
Connecting Black Box data and driving behaviour observation for better understanding of driving behaviour

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Funded by:

NOE HUMANIST TF2

Two methods

Driving behaviour observation “Wiener
Fahrprobe”

linked with

data of Black Box (BB)

Aim referred to here

- Comparing/matching BB data with data of driving behaviour observation done by human observers

Wiener Fahrprobe (Vienna Driving Test)

- Observation method
- Standardised route (45 minutes, urban roads and motorways, divided into sections)
- 2 observers in the back of the car (standardised & free)
- Variables reflecting the driving behaviour
- Standardised variables: descriptive (~80 variables)
- Non - standardised variables: errors, communication process and traffic conflicts

Black Box

(Three axes acceleration recorder)

Development of a very basic Black Box (BB) which saves data of acceleration on three axes {x, y and z}

Recording device - Micro Electro Mechanical System (MEMS sensor)

Reasons for using "only" a basic BB

- Pilot study
- Costs
- BB easily allocated to various cars & Vienna+Brno



Picture 1- Designed „black box“

Project Black Box – Introspection

- Introspection rides with employees of CDV and FACTUM on two of the test routes
- Drivers were observed and in parallel themselves recorded remarkable situations after trip
- Aim: compare the observations of the observers with the notes of the drivers and
- Compare both with the data from the BB
- Sample: Two test rides in Brno in October 2006 and January 2007 and two test rides in Vienna in February 2007

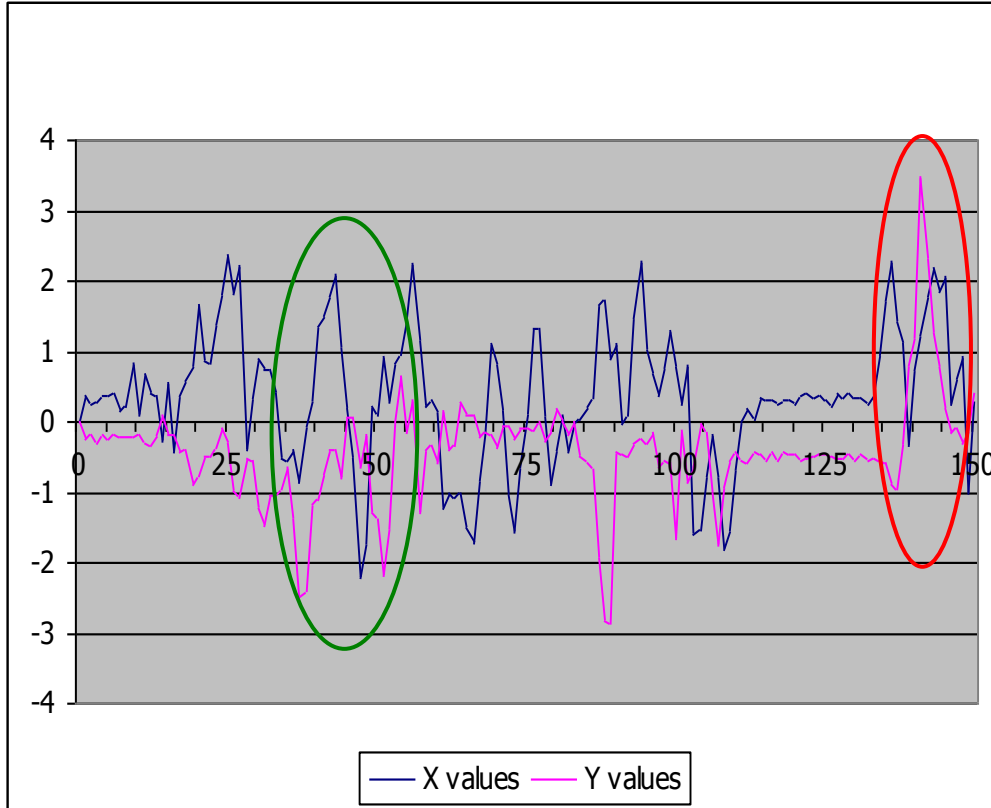
Driving behaviour reflected by the BB data



Acceleration

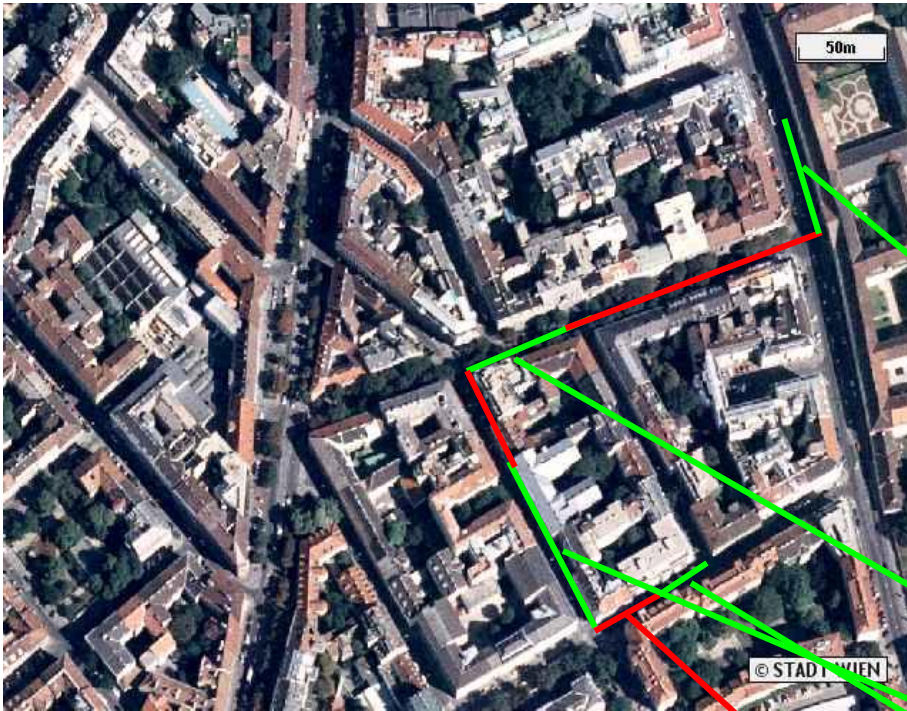
- In the longitudinal axis (x-values) - acceleration & braking action
- In the lateral axis (y-values) - left & right turns
- {In the vertical axis: (z-values) e.g. hump}

Interpretation of the BB data



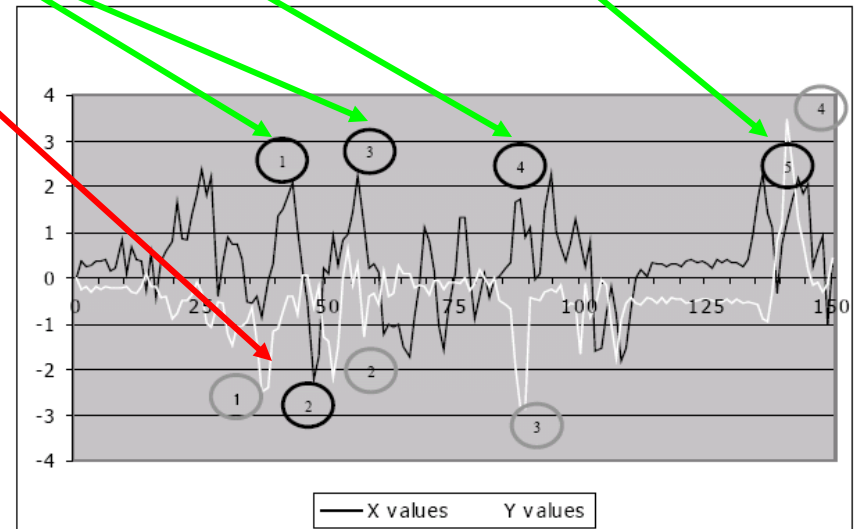
Green circle:
acceleration and
braking action before
and after two right
turns

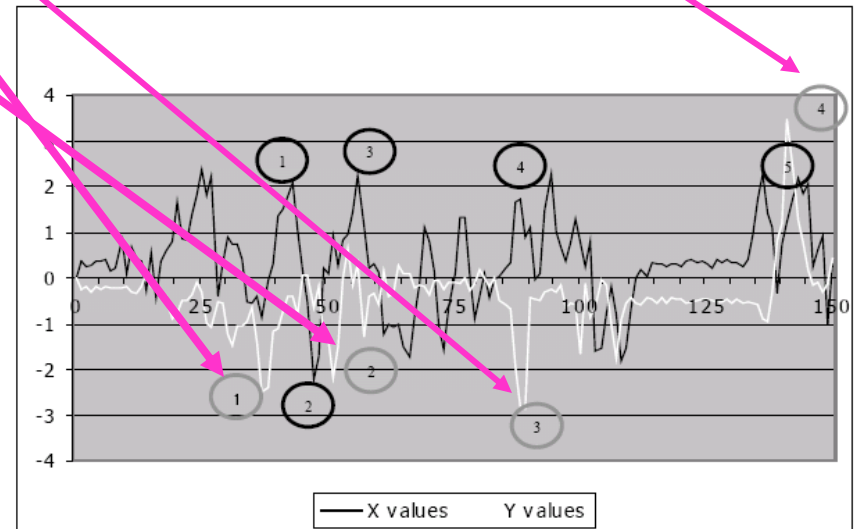
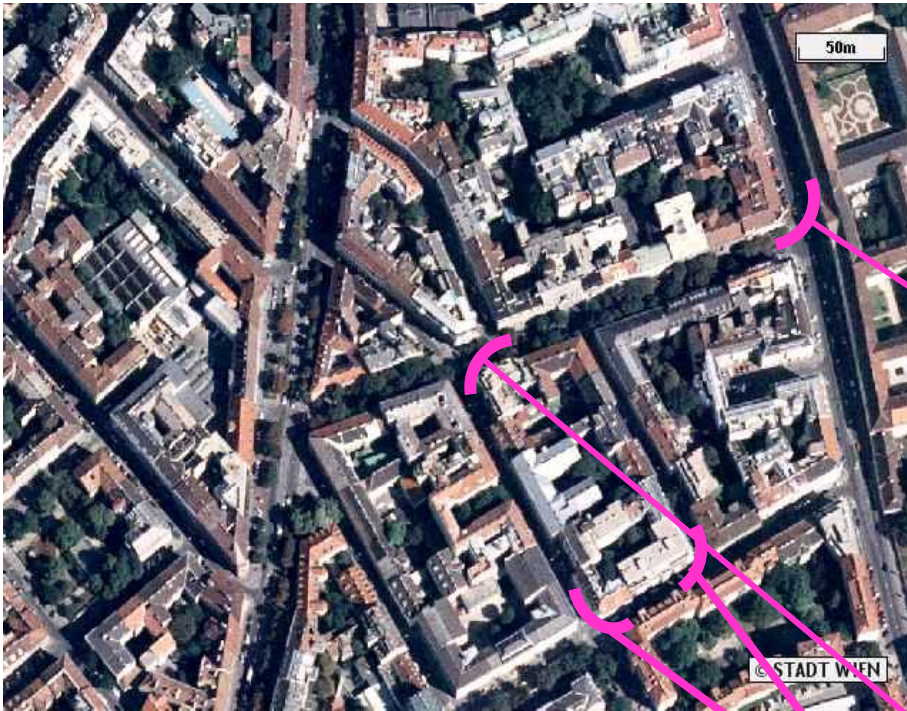
Red circle: fast left
turn after a red traffic
light



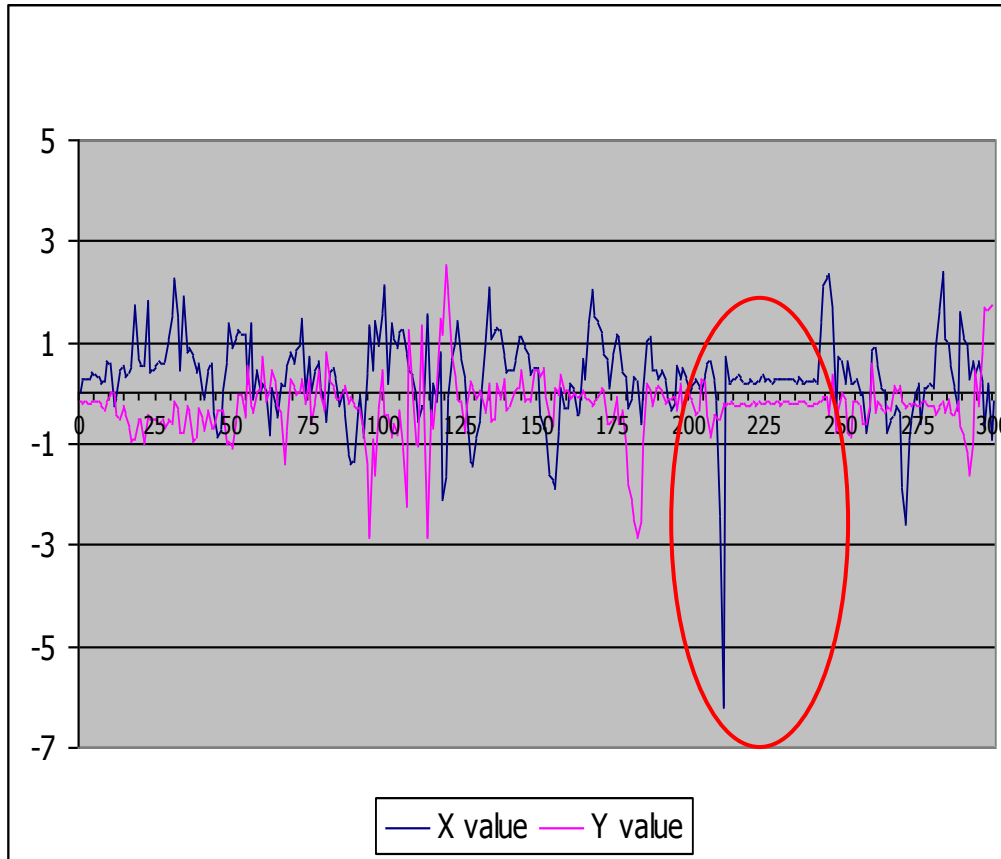
Accelerating

Braking





"Special" driving style



Red circle: hard braking manoeuvre before a traffic light

Problems

- BB-Data do not tell the exact position of the driver
- Difficulties when comparing several drivers since not every test person drove with the same speed and some of them had to wait at a different number of traffic lights

Conclusion

- Observation can help specify what graphs reflect
- Types of behaviour like full braking can be explained/ specified with help of observation
- Typologies of behaviour lying behind certain graphs can be developed → additional solutions to ascertain what “is happening” can be developed
- Stepwise, a better understanding/assessment of the degree of danger reflected by the graphs can be achieved

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Ideas for future work

- Continue work to develop procedures with the goal that graphs/data produced by BB & more sophisticated tools can be used as stand-alones (idea = partly the starter of an EU-project INTERACTION)
- Graphs can be used to underline results of observations made by driving school teachers told to driver learners

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Thank you for your attention!

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