



UDRIVE

European Naturalistic
Driving Study

Secondary task automatic detection

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Background

Research
question

- What is the real impact of secondary task on driving?
- Do drivers adapt their safety margin while performing a secondary task?

Data needed

- Secondary tasks event

Secondary task detection methods

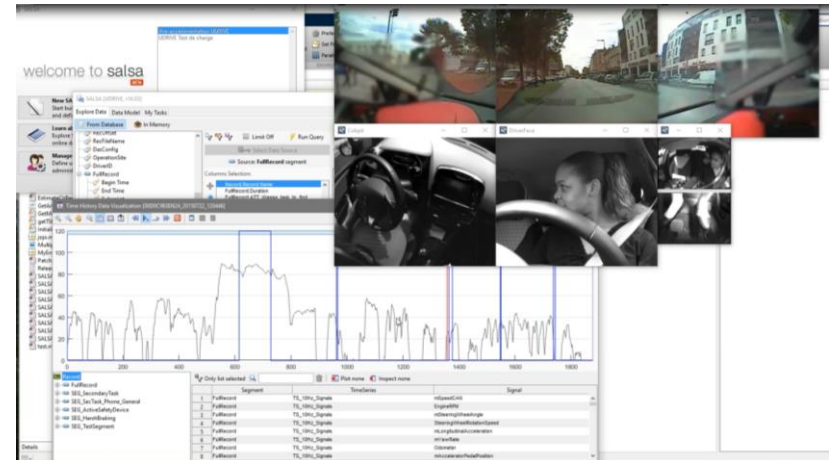
	Pros	Cons
CAN signal: multimedia Customer action	<ul style="list-style-type: none">• Recorded synchronously• High frequency	<ul style="list-style-type: none">• Only Onboard tasks• All tasks mixed together
Manual annotation	<ul style="list-style-type: none">• All tasks• High quality	<ul style="list-style-type: none">• Time consuming• Small sample of available data for analysis
Automatic video annotation	<ul style="list-style-type: none">• Automatic!• Possible to process all the database	<ul style="list-style-type: none">• Quality of detection to be checked• Can't address all type of secondary tasks

Automatic secondary task detection

- Method
 - Machine learning algorithm on video data -> secondary task candidate
 - Manual annotation of candidates (start and end of the task)
- Development of the tool
 - Algorithm based on HOG/SVM methods
 - Manual annotation -> learning data base
 - Algorithm training
 - Data processing
- Features to be detected
 - Texting on a phone
 - Hand held conversation

Tool output

- Frame by frame feature detection (yes/no)
- Associated probability
- Detection position in the image
- Data integrated in SALSA Tool
- Hysteresis for reliability



Preliminary results

- Evaluation on performances on french pilot data
 - Confusion matrix : promising
 - Correct indicator to evaluate performances?
 - First estimation of hysteresis (to be continued)
- Udrive data base
 - Software implemented
 - Manual annotations for validation
 - Manual annotation of secondary tasks (random trips)

Perspectives

- Performances evaluation on Udrive data base
- Data automatic + manual processing
- Study of secondary task impact on driving using large set of segments (random forest, ...)