Best Paper
And
Poster Awards

The book of abstract is online

Date: October 8-10

Venue: CNAM Paris, France

Main Conference
Best Paper Award

Luca Pappalardo (CNR/IT),
Marco Fiore (IMDEA Networks Institute & Net AI),
Jussara Marques Almeida (UFMG)

NetMob

Three Finalists


Abstract 1

On the utility of Digital Contact Tracing on empirical contact network

CHUAN LI[1,2,5], VINCENT GAUTHIER[2], MIGUEL NUNEZ-DEL-PRADO[3,6], HUGO ALATRISTA-SALAS[4*], AND HASSINE MOUNGLA[1,2]

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Abstract 1

Causal inference in the city: Improving Urban Policy Evaluation Through Mobility-Aware Methods

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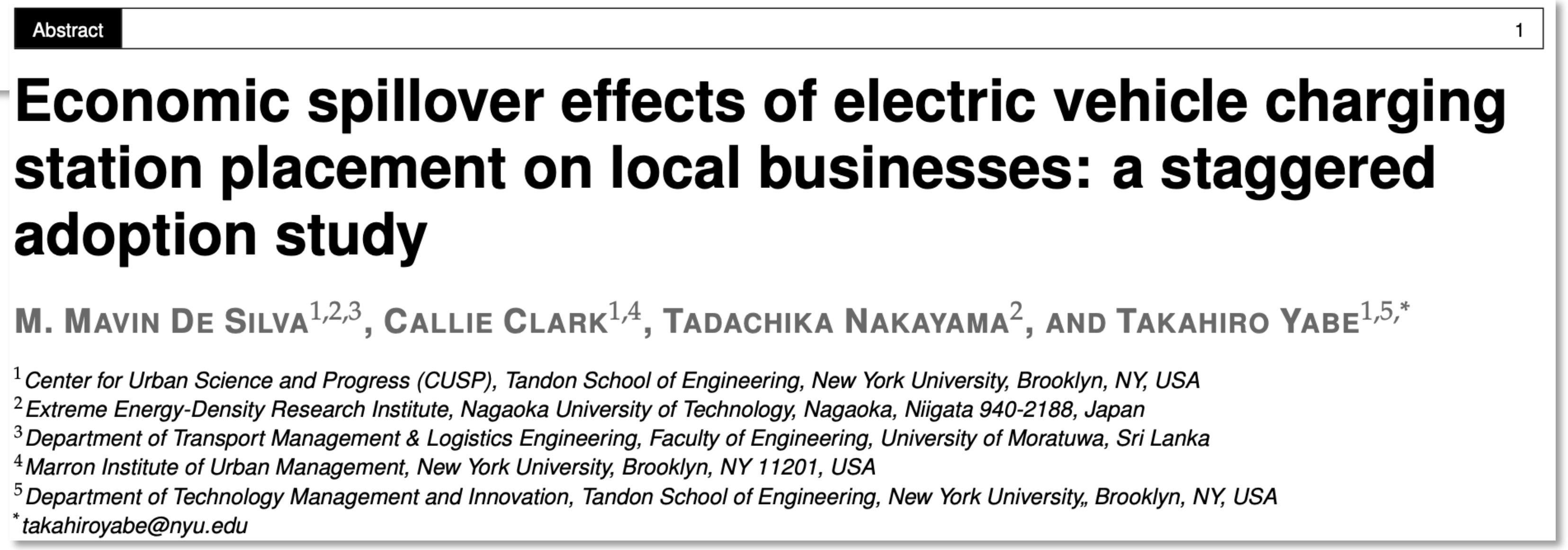
Abstract 1

Economic spillover effects of electric vehicle charging station placement on local businesses: a staggered adoption study

M. MAVIN DE SILVA[1,2,3], CALLIE CLARK[1,4], TADACHIKA NAKAYAMA[2], AND TAKAHIRO YABE[1,5,*]

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AWARD

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In recognition of their paper

Causal inference in the city: Improving Urban Policy Evaluation Through Mobility-Aware Methods

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Diego Madariaga (IMDEA Networks Institute & Net AI),
Andrea Araldo (Telecom SudParis),
Chiara PUGLIESE (CNR/IT)

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Three Finalists

The promise and pitfalls of mobile phone data for recreational fishing: Evaluating potential, biases, and representativeness

KATARZYNA SILA-NOWICKA,[1,*] RICHARD BEAUCHAMP,[1] MURRAY FORD,[1] IAN TUCK[2] AND BRUCE HARTILL [2]

[1]School of Environment, the University of Auckland, New Zealand
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Evaluating Deep Learning for Transport Mode Detection on Crowdsourced Smartphone GPS Data

PAUL FERMÉ[1,*], ABDELLAH EL HASSANI[2], AURÉLIE PIRAYRE[3], AND GUILLAUME SABIRON[4]

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Modeling Base Station Metadata Geolocation

ORLANDO E. MARTÍNEZ-DURIVE[1,2,*], STEFANOS BAKIRTZIS[3], CEZARY ZIEMLICKI[4], AND MARCO FIORE[1]

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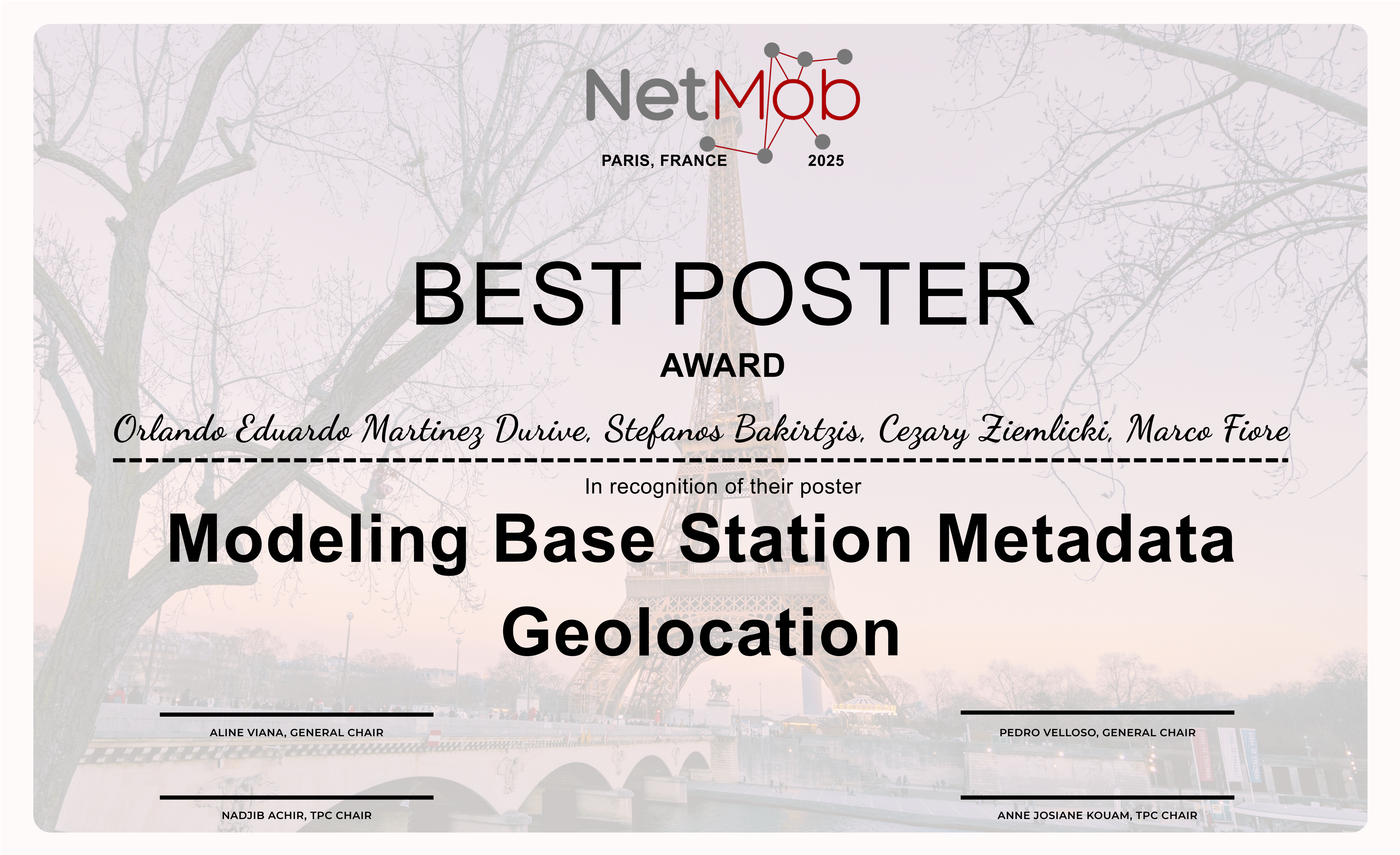
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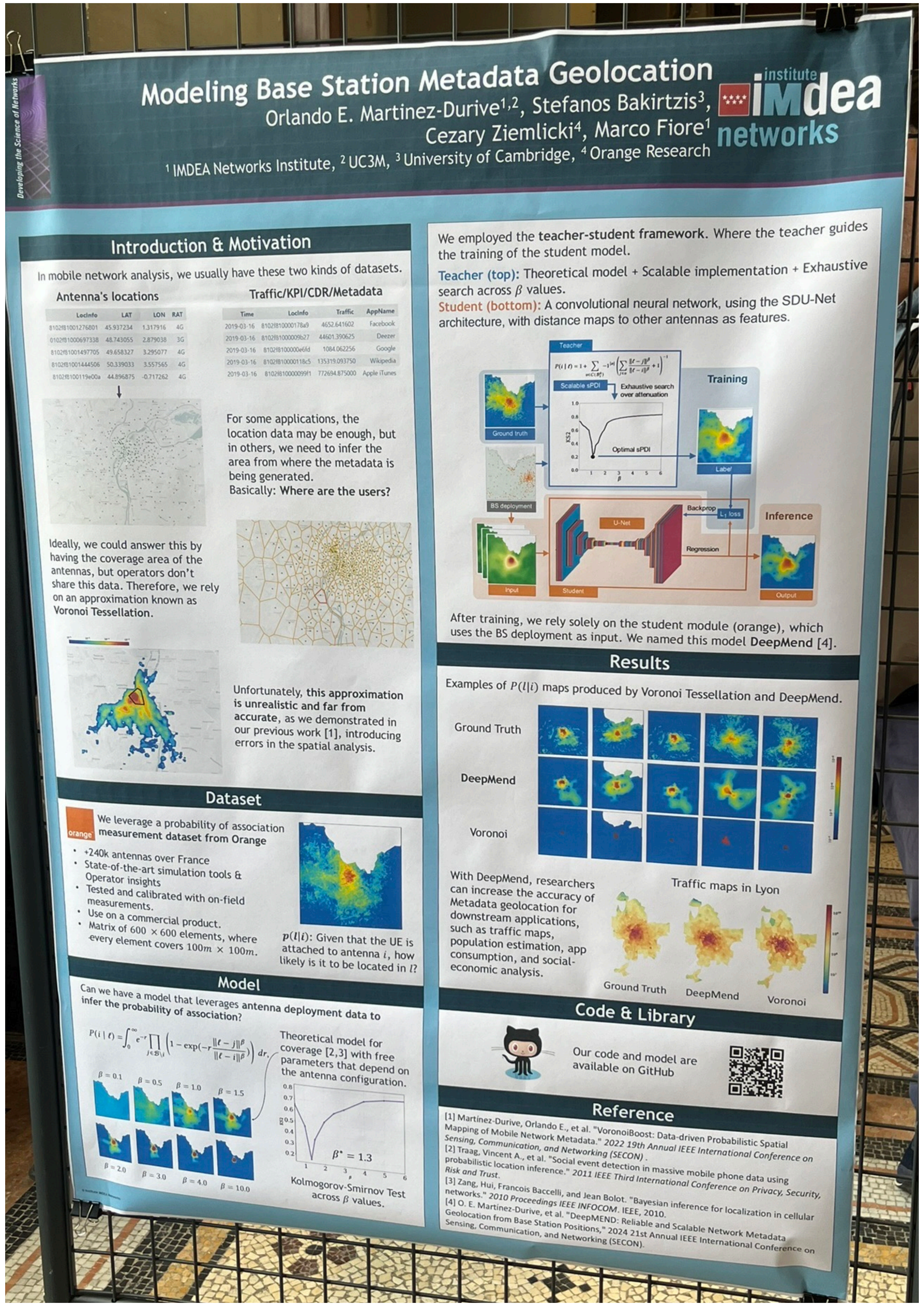
Modeling Base Station Metadata Geolocation
Orlando E. Martinez-Durive1,2, Stefanos Bakirtzis3, Cezary Ziemlicki4, Marco Fiore1
1 IMDEA Networks Institute, 2 UC3M, 3 University of Cambridge, 4 Orange Research
institute IMdea networks
Introduction & Motivation
In mobile network analysis, we usually have these two kinds of datasets.
Antenna's locations
Traffic/KPI/CDR/Metadata
For some applications, the location data may be enough, but in others, we need to infer the area from where the metadata is being generated.
Basically: Where are the users?
Ideally, we could answer this by having the coverage area of the antennas, but operators don't share this data. Therefore, we rely on an approximation known as Voronoi Tessellation.
Unfortunately, this approximation is unrealistic and far from accurate, as we demonstrated in our previous work [1], introducing errors in the spatial analysis.
Dataset
We leverage a probability of association measurement dataset from Orange
+240k antennas over France
State-of-the-art simulation tools & Operator insights
Tested and calibrated with on-field measurements.
Use on a commercial product.
Matrix of 600 × 600 elements, where every element covers 100m × 100m.
Model
Can we have a model that leverages antenna deployment data to infer the probability of association?
Theoretical model for coverage [2,3] with free parameters that depend on the antenna configuration.
Kolmogorov-Smirnov Test across β values.
We employed the teacher-student framework. Where the teacher guides the training of the student model.
Teacher (top): Theoretical model + Scalable implementation + Exhaustive search across β values.
Student (bottom): A convolutional neural network, using the SDU-Net architecture, with distance maps to other antennas as features.
Training
Inference
After training, we rely solely on the student module (orange), which uses the BS deployment as input. We named this model DeepMend [4].
Results
Examples of P(l|i) maps produced by Voronoi Tessellation and DeepMend.
Ground Truth
DeepMend
Voronoi
With DeepMend, researchers can increase the accuracy of Metadata geolocation for downstream applications, such as traffic maps, population estimation, app consumption, and social-economic analysis.
Traffic maps in Lyon
Code & Library
Our code and model are available on GitHub
Reference

Data Challenge
Best Paper Award

Alexandre Chasse (IFPEN),
Razvan Stanica (INRIA)

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Three Finalists

Abstract 1

On the Relationship between Space-Time Accessibility and Leisure Activity Participation

YUAN LIAO[1,2,*], ANTONIO DESIDERIO[2], RAFAEL H. M. PEREIRA[3], JORGE GIL[4], SILVIA DE SOJO CASO[2], AND LAURA ALESSANDRETTI[2]

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Abstract 1

Mobility Patterns, Segregation, and Pollution Exposure in the Context of the Parisian Low-Emission Zone

FRANZISKA ZOLLNER[1,*]

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Abstract 1

Protecting participants or population? Comparison of k-anonymous Origin-Destination matrices

PIETRO ARMENANTE[1], KAI HUANG[1], NIKHIL JHA[1], AND LUCA VASSIO[1,*]

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Jorge Gil, Silvia De Sojo Caso, Laura Alessandretti

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Orlando Martinez Durive (IMDEA), Vania Conan (CNAM)

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Abstract 1

Gendered mobility differences in the era of flexible work

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Abstract 1

The city as experienced: measuring individual differences in contextual exposure through mobility trajectories

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Abstract 1

Beyond Willpower: Structural Constraints and Inequality in Mobility-Related CO_2 Emissions

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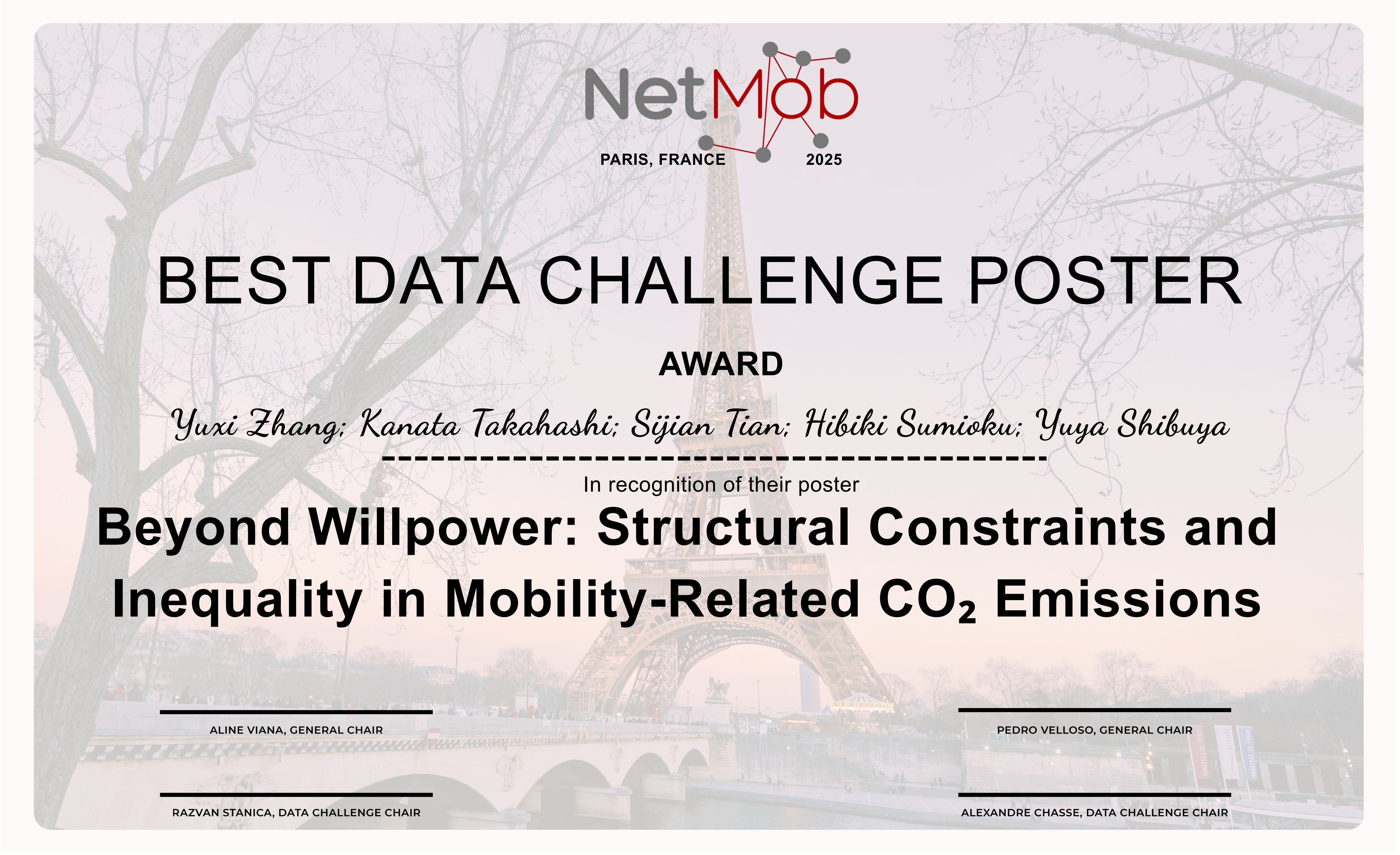
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Beyond Willpower: Structural Constraints and Inequality in Mobility-Related CO₂ Emissions
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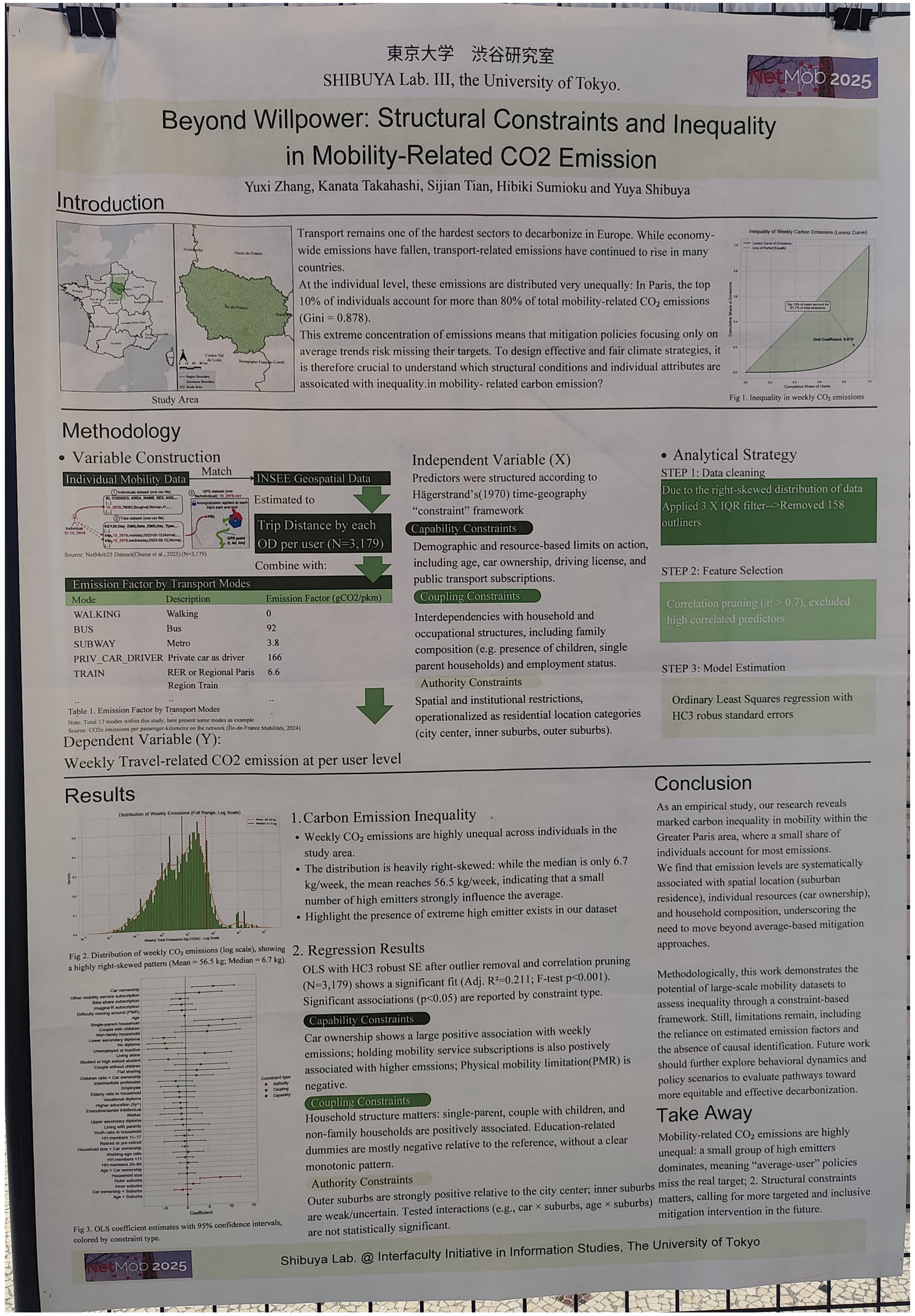
東京大学　渋谷研究室
SHIBUYA Lab. III, the University of Tokyo.
NetMob 2025
Beyond Willpower: Structural Constraints and Inequality in Mobility-Related CO2 Emission
Yuxi Zhang, Kanata Takahashi, Sijian Tian, Hibiki Sumioku and Yuya Shibuya
Introduction
Transport remains one of the hardest sectors to decarbonize in Europe. While economy-wide emissions have fallen, transport-related emissions have continued to rise in many countries.
At the individual level, these emissions are distributed very unequally: In Paris, the top 10% of individuals account for more than 80% of total mobility-related CO₂ emissions (Gini = 0.878).
This extreme concentration of emissions means that mitigation policies focusing only on average trends risk missing their targets. To design effective and fair climate strategies, it is therefore crucial to understand which structural conditions and individual attributes are assoicated with inequality.in mobility- related carbon emission?
Study Area
Inequality of Weekly Carbon Emissions (Lorenz Curve)
Fig 1. Inequality in weekly CO₂ emissions
Methodology
Variable Construction
Individual Mobility Data
Match
INSEE Geospatial Data
Estimated to
Trip Distance by each OD per user (N=3,179)
Source: NetMob25 Dataset(Chasse et al., 2025) (N=3,179)
Combine with:
Emission Factor by Transport Modes
Mode | Description | Emission Factor (gCO2/pkm)
WALKING | Walking | 0
BUS | Bus | 92
SUBWAY | Metro | 3.8
PRIV_CAR_DRIVER | Private car as driver | 166
TRAIN | RER or Regional Paris Region Train | 6.6
Table 1. Emission Factor by Transport Modes
Note: Total 17 modes within this study, here present some modes as example
Source: CO2e emissions per passenger-kilometre on the network (Île-de-France Mobilités, 2024)
Dependent Variable (Y):
Weekly Travel-related CO2 emission at per user level
Independent Variable (X)
Predictors were structured according to Hägerstrand's(1970) time-geography "constraint" framework
Capability Constraints
Demographic and resource-based limits on action, including age, car ownership, driving license, and public transport subscriptions.
Coupling Constraints
Interdependencies with household and occupational structures, including family composition (e.g. presence of children, single parent households) and employment status.
Authority Constraints
Spatial and institutional restrictions, operationalized as residential location categories (city center, inner suburbs, outer suburbs).
Analytical Strategy
STEP 1: Data cleaning
Due to the right-skewed distribution of data Applied 3 X IQR filter-->Removed 158 outliners
STEP 2: Feature Selection
Correlation pruning (|r| > 0.7), excluded high correlated predictors
STEP 3: Model Estimation
Ordinary Least Squares regression with HC3 robus standard errors
Results
Distribution of Weekly Emissions (Full Range, Log Scale)
Fig 2. Distribution of weekly CO₂ emissions (log scale), showing a highly right-skewed pattern (Mean = 56.5 kg; Median = 6.7 kg).
Fig 3. OLS coefficient estimates with 95% confidence intervals, colored by constraint type.
1. Carbon Emission Inequality
Weekly CO₂ emissions are highly unequal across individuals in the study area.
The distribution is heavily right-skewed: while the median is only 6.7 kg/week, the mean reaches 56.5 kg/week, indicating that a small number of high emitters strongly influence the average.
Highlight the presence of extreme high emitter exists in our dataset
2. Regression Results
OLS with HC3 robust SE after outlier removal and correlation pruning (N=3,179) shows a significant fit (Adj. R²=0.211; F-test p<0.001). Significant associations (p<0.05) are reported by constraint type.
Capability Constraints
Car ownership shows a large positive association with weekly emissions; holding mobility service subscriptions is also postively associated with higher emssions; Physical mobility limitation(PMR) is negative.
Coupling Constraints
Household structure matters: single-parent, couple with children, and non-family households are positively associated. Education-related dummies are mostly negative relative to the reference, without a clear monotonic pattern.
Authority Constraints
Outer suburbs are strongly positive relative to the city center; inner suburbs are weak/uncertain. Tested interactions (e.g., car × suburbs, age × suburbs) are not statistically significant.
Conclusion
As an empirical study, our research reveals marked carbon inequality in mobility within the Greater Paris area, where a small share of individuals account for most emissions.
We find that emission levels are systematically associated with spatial location (suburban residence), individual resources (car ownership), and household composition, underscoring the need to move beyond average-based mitigation approaches.
Methodologically, this work demonstrates the potential of large-scale mobility datasets to assess inequality through a constraint-based framework. Still, limitations remain, including the reliance on estimated emission factors and the absence of causal identification. Future work should further explore behavioral dynamics and policy scenarios to evaluate pathways toward more equitable and effective decarbonization.
Take Away
Mobility-related CO₂ emissions are highly unequal: a small group of high emitters dominates, meaning "average-user" policies miss the real target; 2. Structural constraints matters, calling for more targeted and inclusive mitigation intervention in the future.
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