

Semi-automated traffic counting method for forest roads

Balázs Kisfaludi, Péter Primusz, József Péterfalvi

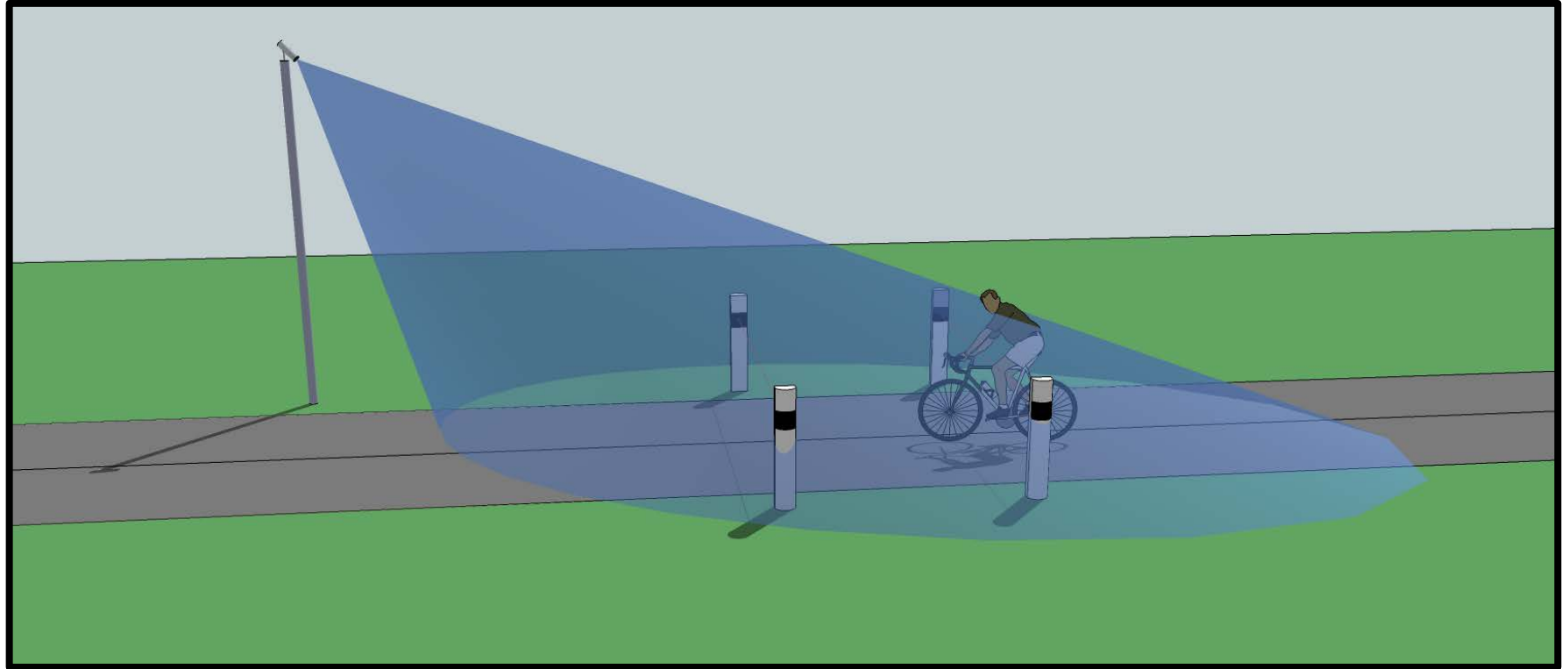
University of West Hungary

Contact: Balázs Kisfaludi | kisfaludi.balazs@emk.nyme.hu

Background

- Mixed use of forest roads
- No data on public use
- Pilot project to take digital photos of road users
- 70.000 digital still images since 2012
- Need of automation

The counter system



The counter system

- Digital security camera
- Reflexive photo electric sensors
- Photo and date stored
- 150 photos daily

The counter system



Image analysis

- 11.000 photos analysed by interpreters
- Database for testing automation

- 1st step: Locate users
- 2nd step: User classification
- Aforge.NET and Accord.NET frameworks

Road user location

- Background - Foreground separation
- Diversity map
- Diverse areas are interesting
- Patches of interesting areas
- Road users included

Road user location

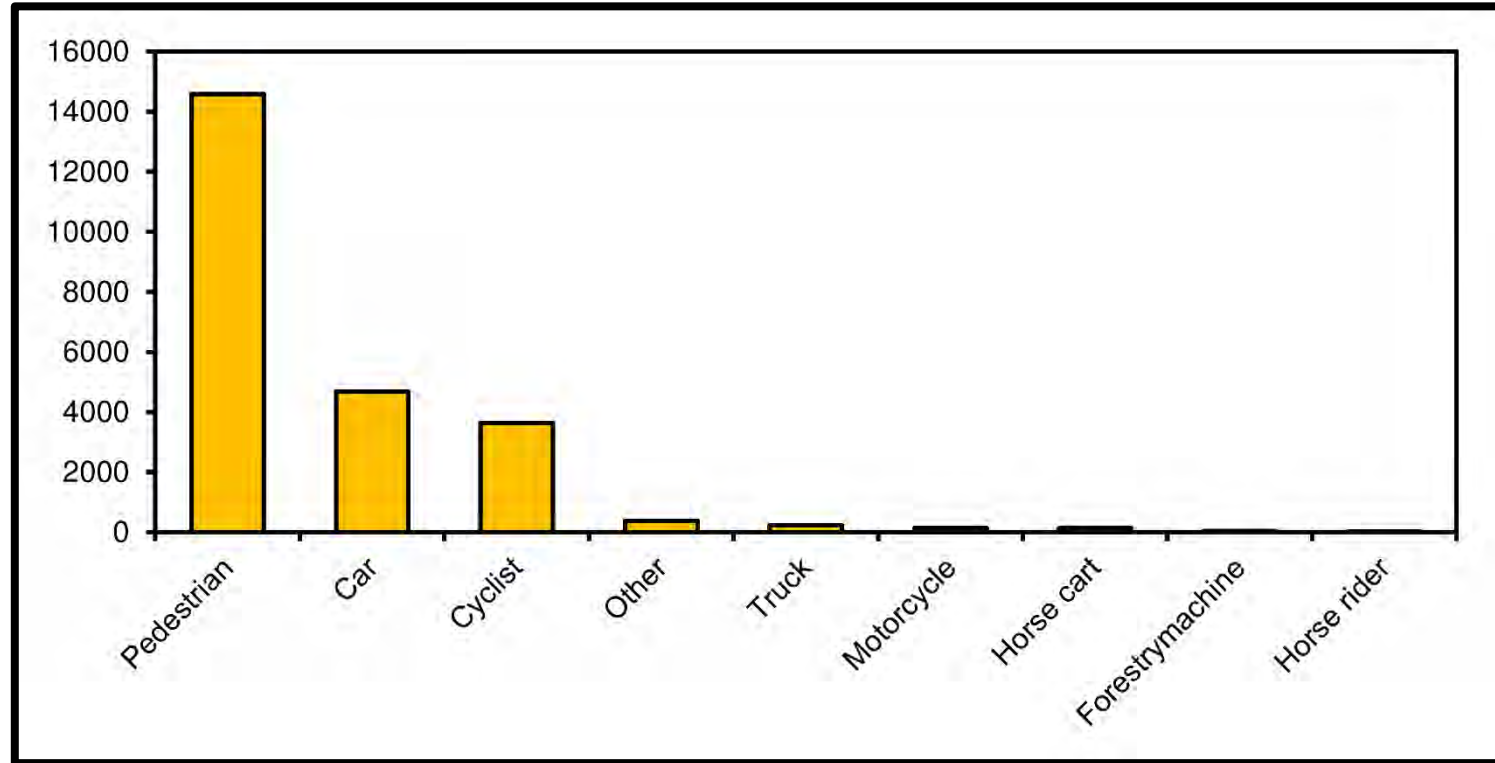


Road user classification

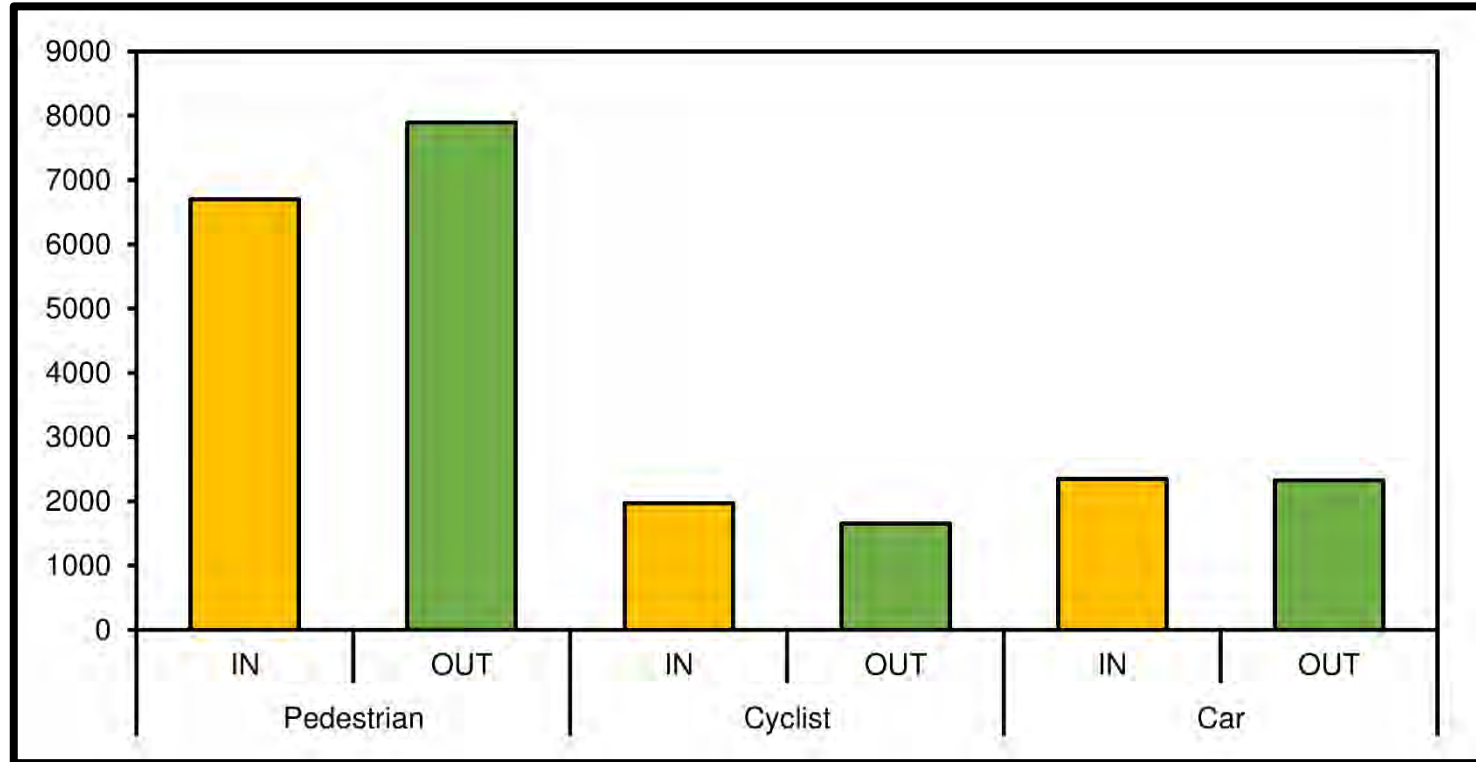
- Machine learning
- Bag of Visual Words model for image description
- Support Vector Machine for classification

- 3 main categories:
pedestrians, cyclists, cars

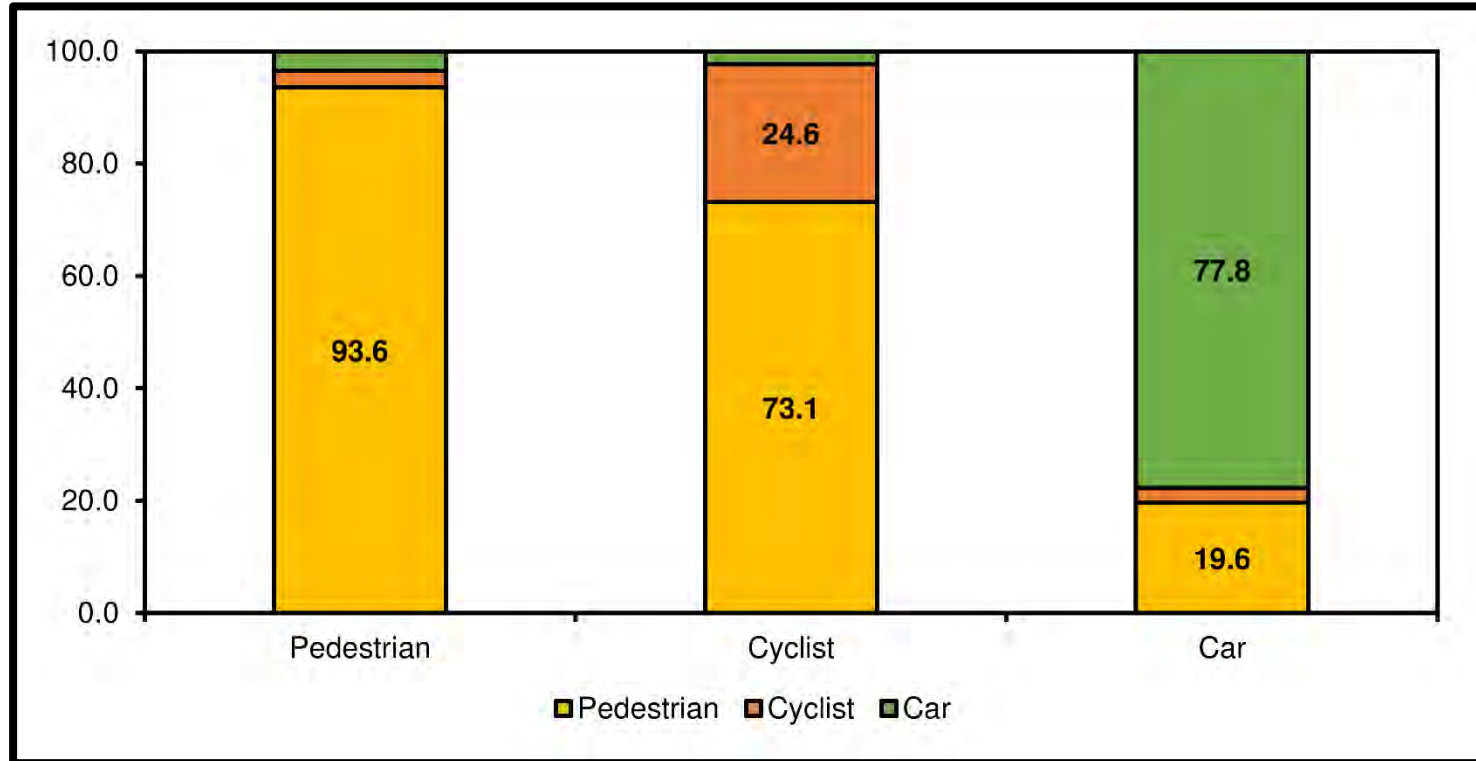
Results



Results



Results



Conclusion

- Human supervised image analysis needed for research purposes
- Semi-automated process can distinguish between cars and humans
- Automation can be improved by:
 - Better image quality
 - Background image or video
 - Better software

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