



VisGuard



VisGuard – Distraction Prevention System

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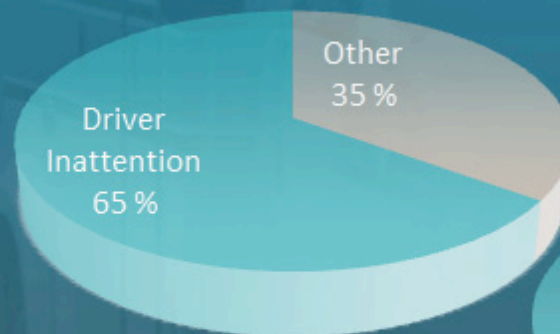
DDI'13 Gothenburg 6.9.2013

Dept. of Computer Science and Information Technology / University of Jyväskylä

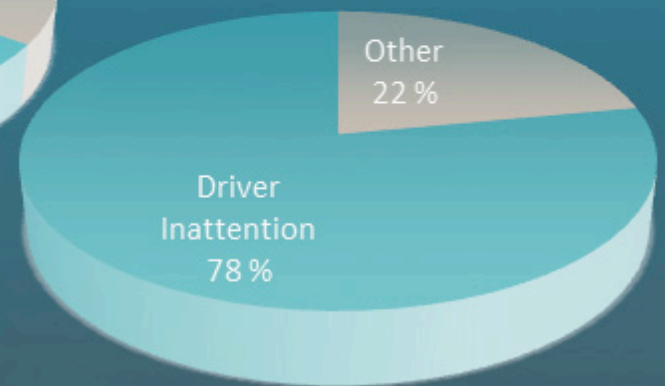
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761 Near-Crash Situations (NHTSA 2006)

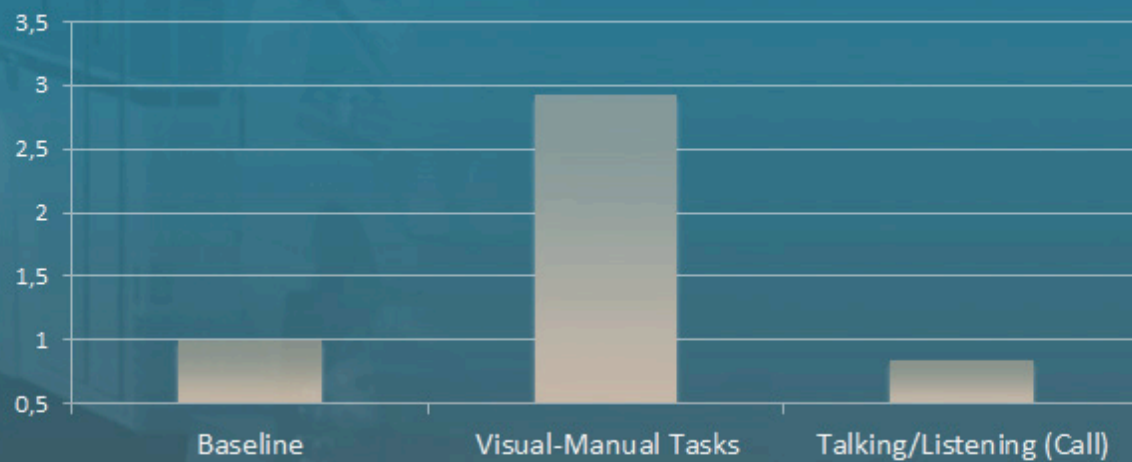


82 Crashes (NHTSA 2006)





Safety-Critical Event Risk Associated With Cell Phone Use (NHTSA 2013)



Is a 2-second glance away from the driving environment always a visual distraction?

And what about a 1-second glance?

Are there driving conditions in which a 1 second glance off road is already too much?



Are the visual demands of driving in a certain situation the same for all the drivers?





www.visguard.com

VisGuard is a PROACTIVE visual distraction prevention system that uses a visual demand algorithm for telling the driver in which kind of traffic situations and for how long the driver SHOULD NOT have eyes off road.

Proof-of-Concept

1. Driving simulator, summer 2013

- N=120

- Visual occlusion

- Visual Demand Algorithm (VDA)

2. Pilot studies, fall-winter 2013

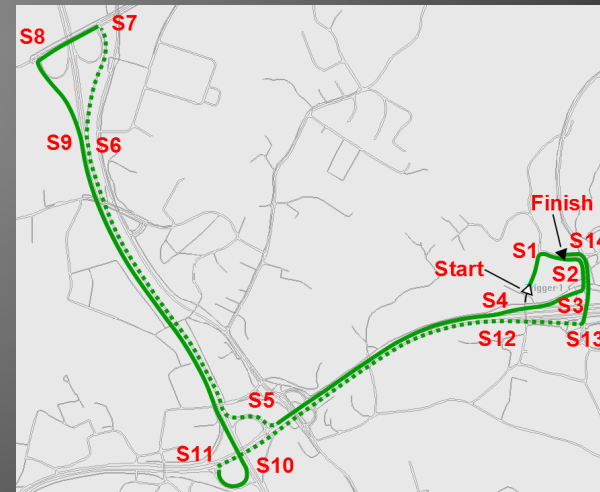
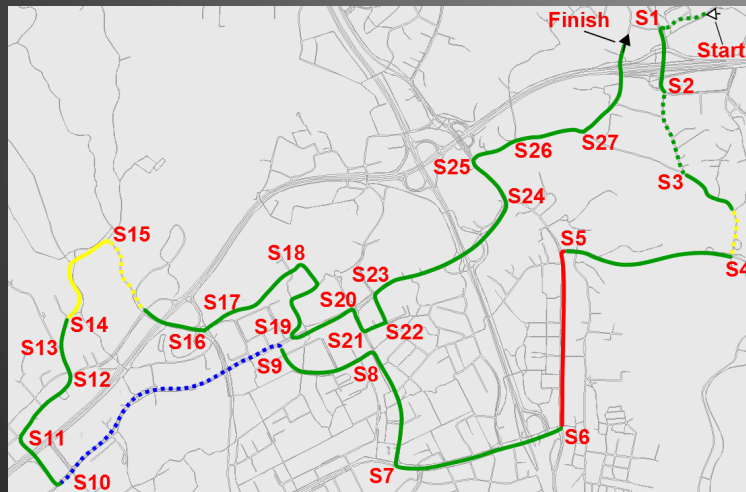
- Plan: Finland, Austria

- Randomized controlled trial

- N=100+100

Driving Simulator Study

- Simulation of a real Finnish traffic environment: Martinlaakso, Vantaa



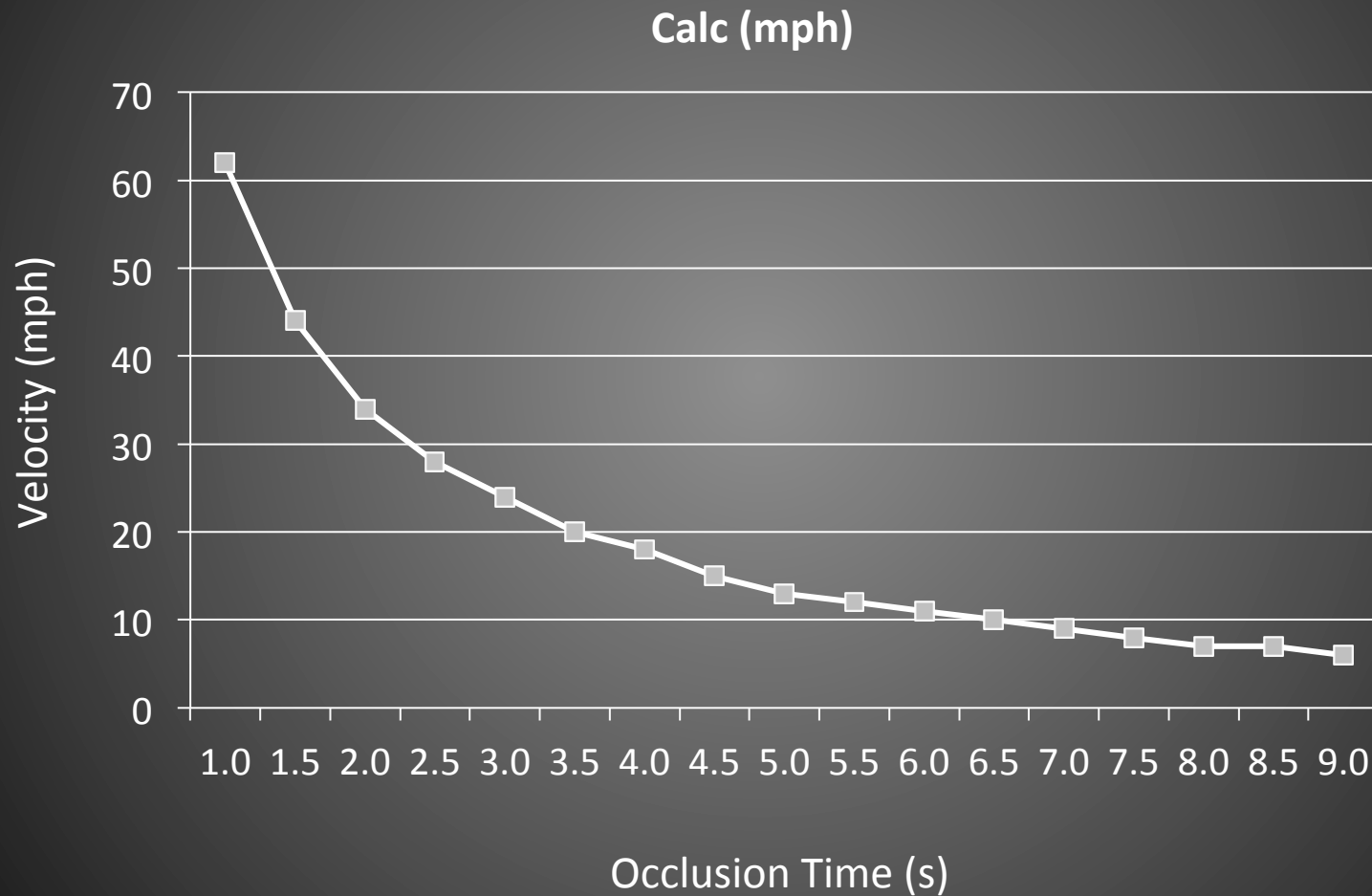
Visual Demand Algorithm (VDA)

- Visual occlusion (Senders et al., 1967):
 - 500 ms unoccluded intervals by pressing a lever but with speed control available
- Occlusion Distance (OD) = Occlusion Time x Speed
- So far the best $R^2 = 0.70$
- OD seems to be driver-specific: high-OD drivers have high ODs over most road types

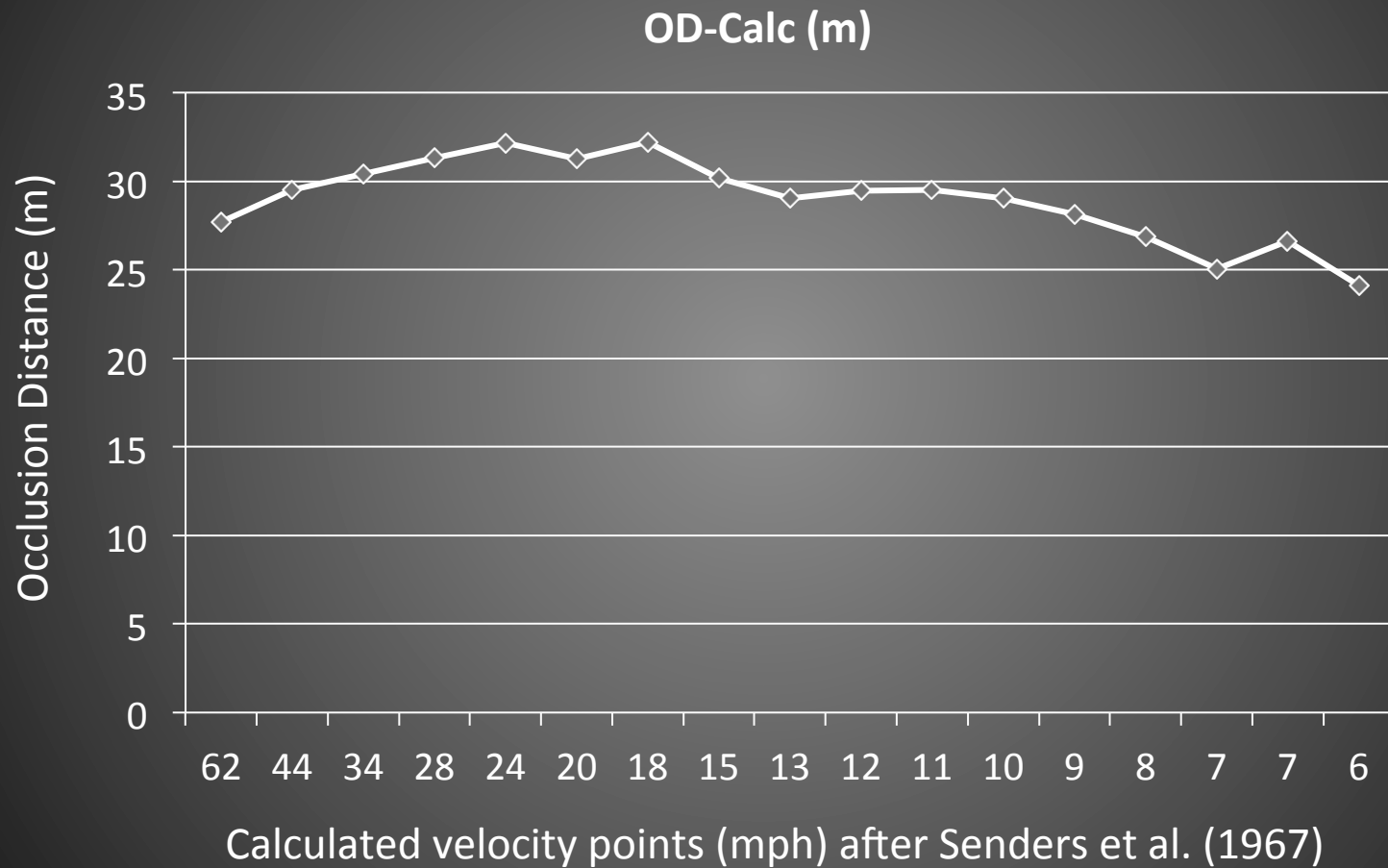
Senders, J.W., Kristofferson, A.B., Levison, W.H., Dietrich, C.W., and Ward, J.L. (1967). *The Attentional Demand of Automobile Driving*, Highway Research Record # 195, Washington, D.C.: National Academy of Sciences, Transportation Research Board, 15-33.

Tsimhoni, O. and Green, P. (1999). Visual demand of driving curves determined by visual occlusion. *Proceedings of the 8th International Vision in Vehicles Conference* (Boston, MA).

Senders et al. (1967)



OD for the same road and driver



OD and VDA - Potential

- Distraction prevention systems
 - Mobile devices
 - Dashboard driver monitoring systems
- Baseline for appropriate visual glancing behaviors!
 - In-car user interface testing and verification
 - Distraction research

Thank you for your attention!



Questions?

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