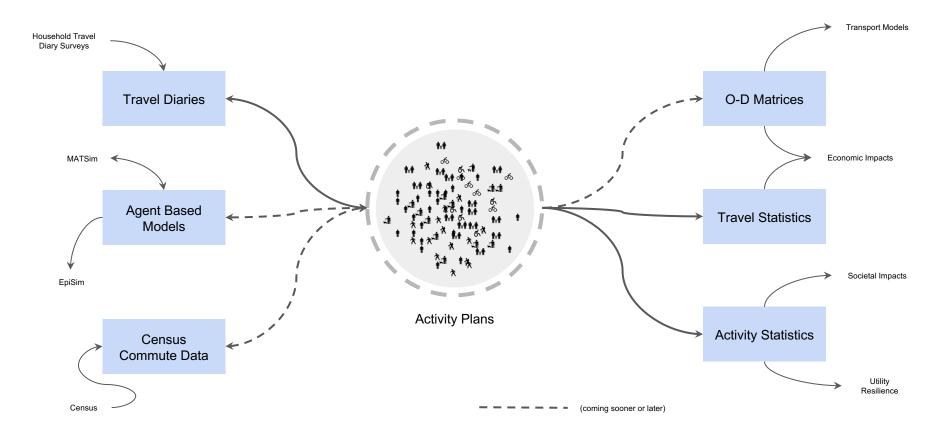
Activity Plans include detailed disaggregate info about a population and its activities

ACTIVITY PLANS are useful for modelling transport demand:

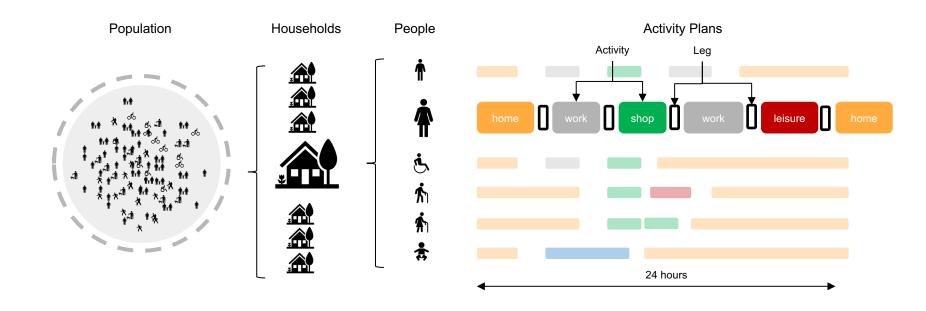


... but also: any model or analysis that cares about where and when people are travelling or doing things, can make use of Activity Plans

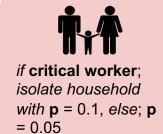
PAM FEATURE (1/2) - reading and writing to and from Activity Plans and other formats/outputs:



PAM CORE (1/2) –Data Structure:



PAM FEATURE (2) - modifying activity plans using policies, for example:





if not critical household; then remove all education activities

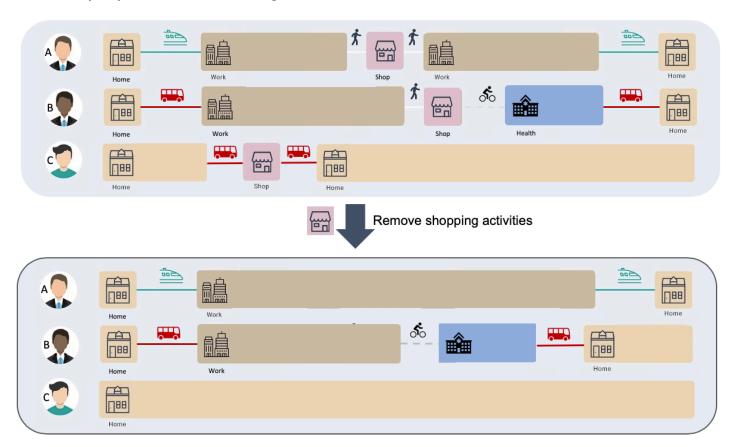


if person age > 50; then isolate with p = 0.2



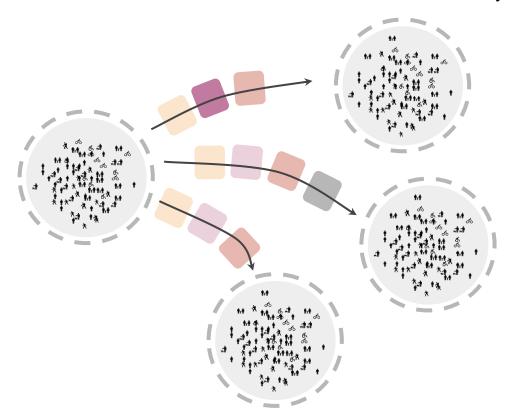
if income > 50k;
remove work
activity p = 0.9

PAM CORE (2/2) – Modification Logic:



PAM APPLIED - eg: Baseline Population **Travel Diaries** Policy A (1) Build Activity Plans Policy B Policy C O-D Matrices (2) Modify Population Activity Plans New Scenario Population **Travel Statistics Travel Diaries** Activity Statistics Agent Based Models (3) Analyse and Output

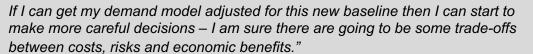
BUT - PAM is a Tool - it doesn't know what's correct, or what the most likely scenarios are:



Example User Story:

"We've reduced transit services as best we can for our drivers and public safety. But we're unsure what impact this has had on people's travel behaviour.

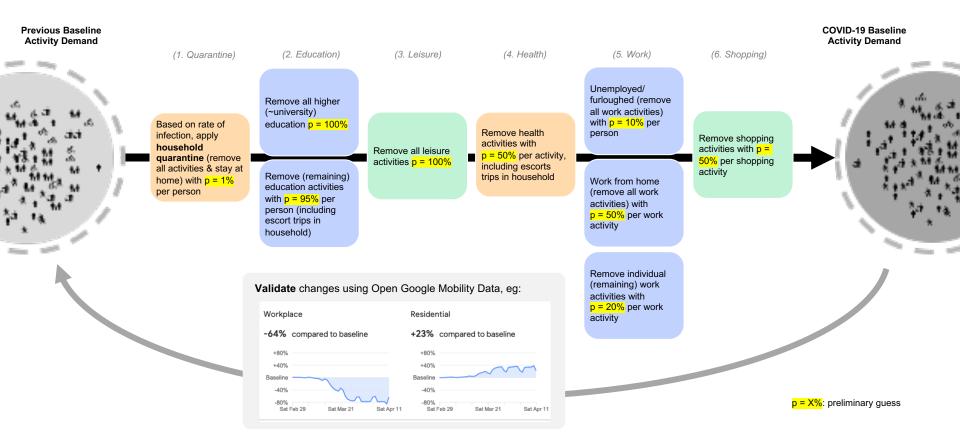
I want to consider closing/opening some stations to better serve the existing demand, but my existing demand model is out of date...



- Local Authority Transport Planner



Baseline 19 – preliminary policy proposals for building a new demand baseline:



Baseline 19 – more advanced policy proposals (2/2):

(2. Education) (3. Leisure) (4. Health) (5. Work) (Kev Workers and Households) (1. Quarantine) (6. Shopping) If not key worker, Apply household Remove all higher remove all work Sample and label individuals as key quarantine with p = If not vulnerable: (~university) Remove all leisure activities with p = 0.9, Remove shopping workers based on segmentation 0.01: Remove all remove health activities with p = 0.5education, based on activities Remove remaining {income/age/race/work activities and stay at activity with p = 0.5age and work status work activities with p status/occupation} home = 0.5Label key worker households, as those Optionally if not critical where all adults are critical workers differentiate between Reduce duration of household: then If key worker, Add health activities different types of extend work activities shopping activities by remove all education if not working household if 50% activities, including to full shift evidence ie escort education {critical/vulnerable} (Vulnerable Persons and Households)

Reduce shared

single household

member

shopping activities to

Label vulnerable households, as those containing a critical worker

Sample and label individuals as

{income/age/race/work

status/occupation}

vulnerable based on segmentation

PAM is Open Source and needs help, we are looking for people to help with:

Literature Review/theoretical vetting by transport modellers/planners

- ie. is the approach useful?
- ie. does the approach sound theoretically ok? is there any existing lit?

Research - what new policies do we need - mode shift?/add daily exercise?/activities closer to home? etc

Data - we need to try out policies and validate them with data

eg can we recreate Google mobility data for different cities with different rules?

Python dev of any level - get in touch please

Got a use case? or new output requirement? - let us know - we will add it to the project

We have more details about the project and how to get involved here: https://github.com/arup-group/pam

Including an example notebook here:

https://github.com/arup-group/pam/blob/master/notebooks/pam-getting-started.ipynb

Feedback:

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