Sleep Well - Live Well

TECHNOLOGICAL CONTRIBUTIONS TO HEALTHY SLEEP

Experimental design for a study of drowsiness using a driving simulator

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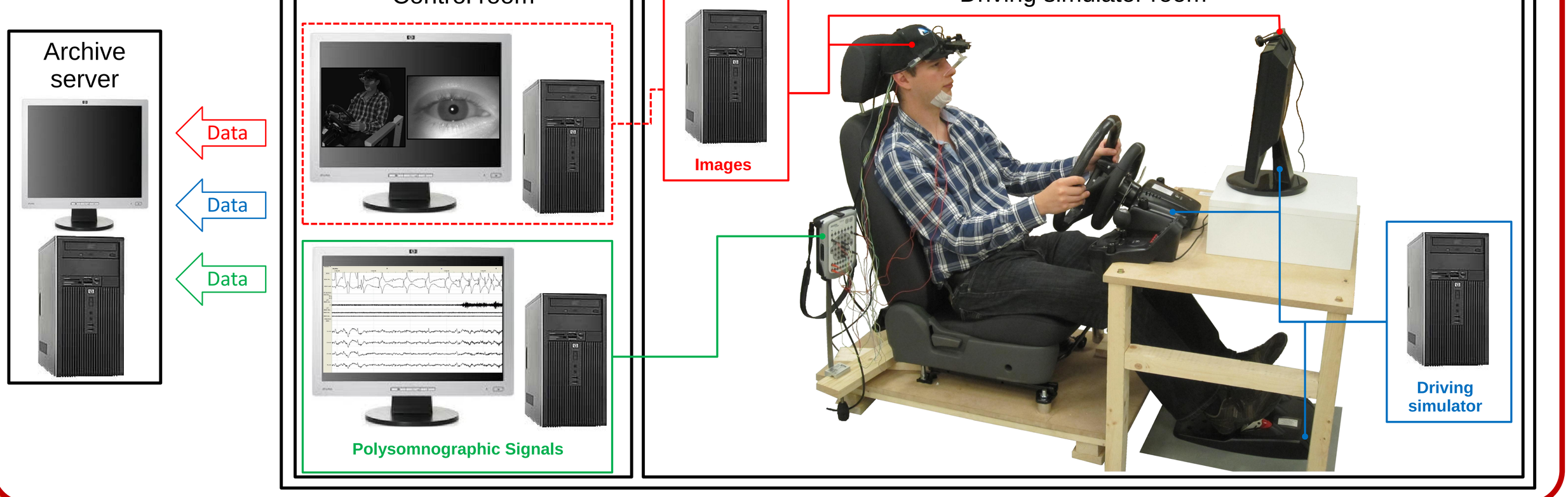
FACILITIES



Drowsiness is a major cause of various types of accidents. According to a recent study [1], drowsiness could account for 90,000 road accidents per year in France. Moreover 6-11% of the population suffers from excessive daytime sleepiness (EDS) [2].

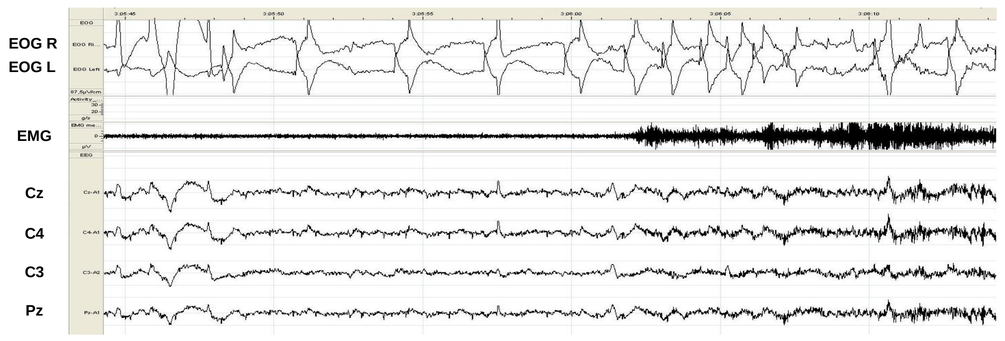
Our study of drowsiness in a driving simulator is a key part of the development of a drowsiness monitoring system. The experimental design is intended to gather - in a simulated driving situation - signal, image, and driving data that is known to be indicative of drowsiness. This data will allow us to develop, test, and validate drowsiness monitoring systems. The preliminary results indicate that our experimental design provides data that constitutes a strong basis for detecting and quantifying drowsiness.

PROTOCOL

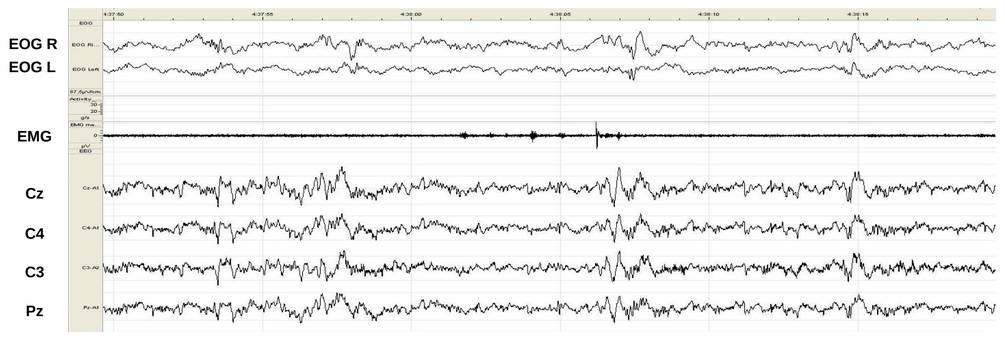
- **Selection of subjects:** 20-35 years old, with driving license, no shift worker, no jet lag within one week of driving in simulator, no known sleep disorder, no drug or alcohol problem, nonsmoker.
- **One week before driving (in simulator):** actimetry and sleep diary.
- **Night before driving:** 60% of usual sleep time.
- **Twelve hours before driving:**
  - No consumption of stimulants.
  - No sleep.
- **During driving (from 3:00 AM to 5:00 AM):**
  - Sole instruction to subject: "*Just drive, stay in your lane, and obey traffic regulations*".
  - No time reference.
  - Self-evaluation of drowsiness (KSS, 3x).
- **After driving:** a bedroom is available during 8 hours.

PRELIMINARY RESULTS

- **At the beginning of the simulated-driving task (at 3:06 AM):**



- **At the end of the simulated-driving task (at 4:38 AM):**



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- **Driving simulator software: IFSTTAR**

REFERENCES

[1] P. Sagaspe, et al., "*Sleepiness, near-misses and driving accidents among a representative population of French drivers*". J. Sleep Res., vol. 9, 2010, pp. 578-584.

[2] M.F. Vecchierini and D. Léger, "*La somnolence diurne excessive et les hypersomnies centrales primaires : données épidémiologiques*". Médecine du sommeil, vol. 7, 2010, pp. 129-138.

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