Simulated Driving Lessons: Overtaking a Car

ALE1 – SSS2

Isabella Pollak, Jan Grosche, Kassim Sheghembe, Rosen Chakarov

Designed System and its Learners

- Task: overtaking another car

- System:
  - simulated driving lessons with steering wheel and pedals to control direction and speed
  - driving instructor agent links practical training to theory, guides through sequence of actions in order to overtake, gives hints and prompts
  - eye-tracking used to evaluate students' visual attention of crucial areas of the road

- Interface between theory and application to support driving lessons

Interacting and Adapting to the Learner

- Interaction:
  - asks students to evaluate situation (theory linked as well as action based)
  - natural language dialogue about crucial aspects of the situation
  - hints and prompts provided if student is unsure about evaluation
- Reaction:
  - students actions
  - their looking patterns (eye-tracking)
- Adaptation:
  - Next situation more or less complex than previous one based on students' previous answers

Teaching Approach

- Simulated driving lessons based on empirical findings about effects of simulation training on driving habits (Underwood, 2011; Pradhan, 2009)

- "Coached problem solving" - mastering situation together, students modeling (based on Andes, Gertner & VanLehn, 2000)

- Simulated agent – helps student construct knowledge about applying theory to traffic situations (based on Autotutor, D'Mello & Graesser, 2012)

Bibliography

Best Glass (Retrieved 03-2018). Side View Mirror Replacement. https://www.bestglass.com/side-view-mirror-replacement.html

D'mello, Sidney, and Art Graesser. "AutoTutor and affective AutoTutor: Learning by talking with cognitively and emotionally intelligent computers that talk back." ACM Transactions on Interactive Intelligent Systems (TiiS) 2.4 (2012): 23.

Pradhan, A. K., Pollatsek, A., Knodler, M., & Fisher, D. L. (2009). Can younger drivers be trained to scan for information that will reduce their risk in roadway traffic scenarios that are hard to identify as hazardous?. Ergonomics, 52(6), 657-673.

Texas Instruments (Retrieved 03-2018).Automotive Chipsets – Head-up display, True augmented reality. http://www.ti.com/dlp-chip/automotive/applications/head-up-display-hud.html

Underwood, G., Crundall, D., & Chapman, P. (2011). Driving simulator validation with hazard perception. Transportation research part F: traffic psychology and behaviour, 14(6), 435-446.

VanLehn, K. (1996, June). Conceptual and meta learning during coached problem solving. In International Conference on Intelligent Tutoring Systems (pp. 29-47). Springer, Berlin, Heidelberg.

Autointhebox (2017). How to choose the right mirror for your car? http://blog.autointhebox.com/how-to-choose-the-right-mirror-for-your-car.html