Using Argumentation within Sustainable Transport Communication

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Abstract

In this paper we present the preliminary results of a survey of persuasive communication within the sustainable transport domain. This survey is underpinned by a reconstruction of the arguments used, a scheme-oriented analysis of the corpus of reconstructed arguments, and elements of a theoretical and applied framework for using the corpus to effect lasting behaviour change using argumentative techniques within the self-same domain.

Transport, particularly that relating to personal mobility is a huge source of environmentally damaging emissions and pollutants. Additionally the transport sector alone accounts for 40% of final energy consumption in the European Union. Whilst emissions in most sectors are falling, those from transport-related emissions have risen by 36% since 1990. Cars alone account for 12% of the total EU CO2 emissions, with similar figures for CO, NO, PM, Ozone, and other toxic and volatile chemicals (figures gathered from the European Commission[1]). Individual travel habits therefore have a large impact on the quality of the environment, particularly in urban environments in which 54% of the world's population now live [2]. However, if people can be persuaded to modify their habitual behaviours, to choose to use more sustainable transport modes where those are available, then real improvements in the environment can be achieved. To achieve this requires three important factors to be taken into account; firstly, how to effect lasting behaviour change, in this case we see argumentation-based interaction as a key factor, secondly, how to effect such changes at scale, in this case supported by digital technology, and finally, to collate sufficient resources, in this case arguments, to enable a digital behaviour change support system to act autonomously and sustainably in the problem domain.

A preparatory step in developing an argumentation system that targets a specific problem domain is the acquisition, structuring and preparation of useful domain-knowledge. It is this knowledge acquisition step upon which we focus in the core of this paper. There have been many public awareness campaigns and communications over the last few decades

[1]Climate Action Policies: `http://ec.europa.eu/clima/policies/transport/index_en.htm`

[2]World Health Organisation Global Health Observatory Data: `http://www.who.int/gho/urban_health/situation_trends/urban_population_growth_text/en/`

which have aimed to change personal transportation habits[5], for example, encouraging cycle use or discouraging car use. These campaigns often reduce the message to the level of a slogan, removing nuance that might otherwise make a developed argument more persuasive. We have collated motivational messages from more than 100 existing sustainable transport communication campaigns deployed around the world. These messages have, where necessary, been treated as enthymemes and have been reconstructed to instantiate unexpressed premises and conclusions. The resulting arguments have been subjected to a scheme oriented analysis to yield more complete argument resources that include consideration of critical questions and the ways in which the argument might be responded to. By reconstructing these arguments and storing them in a reusable way using the Argument Interchange Format (AIF), we have been able to construct a corpus that can be explored using appropriate interaction techniques, and whose elements can be framed and presented in the most strategically appropriate way, given consideration of the specific person and the behaviour that is being targeted.

We propose that to effect lasting behaviour change, the recipient must make an informed decision about their behaviour and the habits that they wish to change. Non-permanent behaviour change could occur through happenstance, the participant tries something different for no apparent reason, or trickery, the participant does something different because it is made easier to perform the new behaviour, or bribery, the participant is offered some incentive to alter their behaviour. However lasting and persistent habit formation will occur when a person understands the context in which their behaviour must change and can fall back upon their personal reasons for doing so, especially if the old habits are difficult to break or the new habits are difficult to form. Additionally it is also important to recognise that for a person to change their established habits is difficult and that they need to be supported in forming new and different habitual behaviours[3]; behaviour change, especially in difficult problem domains does not easily occur in a vacuum but can require external support. Whilst behaviour change theory can provide relatively rich psychological models, particularly of the process that underpins how new behaviours are formed, it is argumentation that can provide well developed models of (1) dialogical interaction, (2) reasoning, and (3) supporting knowledge representation. Together these will enable effective and repeatable behaviour change in targeted problem domains like sustainable transport. Whilst behaviour change provides mechanisms for supporting the formation of new habits, for example, through the use of targeted interventions and challenges, argumentation provides the mechanisms for ensuring that a person is making an informed choice and has established a personal justification for why they are performing such a difficult task. It is the person deciding to make an informed and justifiable choice, to change their behaviour, that is a key aspect to effecting long lasting behaviour change. Additionally, to achieve this kind of behaviour change at scale requires the adoption of digital technologies and the use of personalised and appropriate interaction techniques[6] to ensure that arguments are both selected and framed so as to be as effective as possible for the given person. Our aim is to use arguments to increase motivation, to use dialogue to interact with

users, and to adapt the rich range of argumentation schemes[8] and dialogue models[9, 7] to work with behaviour change theories [4, 2].

Finally we lay out a program of future work that seeks to provide a solid quantitative foundation for the current approach though evaluation of both our corpus of sustainable transport arguments and our interaction mechanisms to ensure that they are both effective and appropriate. In the longer term we aim to identify effective, scalable, and reproducible communicative and argumentative techniques that can be used to help people to make informed and justifiable choices about their behaviours.

The major contribution of this research is to underpin existing motivational and behaviour change communications within the sustainable transport domain with solid argumentation theoretic foundations and to provide an extended corpus of analysed and reusable arguments. This approach brings together two important and complementary research areas, one of which has focussed on psychological models at the expense of practical techniques, and the other which has focussed more heavily on ideal reasoners and normative models, almost to the exclusion of consideration of the messy thinking that characterises human action in the real world.

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