Exploration of Vehicle Personality Expressed Through Motion

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ABSTRACT

In this extended abstract we discuss the design of a personal vehicle that exhibits behavioral constructs expressed through motion in order to improve the user's commuting experience. The behavioral, personality-like traits demonstrated by the vehicle are intended to be useful and helpful, as well as to stretch beyond the effectiveness into affect and emotion, creating an overall more satisfying experience for the user. In this short paper we describe the design of the personal vehicle behaviors, demonstrate the scenarios they will be used within, and argue how a vehicle with personality expressed through motion could be beneficial. While this work-in-progress report reflects mostly on our high-level design approach we are currently completing the implementation of our prototype personal vehicle and are about to conduct preliminary user studies.

Keywords

Vehicle, personality, behavior, expression through motion

1. INTRODUCTION

Vehicle personality may seem like an abstract concept but in reality many people already treat their vehicles as if they possessed the ability to understand and respond to their requests. In fact, many people have been known to give their vehicle a name. This behavior seems irrational but the emotional connections we have with our vehicles appear to justify these behaviors. Emotions that are evoked by these relationships can range from anger to fear to pleasure, and can play a fundamental role in the way we operate our vehicles [1].

The purpose of our research is to design a personal vehicle that exhibits personality through motion, and to discover how humans will react to such a vehicle. That is, more specifically, what behavior types exhibited by the vehicle motion and movement would be acceptable to humans? Which displays of behavior are beneficial and which ones pose a negative impact on human-vehicle interaction? It has been shown that matching a driver's emotion to the perceived emotion of a simulated car voice can improve the driver performance and safety [2]. We would like to further explore the emotional connection between human and vehicle through a different non-verbal layer, the vehicle personality as expressed via its motion. We propose three different classes of applicable behavior, which we are planning on investigating using our prototype: *semi-autonomous*, *cooperative*, and *training or taming*.

2. BEHAVIORAL CONTEXTS

This section introduces the main proposed applicable personality-through-motion classes and suitable scenarios.

2.1 Semi-Autonomous Behavior

With this behavior type the vehicle follows a trend that allows the user to provide as little or as much input as they wish. During the semi-autonomous behavior the vehicle navigates or takes the user where they wish or are required to go, but alarms the user, for example via abrupt motion or vibration, of any information that is of importance. This personality profile allows the user to focus on other tasks as opposed to navigating, but still maintains situational awareness via subtle motion-based expression.

2.2 Cooperative Behavior

During this behavioral state the user and the vehicle collaborate to enhance the user's experience, and help the user fulfill predefined set of tasks. As an example, while the user is awaiting their flight departure, the personal vehicle transports the user among the shops at the airport. The user is preoccupied shopping and is unaware of the time. In order to prevent the user from missing their flight, when it is boarding time the vehicle may perform "nudging" motions, attempting to transports the user in the direction of the gate, signifying that the user needs to get going. The vehicle may exhibit portions of the semi-autonomous state or may be completely passive until the user wishes to perform some action that is not in their best interest.

2.3 Taming/Training Behavior

In this behavioral state the vehicle initially begins as a blank slate that may or may not behave the way the user wishes. Similar to a puppy dog or a horse, the vehicle must be "broken" or trained to respond the way the user would like them to. The vehicle may, for example, move too fast for the user who prefers a more cautious style of movement. Conversely, the user may want the vehicle to move in a more aggressive manner with quick accelerations and more abrupt stops. This behavioral type allows the user to have a sense of customization, companionship and pride of ownership.

Further exploration will be conducted as to discern which behavioral classes would be best suited for different tasks and scenarios.

3. PERSONALITY EXHIBITING VEHICLE

For our testing we have designed two types of prototype vehicles, a sitting and a standing platform, both of which are based upon an electric wheelchair base. For input, both vehicles use a Nintendo Wiimote connected via Bluetooth to a PC and a Sabertooth 2X25A motor driver that takes input from the PC. Preliminary studies will be conducted using a "Wizard of Oz" method, wherein the user is unaware that the vehicle behavior is being controlled, "puppeteered", by the study administrator. Personality profiles loaded on the PC then determine the mixture of control the user and the vehicle (expressed by the "Wizard") have over the overall motion of the vehicle, thus allowing the vehicle's expression of behavior-through-motion to emerge, and allow us to explore user's thoughts and feedback regarding the effectiveness of our approach.

4. REFERENCES

[1] Sheller M. Automotive Emotions: Feeling the Car. *Theory Culture Society* 2004 21: 221, 2004.

[2] Nass et. Al. Improving Automotive Safety by Pairing Driver Emotion and Car Voice Emotion, 2005