

Vehicular Lifelogging for Ambient Storytelling and Contextually Rich Play

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Abstract:

This project presents an innovative design for vehicular lifelogging that engages drivers in playful interactions with their vehicle. In particular, our design strategy provokes drivers' imaginations of their car's "character," augments the relationship between driver and vehicle, and repositions the context of driving as an opportunity for ambient storytelling.

USC's Mobile and Environmental Media Lab:

Housed within USC's School of Cinematic Arts, *The Mobile and Environmental Media Lab's* design methodology straddles the cultures of visual storytelling, games, and interaction design. Accordingly, our work mashes together conceptual tools of storytelling (dramatic arc, character motivation, conflict, obstacles, and resolution) with the core concerns of game design (systems, procedures, constraints, objectives, resources, core mechanics). Our research has explored context- and location-specific mobile storytelling, interactive architecture, vehicular and environmental lifelogging, and core automotive experience design [7,8,9].

1. Introduction:

MobileHCI 2012

(Position paper for The Car as an Arena for Gaming)

As traditional notions of the magic circle become decentered by ubiquitous modes of engagement, new strategies are available for interactivity designers to blur the boundaries between ludic and non-ludic experiences in everyday life. The expansion and destabilization of the context of driving opens up exciting new research opportunities for designing play and



Figure 1.
Early paper prototype for an automotive
"assassin" game.

storytelling experiences for drivers and passengers [1,8,10]. In this area, our research is particularly interested in how these new opportunities enable us to rethink the relationships between humans, environments, and vehicles.

Our aims have been three fold: (1) to look inward to the imagined "character" of the car, (2) to look outward to the larger social context that surrounds driving, and (3) to treat the "lives" of vehicles (and the relationship between humans and cars) as fruitful areas of design research.

This approach represents a significant departure from the familiar motif of onboard computer as glorified butler. Rather than thinking about how a car can anticipate its driver's every need, instead we reposition the car as co-participant (and co-conspirator) in an evolving relationship. We use the framework of the

Lifelog Interface as a portal through which drivers can engage with their vehicle as a new kind of experience platform. We developed a series of prototypes to test out these models. These initially included paper prototypes [Fig. 1], storyboards, sensor-based brainstorm cards, and theatrical experience design strategies. This process led us to develop a rapid prototyping system using iOS, an automotive sensor API, and a cloud-based authoring tool. This platform was engineered to enable modular and recombinatory connections between sensors and driver feedback. In our model, the car is no longer merely transport but a springboard for adventure, a "drivable" musical instrument, a 21st century scrapbook, and a playful reimaging of what it means to drive.

2. Vehicular Lifelogging

Towards this end, we have designed a vehicular lifelog system for the MINI Cooper line. Our prototyping system uses in-car sensors to engage drivers in playful discoveries about their vehicle, driving environment, and social context (throughout the lifecycle of their car).

2.1 Authoring Tool

We developed a browser-based authoring tool to feed sensor-event-definitions to an iOS application that communicates with the MINI's onboard computer. With this system, every sensor in the car becomes a potential input for an experience design scenario. The authoring tool enables us to define sensors (and tallies of sensor events) as triggers for particular text-based responses in the car. This strategy enables rapid prototyping of novel play and storytelling experiences and essentially turns the car into a giant immersive game controller.

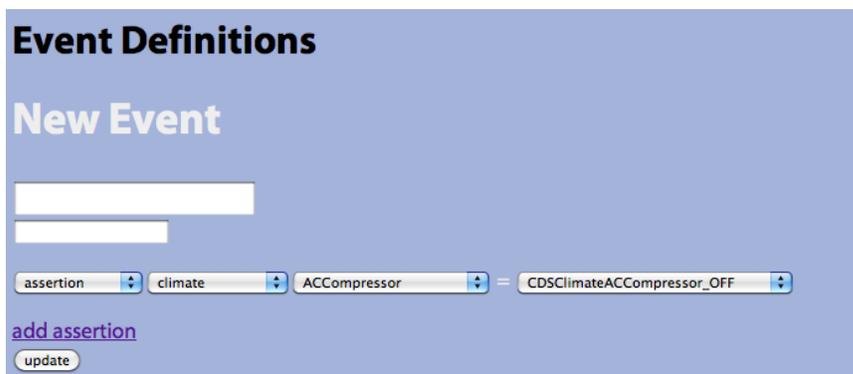


Figure 2.
Event creation module of web-based lifelog authoring tool.

We created a web interface that breaks all of the car's sensors down into an XML hierarchy, which populates a dropdown selection tool [Fig. 2]. We positioned the server component to not only track which events were found, but also, to define which events we were looking for at the point that the driver plugs in the phone. This model enables us to define new—or modify existing—events on the fly and meant we could author new events via the web while we were out driving "in the field."

3. Lifelogging for non-humans:

The concept of the lifelog is often associated with ubiquitous video capture from a single human's perspective. Recent examples include Steve Mann's work on sousveillance [9] as well as Gordon Bell and Jeff Gimmel's work with the MyLifeBitsSystem (which utilized the SenseCam to capture every moment of Bell's life) [5,6].

By contrast, our approach to lifelogging treats objects and environments as entities with their own stories to tell and as narrative platforms for the speculative authoring of human-object relationships [11]. We also sidestep

the typical emphasis on video capture and instead focus on the way that objects “see” the world through sensors.

4. Lifelogging as platform for Ambient Storytelling

Our model of lifelog research has led to insights about a mode of engagement that we refer to as ambient story telling – essentially storytelling that unfolds asynchronously in the background, (as opposed to the foregrounded and durational storytelling of media artifacts like movies, traditional novels, or most video games). Examples of ambient storytelling in the automotive design context include location-based storytelling applications developed by Brunnberg *et al.* [2] (this work used objects in the environment and audio cues to drive a location-based interactive story).

This notion of ambient storytelling is informed by a variety of artistic, narrative, and design traditions including but not limited to: Mail Art, Sticker Art, web-based ambient storytelling, geocaching, augmented reality games, alternate reality games, and certain locative/pervasive games where players first blend into and then emerge from the background of a city. What these interactive experiences share is a kind of intermittence, a lack of explicit foregrounding, and a sense of always-on or potentially available mystery that confounds the expectations of a participant and keeps them guessing about what counts as play or story.

5. Playful Remapping of the Relationship between Sensors and Context:



Figure 3.
Rain sensors, originally intended to trigger the automatic windshield wipers, were used instead to trigger a “Car Wash” event.

Our lifelog authoring system and framework of ambient storytelling enabled us to adapt automotive sensors for unexpected purposes. In particular, we were interested in exploring surprising and playful connections between sensors and driving context. For example, we used the rain sensors (which were designed to trigger the automatic windshield wipers) to indicate that the car was being washed [Fig. 3].

This recognition enabled us to create notifications that demonstrated the car’s gratitude to the driver.

Other playful interactions included a “Showering Together” achievement for spraying the windshield fluid while the sunroof was open (i.e. inadvertently getting the driver wet). These sorts of “achievements” were designed to be

tongue in cheek, or in other cases mysterious. This approach enabled us to sidestep the pitfalls of gamification [3] by recontextualizing driving as a playful opportunity for storytelling.

5.1 Recognizing Social Context

The lifelog events we prototyped provided new ways of mapping the relationship between sensors and social context. In [Fig. 4], for example, we enacted a scenario in which a child is dropped off at preschool. The lifelog can infer (and tally) this event by recognizing a change in the passenger seat sensor-status (switching from child-occupied to unoccupied) along with a particular GPS location. Similarly, seat sensors can recognize the first time a child has occupied a passenger seat, and GPS coordinates can match this event with the location of a hospital. Later, when the driver returns to the vicinity of this location, a “Memory” event is triggered.



Figure 4. Using the seat sensor, the lifelog recognizes that a passenger (in a child-seat) has been dropped off. This information, paired with GPS coordinates for a local school, adds an instance to the “Dropping Off Child” tally.

5.2 Sensor Cards as Brainstorming Tool

In order to inspire this design process as well as organize the sheer number of sensors and sensor-states available, we created a deck of automotive brainstorming cards [Fig. 5] that break the sensors into: (1) families (by color), (2) sensor names (illustrated by evocative icons), and (3) the available states or potential values/units for each sensor. These cards proved pivotal in helping us to visualize the various sensors and their potential combinations. Drawing inspiration from design cards such as IDEO’s Method Cards [4] and Batya Friedman et al.’s Envisioning Cards [7], we used our deck as a tool for brainstorming novel approaches to vehicular lifelogging. In particular, we created concepting exercises



Figure 5. Sensor cards: a concepting tool that helped us to playfully reimagine the relationship between automotive sensors and driving contexts.

around these cards in order to provoke serendipitous connections between sensors and help us to reimagine the familiar contexts of driving.

6. Lifelog interfaces:

While lifelog events trigger notifications on the MINI infotainment system, a much richer iPad interface [Fig. 6] was also designed for out-of-car review. This interface maps lifelog events according to location, time, and event definition.

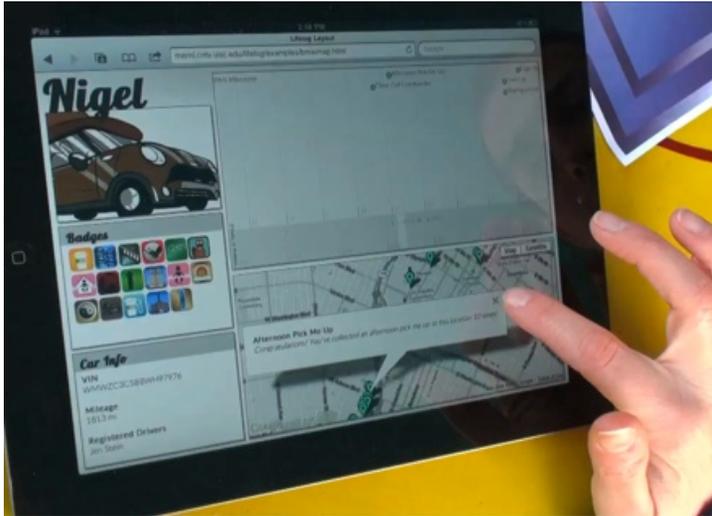


Figure 6.
Lifelog out-of-car review interface for iPad.

Earlier prototypes of our lifelog interface transformed the car key—which we see as a tangible avatar of the vehicle—into an evocative fiduciary object for touch screen interfaces [Fig. 7 & Fig. 8].



Figure 7.



Figure 8.

When drivers return home, this interface [Fig. 7 & 8] offers an evocative portal into the vehicular lifelog. The interface itself plays on the metaphor of concentric tree rings to represent units of time [Fig. 8].

7. Conclusions:

Our design strategy uses intermittent play, ambient storytelling, and lifelogging concepts to deepen the relationship between a driver and their vehicle. Our lifelog authoring system affords rapid prototyping for sensor-driven interactive experiences. This approach encourages creative remapping of the relationship between sensors and driving contexts. In this way we've proposed a new approach to automotive design that looks "in" to the imagined space of a car's character and "out" to the surrounding social contexts in which a car exists as a lived experience.

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