Introduction

Well designed automobile Traveler Information Systems (ATIS) can enhance the navigational performance and enjoyment of drivers. For example, providing turn-by-turn directions, supporting the user’s goals, and distinguishing between planning and driving tasks can greatly improve the experience.

Use of Landmarks

- Using appropriately selected landmarks (e.g., “next traffic light”) leads to decreased reaction times when using ATIS.
- Redundant cues increase the probability and speed of detection.

42% of drivers preferred turn commands that mention both the street name and the traffic light (e.g., “Make a left at Main Street, which is the next light”).

61% of drivers would like to use familiar landmarks to describe directions to new locations.

Planning vs. Completing the Task

- Planning and executing navigational tasks may be done in different contexts.
- Planning may either be done away from the car (e.g., at home, before leaving). Carrying out the task of navigation may only be done while driving.
- Planning a trip may also occur while driving.

While driving to shopping, entertainment, or dining, nearly half of drivers change destinations en route more than 1 trip out of 10 (45%).

Goals of Driver vs. Goals of ATIS

- Drivers want navigation help for 2+ destinations (74%).
- Drivers prefer to allocate part of the planning to the ATIS when not under time pressure (39%).

Display Issues

- Driving is a visually intense task that could have life-or-death implications.
- Displays that allow quick access to pertinent information are necessary.

Drivers prefer a dedicated in-vehicle display for navigation, rather than a laptop or PDA.

Conclusions & Future Work

Survey results supplemented existing Human Factors literature to provide suggestions for the improvement of ATIS. The research indicated that further study is necessary to improve the information provided by ATIS.

Survey Nuggets

- Most travel on an unfamiliar route at least once a week.
- 56% use maps; 40% use directions to navigate.
- 50% learn a route after one or two visits; 95% after 5 visits.
- 63% in favor of logging their trips automatically.
- Turn instructions: 22% prefer “at Main Street”; 26% “at traffic light”; 42% prefer both.
- “Directions users”: Younger; urban; female; in a hurry.
- “Landmark users”: Those who prefer “traffic light” also prefer using other landmarks to navigate.

Under time pressure: avoid delays; minimize route time; avoid stressful situations.

No time pressure: avoid stress; enjoy scenery.

Fewer route changes and more time pressure when going to work, school, or appointments.

Carpool more often when going to dining/entertainment; less carpooling when going to work.

Females drive less; more unfamiliar routes; avoid using maps; prefer to use familiar places as landmarks for getting to destinations.

Younger drivers more in favor of chunking turn sequences in a single command; travel unfamiliar routes more often; emphasize shorter route times over other factors (like stress, enjoyment, etc.).

Survey

550 participants (60% F; 40% M) 50% from metro areas of 1,000,000+ Median age 37 yrs

Internet responses, from a pool of registered participants.

Designing Better Traveler Information Systems: Cognitive & Task-Related Factors

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