



TUBAF

Die Ressourcenuniversität.
Seit 1765.



IEEE INTERNATIONAL SYMPOSIUM ON
ROSE 2024
ROBOTIC AND SENSORS ENVIRONMENTS
June 20–21 2024 || Chemnitz, Germany

Using Unsupervised Learning to Explore Robot-Pedestrian Interactions in Urban Environments

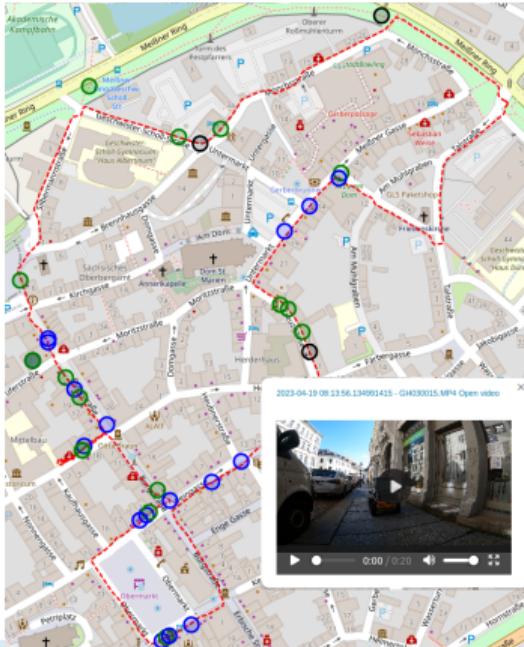
IEEE ROSE 2024

Sebastian Zug, Georg Jäger, Norman Seyffer, Martin Plank, Gero Licht, Felix
Wilhelm Siebert

TU Bergakademie Freiberg
Technical University of Denmark

17. Oktober 2024

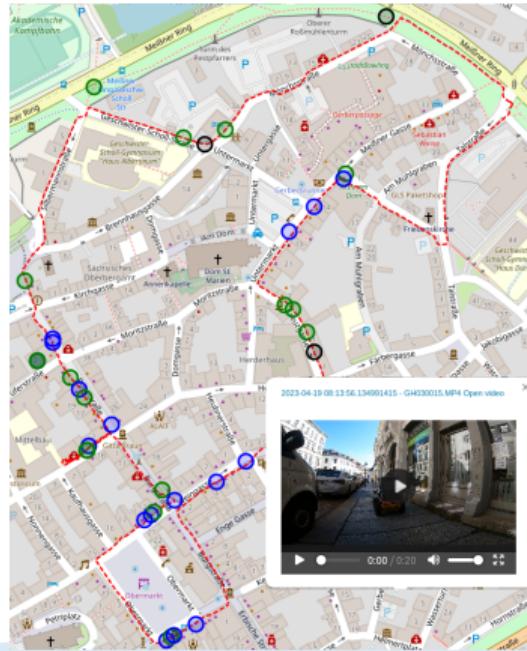
What are the critical places for human machine interaction?



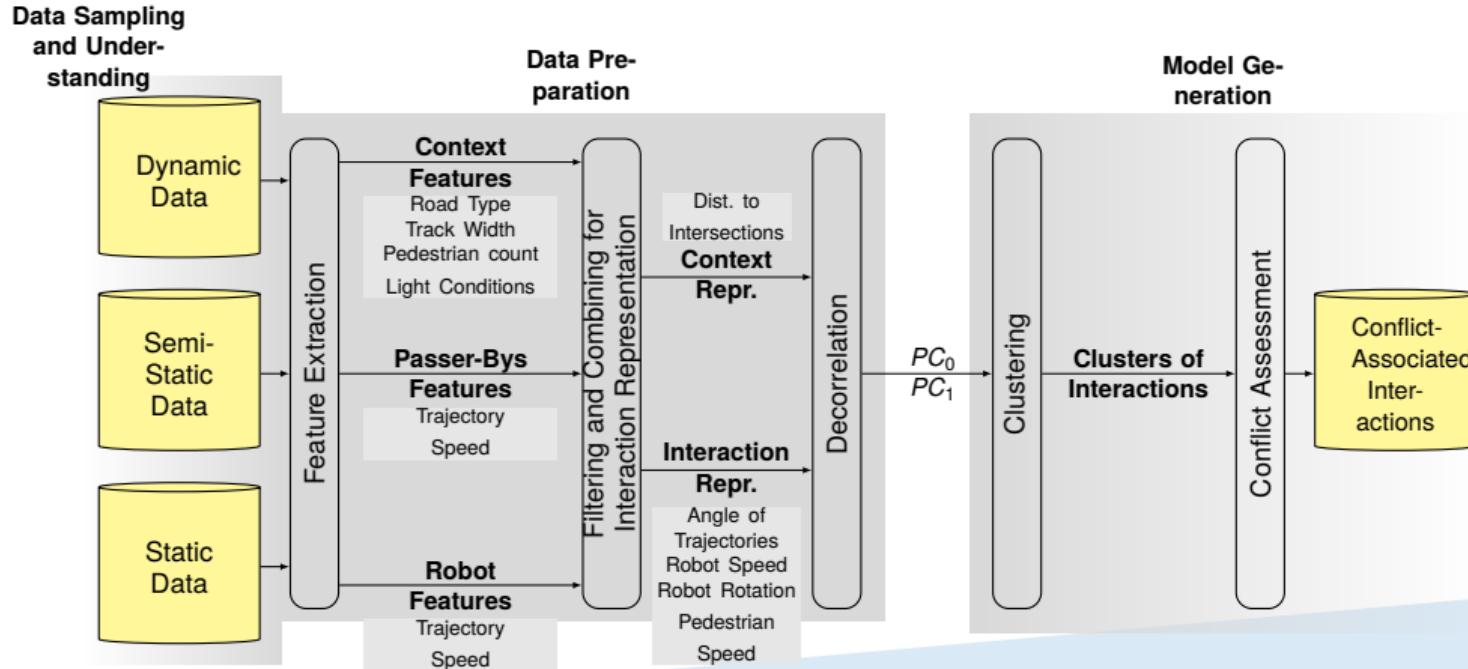
What are the critical places for human machine interaction?

Date-driven identification of *critical points*

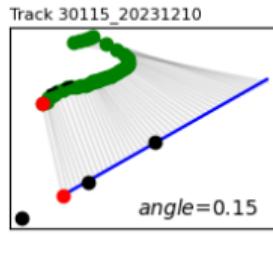
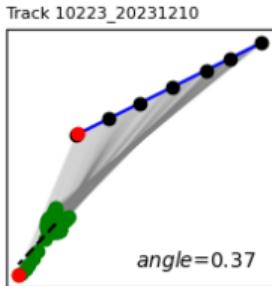
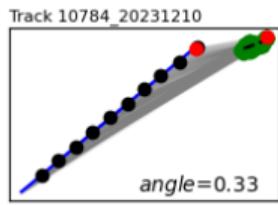
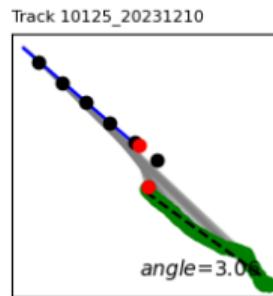
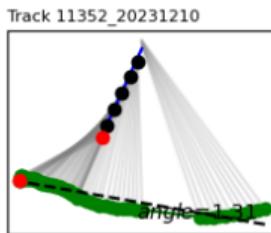
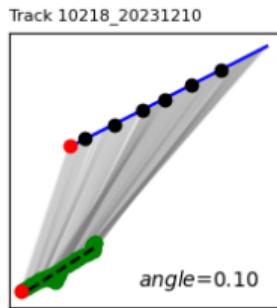
1. Represent human robot interaction
2. Extract relevant environmental parameters
3. Identify context related patterns explaining human behavior



Concept



Interaction representation



Current implementation

1. Linear models
(correlation as quality metric)
2. Parameters: angle, shortest distance, duration

Potential extensions

1. Non-linear motion models
2. Speed levels

Context representation



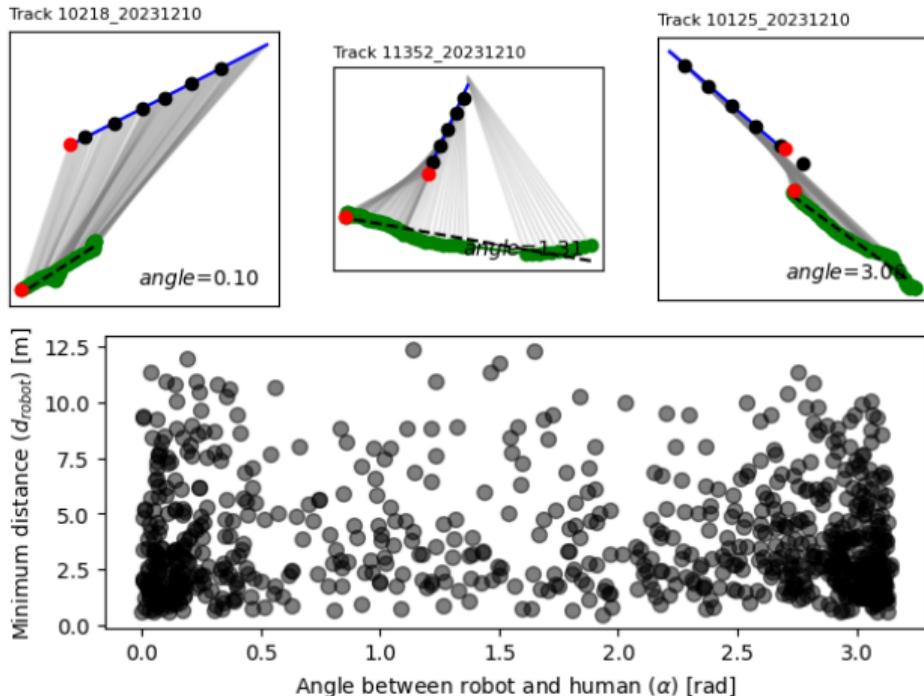
Current implementation

1. Distance related to junctions

Potential extensions

1. Track width
2. Classes and configurations of obstacles
3. Line of sights

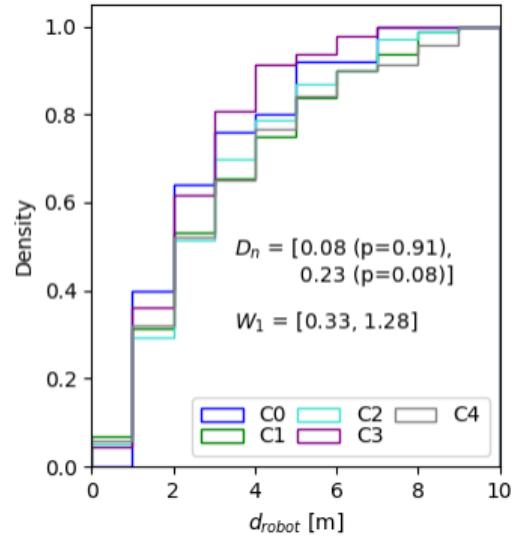
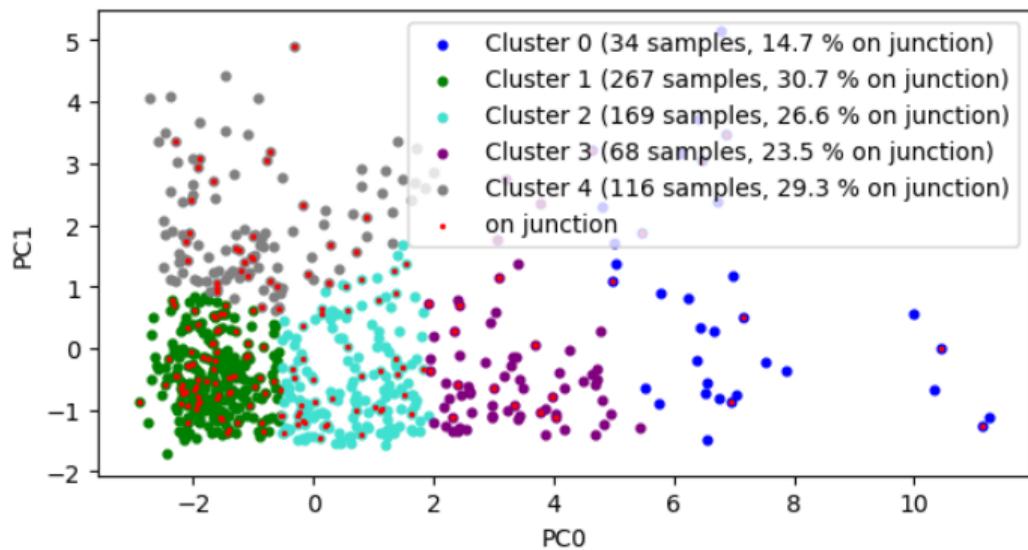
Analysis



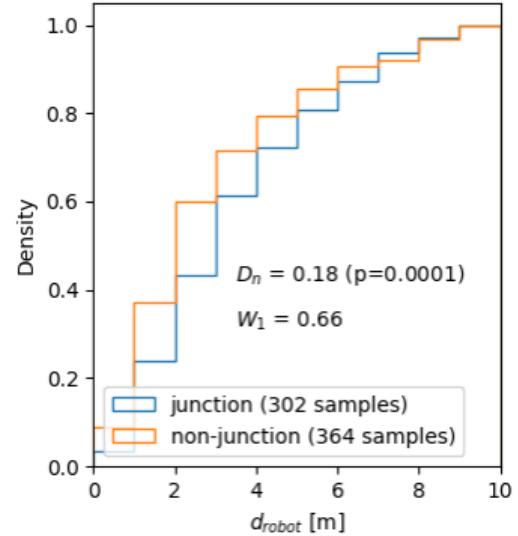
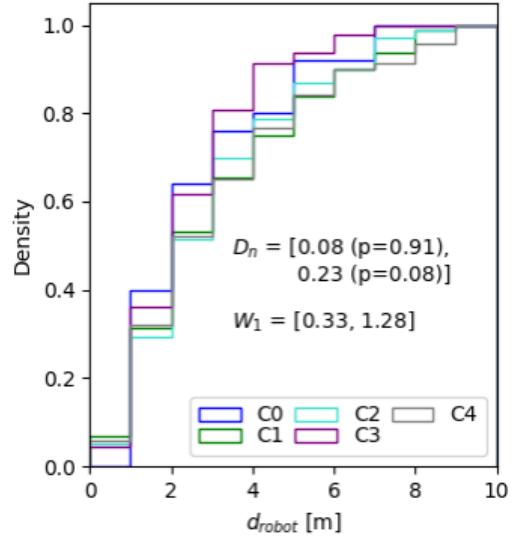
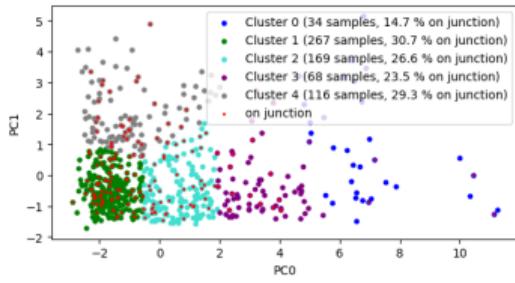
Results

1. Head-on and overtaking situations dominate.
2. Orthogonal pass by situations are much less common

Clustering and Evaluation



Clustering and Evaluation





TUBAF

Die Ressourcenuniversität.
Seit 1765.



IEEE INTERNATIONAL SYMPOSIUM ON
ROSE 2024
ROBOTIC AND SENSORS ENVIRONMENTS
June 20–21 2024 || Chemnitz, Germany

Thank you very much for your Attention.



sebastian.zug@informatik.tu-freiberg.de

Prof. Sebastian Zug

Department of Software Development and Robotics

Technische Universität Bergakademie Freiberg

Akademiestraße 6

09599 Freiberg



Gefördert durch:



aufgrund eines Beschlusses
des Deutschen Bundestages