DESIGNING ADAPTIVE AUDIO FOR AUTONOMOUS DRIVING: AN INDUSTRIAL AND ACADEMIC-LED DESIGN CHALLENGE

Doon Macdonald

Swansea University
Swansea
SA1 8EN, Swansea, UK
d.g.macdonald@swansea.ac.uk

ABSTRACT

The paper discusses a design challenge around the use of adaptive audio to support experience and uptake of autonomous driving. The paper outlines a collaboration that is currently being established between Researchers at Swansea university and a major OEM that is set to examine user-centred approaches to designing audio that enhance and enrich human-experience with driving.

The paper outlines the potential collaboration and describes how we will address the challenge to designing adaptive audio for unsupervised autonomous driving. The paper outlines the research question we will address and how we will apply a tool/method that supports rapid prototyping for novice designers alongside addressing ideas around aesthetics in the interface and relationships between sound as a means for communication and as experience.

1. INTRODUCTION

The enthusiasm around autonomous cars is on the increase. This exciting technology has the potential to nurture positive societal changes, including reduced environmental impact, improved traffic safety and more efficient mobility. Additionally, using Autonomous Driving (AD) technology might support commuters by allowing them to be more productive to and from the commute to work (time to do work, for example). However, the introduction of highly automated cars will require a re-definition of the car-driver interaction. The ongoing technological development will put completely new demands on the design of interactions inside of the car, in order to support the driver in his or her role and to create an appropriate driving experience.

The relationship between the human and the car becomes a vital factor and is more important than ever when it comes to the trust and uptake of autonomous vehicles. The Car will be in control and so, it is only prudent to ask, what role the driver will take when the car is making the decisions? how will the driver (or, end-user) trust the car and perceive it as intelligent enough? what can we, as designers, do to enable a comfortable and safe experience for the end-user?

Even if unsupervised AD cars are brought to the market, their success will be down to the willingness of users to accept and adopt this new technology. Users need to feel that they can trust the AD technology [1, 2] they need to feel that it is safe to use it, they need to perceive it as being more useful than their current mode of transportation [1] and they need to enjoy using it, in order for them to accept unsupervised AD and eventually adopt it [2]. The user does not have to pay attention to vehicle-related visual displays any more and is freely enabled to carry out non-driving tasks [3]. This situation introduces a lot of freedom and calls for new ways of designing the user experience of the car [4].

As control is shifted away from the driver and vehicles become autonomous, there is a limit to the joyment felt. This is because the travelling experience for the driver is not taken into account [5].

It is fair to argue that, with the adoption of autonomous cars visible on the horizon, the car industry needs to explore important questions that focus on the human: trust, experience, uptake, acceptability and accessibility.

2. ACADEMIA AND INDUSTRY

Researchers from the CHERISH-Digital Economy Centre at Swansea University, UK and the OEM are developing an important relationship in order to address this challenge. Specifically, researchers at both institutions will explore the role of sound in creating a valuable user experience, with a focus on how adaptive sounds can be designed and implemented in order to support the relationship between the user and the car in a given driving scenario.

Researchers from the OEM and Swansea met at when the author presented SoundTrAD (a method and tool created by the researcher) to a driving scenario [6]. SoundTrAD is a tool that enables a designer to create prototype auditory displays and adopt a user-centric approach to the design. The tool is based on ideas and principles from Soundtrack composition. It enables a systematic approach to prototyping audio for a given scenario whereby the story and aesthetics and the use of sound as both communication and experience are important design considerations. SoundTrAD enables designers to blend different audio, test different use cases and rapidly prototype auditory displays. More is discussed on this in section 4.0.1.

A relationship was formed because the OEM and CHERISH-DE both share a human-centred approach to design whereby human values remain at the heart of any technical innovation. The CHERISH-DE centre (CHERISH) is an acronym for ‘challenging
The CHERISH Digital Economy Hub, Swansea University

1https://cycling74.com
2https://processing.org
3http://icnmat.berkeley.edu
4https://unity.com
7. REFERENCES


