Using Argumentation Within Sustainable Transport Communication

The road towards applied argumentation systems at scale

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Why Sustainable Transport?

- Happenstance.

- MyWay EU Project: seamless integration of point-to-point sustainable transport services

- SUPERHUB EU Project: integrate existing behaviour change mechanisms into sustainable urban transport systems
Aims

1. Build an exemplar open & extensible applied argumentation system
   - Lots of people working on key elements of all stages of such a system, but very few systems in the wild (& none that are completely open)
   - [a] gather & analyse data from the problem domain (the corpus)
   - [b] construct a theoretical & applied framework for using the corpus
   - [c] Apply the system to effect lasting behaviour change at scale

2. Demonstrate that techniques from Argumentation Theory can align productively with Behaviour Change Theories to build effective behaviour management systems
Polluting emissions from most sectors are falling but transport related emissions have risen 36% since 1990.

Transport is a huge source of environmentally damaging emissions & pollutants (CO2, CO, NO, Ozone, Particulates, Toxics & Volatiles)

Accounts for 40% of final energy consumption in the EU.

73% of road passenger transport is individual cars (often with a lone occupier).

In aggregate, individual travel habits have a large impact on the quality of the environment (particularly urban environments in which 54% of the world’s population now live).

Reducing unsustainable travel behaviours is a normative policy goal in many developed world contexts.
Behaviour Change

Two popular theoretical models:

- Fogg’s Model of Persuasive Technology or “Captology”
- Michie’s COM-B Model

Popular basic techniques:

- Goal Setting+review | Monitoring+feedback | Comparison | Prompts+personalisation | Aiding/supporting decision making | Gamifying
Fogg & Michie

* Captology [fogg, 2003]:
  * [M]otivation
  * [A]bility (make behaviour easier/lower to target’s level)
  * [T]rigger
  * (simultaneously) M+A+T ==> Behaviour more likely to occur

* COM-B [Michie, 2011]:
  * [C]apability
  * [O]pportunity
  * [M]otivation
  * C + O + M ==> Behaviour Change
Behaviour Change in SUPERHUB [gabrielli, 2014]

- Gamifying/Leveling/Achieving

- Earn points for performing approved actions

- Gain rewards for achieving certain statuses

- Hope that this “Skinner box” approach leads to habitual change
Feedback

• Provide information about choices before they are made
• Show how choices affect individual

Behaviour Change in SUPERHUB
[gabrielli, 2014]
So What’s The Problem?

- Even if a person has the Capability & an Opportunity (or the Ability & a Trigger);

- If a person isn’t particularly motivated then
  
  - behaviour change is less likely to be successful, &

- If behaviour change is successful then
  
  - it is less likely to be life-long / lasting / sustainable
& How are we going to tackle it?

- Informed choices are made in the presence of increased knowledge.
- Dialogue is a good interaction mechanism for increasing a person’s knowledge about the context of their behaviour.
- Argument is a good way to structure information if it is related to justifying positions.
- Assumption: For behaviour change to be sustainable, target must make informed choices about their behaviour.
Motivating Sustainable Behaviour Change

- Current behaviour changes theories & techniques
  - Have rich psychological model of how behaviour changes
  - Techniques for achieving behaviour change are less well developed
    - Rudimentary forms of information-seeking/persuasion & use of incentives or coercive techniques
Behaviour Change & Argumentation

* Align well developed models of (1) interaction, (2) knowledge representation, & (3) reasoning from argumentation theory with the well developed models from behaviour change theory

* AIM:

  * [A] Use arguments to increase motivation
  * [B] Use dialogue to interact with users
  * [B] Adapt the rich range of argumentation schemes and dialogue models to work with behaviour change theories
Building the Corpus

* Many websites & “official” communications that aim to raise awareness of sustainable transport issues

* Kate had built a private research archive of sustainable transport related websites which provided the core

* Initial raw data collected in 2014-15 (ongoing)

* Currently incomplete - A “Living Resource”; When is a dataset complete...?
Formatting & Handling Procedures

- Git repository (currently shared on GitHub & also archived to FigShare for “releases”) containing:
  - Resource: UTF8 Plain Text File
  - Analysis: AML & AIF files
  - (optional) Annotated & Extended resource showing contextual placement of non-textual elements
  - (optional) Additional notes.txt about the resource
  - (optional) Screenshot of original resource in situ as PDF or PNG file at sufficient resolution for legibility
- Metadata: UTF8 plain text file containing:
  - GUID - generated using a standard tool
  - Date & Time of Collection (ISO-8601 format)
  - Location of original resources (URL, URI, DOI)
- Supplementary scripts: for generating metadata file, for converting everything into JSON for bulk loading into a document oriented DB (e.g. MongoDB or CouchDB)
Best Practises

* Hierarchy of optimal data reuse aspects:
  * Preserved in some format
  * Archived for long term
  * Accessible to others
  * Comprehensible by others
  * Discoverable & indexable

* Reproducible
  * Trusted provenance
  * Citable & trackable
  * Usable by others
  * Integrated
  * Based on 10 habits of highly effective data [de Waard, 2014]
Summary of Data so far

- >60 resources from public-facing web-sites
- Recurring features:
  - Population segmented by transport type & messages directed accordingly (often also further assumptions about life-style).
  - Testimonials frequently used to personalise otherwise plain facts, e.g. “I am fed up of X & desire Y because Z” or “Since I started X I have seen benefits Y because Z”
  - Devils advocate - posing tougher questions “the bus will always run so does walking really save carbon?”
  - Incorporation of challenges interleaved with reasons: “why not try walking to work during ‘walk to work week’? It could save you money and you get fit!”
  - Longer discursive text supporting the briefer messages of the “advertising campaigns”
  - Positive or neutral tone is used. The tone is rarely negative, e.g. “here are 3 good reason to get out of your car and on your bike...”
  - Messages often couched in terms of shift of behaviour between modes (see above)
  - Negative communications reserved for the car (but only as individual private transport; sharing, pooling, taxis exempted)
Conclusions

• 1 step on a long path

• Many more resources to incorporate (& a lot of analysis to perform)

• A system, which uses the resources, to build

• An aligned model of behaviour and argumentation to build and validate
References


