Some remarks on
human factors in driving automation
by
Prof. Thomas B. Sheridan

Introduced by

Prof. Makoto Itoh

University of Tsukuba

Motivation

- I was not sure whether or not
  - we understand human factors issues to be addressed, and
  - we are going to the right direction.

- I wanted to ask questions to
  - Prof. Thomas B. Sheridan,
  - Prof. Raja Parasuraman, and
  - Prof. Neville P. Moray.

- This time, I had an opportunity to ask some questions to Prof. Thomas B. Sheridan.

Prof. Thomas B. Sheridan

- He is Professor Emeritus, MIT

- His research interests are in experimentation, modeling, and design of human-machine systems in aviation, rail and highway transportation, space and undersea robotics, process control, and medicine.

- He is the author *of Telerobotics, Automation, and Human Supervisory Control* (MIT Press, 1992).

Levels of Automation (Sheridan, 1992)

1. The computer offers no assistance; human must do it all.
2. The computer offers a complete set of action alternatives, and
3. narrows the selection down to a few, or
4. suggests one, and
5. executes that suggestion if the human approves, or
6. allows the human a restricted time to veto before automatic execution, or
7. executes automatically, then necessarily informs humans, or
8. informs him after execution only if he asks, or
9. informs him after execution if it, the computer, decides to.
10. The computer decides everything and acts autonomously, ignoring the human.

Questions from Itoh to Prof. Sheridan

1. **What are the important problems that automated driving systems are facing? In our project, we think that**
   – It is difficult for drivers to understand when to intervene into or take-over the control. The mechanism and its limitation are quite unclear for lay drivers.
   – It is difficult for drivers to maintain their "readiness" during automated driving. In particular, supervisory control for an automated driving system is difficult for human drivers.
   – It is difficult for automated driving systems to communicate with other road users.

   Are there any other important problems to be solved?

2. **Possible solutions for the problems**
   – If we need to realize Level 2 automated driving systems, what could be effective? What kinds of HMIs are needed? What kinds of skills are required for drivers? Is education and/or training useful?

3. **Future direction for really useful automated driving systems. To whom, for what purpose?**

4. **What are the roles of human factors engineers for developing automated driving systems?**

See video presentation

10 min