

# Curriculum vitae

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## Tiago Tamagusko

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Transport engineer building the tools that let cities count and assess walking and cycling the way they already count cars. Five years as a road infrastructure engineer in Brazil (co-developed the national high-speed weigh-in-motion (HS-WIM) standard; 35 stations deployed with DNIT) and a PhD in Transport Systems from the University of Coimbra (2024, highest distinction).

Principal Investigator of *CAMINA* (co-PI: Prof. Francesco Pilla), an open-source edge-AI sensor that counts pedestrians, cyclists, e-scooters, and vehicles on the device, with no images transmitted; currently in laboratory validation.

Postdoctoral Research Fellow at University College Dublin (Horizon Europe *REALLOCATE*; vision-language models for active-travel safety in *COLOURWAYS*) and Adjunct Assistant Professor at the Military Institute of Engineering (IME), Brazil, teaching two doctoral courses on AI for transportation, both designed from scratch. Machine learning for pavement performance, the subject of the PhD, remains the infrastructure-management side of this record.

### At a glance

|                                                                            |                                                                                |
|----------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Principal Investigator, CAMINA (UCD)                                       | 17 published peer-reviewed publications (9 journal articles, 5 first-author)   |
| h-index 9                                                                  | 2 doctoral courses designed and taught (3 semester offerings)                  |
| External evaluator for the Research Foundation Flanders (FWO), 6 proposals | 5 years of engineering practice with Brazil's national transport agency (DNIT) |

### Education

**PhD in Transport Systems**, University of Coimbra, Portugal (2020–2024). Highest Distinction. FCT doctoral fellowship.  
*Thesis: Artificial Intelligence applied to Transport Infrastructure Management*

**MSc in Urban Mobility Management**, University of Coimbra, Portugal (2018–2020). *Dissertation: Airport Pavement Design*

**BSc in Civil Engineering** (five-year degree), Federal University of Santa Catarina, Brazil (2008–2013)

Technical Degrees in Telecommunications (2003–2004) and Computer Networking (2002–2003), IFSC, Brazil

## Academic and Professional Experience

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### Current Positions

**Adjunct Assistant Professor**, Military Institute of Engineering (IME), Brazil (2025–Present, remote)

- Designed and teach two doctoral courses (three semester offerings) in the Postgraduate Program in Transportation Engineering: *AI Applied to Transportation* (2025/2, 2026/2) and *Data Science and Deep Learning Applied to Transportation* (2026/1)

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**Postdoctoral Research Fellow**, University College Dublin, Ireland (2024–Present)

- Principal Investigator of *CAMINA* (co-PI: Prof. Francesco Pilla): open-source edge-AI sensor counting pedestrians, cyclists, e-scooters, and vehicles on the device, with no images transmitted; in laboratory validation
- Lead data analytics and spatial analysis for Horizon Europe *REALLOCATE* (street-space reallocation, 10+ cities, 16 living labs)
- Oversee vision-language-model development for *COLOURWAYS* (cycling risk, school-commute safety, building vacancy); Docker/AWS backend
- Data scientist and backend engineer on *Bike Library* (NTA Ireland) and data scientist on *I-CHANGE* (H2020); LiDAR and zero-shot detection for sidewalk accessibility

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### Previous Positions

**Researcher & Facilitator**, The Alan Turing Institute, UK (2024)

- Facilitated a Data Study Group with Transport for London: LiDAR point-cloud processing and computer vision for underground track-fault detection; findings delivered to TfL in the published final report

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**PhD Researcher**, CITTA Research Centre, University of Coimbra, Portugal (2020–2024)

- Machine learning for pavement performance prediction; transfer learning and synthetic data for limited-data settings; deep learning for accident detection; optimization of pavement maintenance

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**Data Scientist & Technology Coordinator**, JEST, Portugal (2020–2022)

- Coordinated 4+ applied data-science projects (computer-vision monitoring, GDPR-compliant NLP); technology committee member

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**Road Infrastructure Engineer & Transport Systems Researcher**, LabTrans/UFSC, Brazil (2013–2018)

- Co-developed the Brazilian national standard for high-speed weigh-in-motion (HS-WIM) with DNIT
- Contributed to the design, deployment, and commissioning of 35 HS-WIM stations on the federal highway network
- Freight-loading, asset-management, and sensor-placement analyses supporting agency planning decisions

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## Research Interests

Active-travel measurement and safety: edge AI, computer vision, and vision-language models for counting pedestrians, cyclists, and micromobility users and assessing their risk

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Edge AI for transportation: real-time multimodal traffic monitoring, detection and tracking, privacy-preserving on-device analytics

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Spatio-temporal modeling and sensor fusion: cameras, LiDAR, telemetry, and GIS for exposure estimation and safety analysis

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Machine learning for infrastructure systems: transfer learning and synthetic data for pavement performance prediction and maintenance decisions

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Translational research: pilot deployments with transportation agencies and evidence-based policy support

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Digital twins and data-driven visualization for urban mobility planning

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## Teaching Activity

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*Abbreviations: AY, academic year; PGTE, Postgraduate Program in Transportation Engineering (doctoral level), IME.*

### At the Military Institute of Engineering (IME), Brazil

**2025/2, 2026/2 (2 AYs)**

#### Artificial Intelligence Applied to Transportation

30-hour course (2 credits), doctoral level, PGTE. Designed from scratch; delivered in 2025/2 and currently in delivery (2026/2), remotely from Ireland: lectures, hands-on coding assignments, real infrastructure datasets, challenge-based project assessment

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**2026/1 (1 AY)**

#### Data Science and Deep Learning Applied to Transportation

30-hour course (2 credits), doctoral level, PGTE. Designed and delivered as the progression from the course above

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### At EIT Urban Mobility (online)

**2024**

#### Geospatial Data Science for Sustainable Urban Mobility (MOOC)

8 hours of online content in English (instructional videos, interactive exercises, assessments) for an international audience of 100+ professionals and students

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### Supervision

Undergraduate and MSc: supervised 3 research internships (three to six months each), University College Dublin, 2024–2025, on computational methods for sustainable mobility and infrastructure

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## Research Projects and Funding

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### Led as Principal Investigator

**2025–Present, CAMINA**, University College Dublin. Principal Investigator; co-PI Prof. Francesco Pilla. Open-source edge-AI multimodal traffic counting on low-cost hardware, privacy by design (on-device inference, no images transmitted), built for citizen-led deployment; in laboratory validation

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### Project Roles

**2024–Present, REALLOCATE** (reallocate-mobility.eu), Horizon Europe, GA 101103924. Researcher leading data analytics and spatial analysis, UCD. Evaluation of street-space reallocation for walking, cycling, and public transport through living labs

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**2024–Present, COLOURWAYS** (sdl-buildingstories.vercel.app), Researcher overseeing vision-language-model algorithms, UCD. CycleIRAP-based cycling risk, children's school-commute safety, building vacancy detection

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**2024–2026, Bike Library** (bikelibrary.eu), National Transport Authority of Ireland. Data Scientist and Backend Engineer. Evaluation of cargo/e-bike access as a modal-shift intervention; findings informed NTA policy

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**2024–2025, I-CHANGE** (ichange-project.eu), Horizon 2020, GA 101037193. Researcher, UCD. Citizen science and behavioral change for climate adaptation

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**2024, TfL Underground Railway Safety**, The Alan Turing Institute Data Study Group. Researcher and facilitator; computer vision and 3D spatial analysis for railway safety monitoring

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**2023, CycleAI, Lisboa+** (voxpoplisboa.pt), VoxPop Lisboa innovation call (public EU funding). Scientific Advisor and Data Scientist. Computer-vision mapping of cycling safety conditions in Lisbon

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**2020–2024, PhD Fellowship**, Portuguese Foundation for Science and Technology (FCT). Individual doctoral fellowship, University of Coimbra

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**2013–2018, HS-WIM PIAF** (labtrans.ufsc.br), DNIT, Brazil. Transport Systems Engineer and Researcher. National HS-WIM standard and 35-station deployment

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## Publications

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17 published peer-reviewed publications (9 journal articles, 5 as first author; 6 conference papers; 2 book chapters), plus 1 paper in press and 1 technical report. h-index 9 and 533 citations across these publications (Google Scholar).

### Selected Publications

#### 2026

**Optimizing Pavement Maintenance with AI: A Data-Driven Framework Integrating Optimization and Machine Learning**

**Tamagusko, T.**, Callai, S. C., Gomes Correia, M., Ferreira, A.

*International Journal of Pavement Research and Technology*, online first

doi.org/10.1007/s42947-026-00802-w

First author. Cited by: 1.

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#### 2023

**Data-Driven Approach for Urban Micromobility Enhancement through Safety Mapping and Intelligent Route Planning**

**Tamagusko, T.**, Gomes Correia, M., Rita, L., Bostan, T.-C., Peliteiro, M., Martins, R., Santos, L., Ferreira, A.

*Smart Cities*, 6(4), 2035–2056

doi.org/10.3390/smartcities6040094

First author. Cited by: 39.

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*Citation counts: Google Scholar.*

### Journal articles

#### 2026

**Bikeable: Estimating cyclists' perceived safety from street-level imagery to support transport planning in Lisbon and London**

Rita, L., Vizoso, B., **Tamagusko, T.**, Callai, S., Santos, L., Peliteiro, M., Ferreira, A., Santos, V.

*Case Studies on Transport Policy*, 25, 101830

doi.org/10.1016/j.cstp.2026.101830

Elsevier.

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2026

**Optimizing Pavement Maintenance with AI: A Data-Driven Framework Integrating Optimization and Machine Learning**

**Tamagusko, T.**, Callai, S. C., Gomes Correia, M., Ferreira, A.

*International Journal of Pavement Research and Technology*, online first

doi.org/10.1007/s42947-026-00802-w

Springer. Cited by: 1.

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2026

**Street vitality and traffic risk: a multiscale analysis of Barcelona and Warsaw**

Galaktionova, A., Istrate, A.-L., **Tamagusko, T.**, Carroll, P.

*Accident Analysis & Prevention*, 228, 108393

doi.org/10.1016/j.aap.2026.108393

Elsevier. Cited by: 3.

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2024

**Machine Learning Applications in Road Pavement Management: A Review, Challenges and Future Directions**

**Tamagusko, T.**, Gomes Correia, M., Ferreira, A.

*Infrastructures*, 9(12), 213

doi.org/10.3390/infrastructures9120213

MDPI. Cited by: 89.

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2023

**Machine Learning for Prediction of the International Roughness Index on Flexible Pavements: A Review, Challenges, and Future Directions**

**Tamagusko, T.**, Ferreira, A.

*Infrastructures*, 8(12), 170

doi.org/10.3390/infrastructures8120170

MDPI. Cited by: 72.

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2023

**Data-Driven Approach for Urban Micromobility Enhancement through Safety Mapping and Intelligent Route Planning**

**Tamagusko, T.**, Gomes Correia, M., Rita, L., Bostan, T.-C., Peliteiro, M., Martins, R., Santos, L., Ferreira, A.

*Smart Cities*, 6(4), 2035–2056

doi.org/10.3390/smartcities6040094

MDPI. Cited by: 39.

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2023

**Using Deep Learning and Google Street View Imagery to Assess and Improve Cyclist Safety in London**

Rita, L., Nathvani, R., Peliteiro, M., Bostan, T.-C., Muller, E., Suel, E., Metzler, A. B., **Tamagusko, T.**, Ferreira, A.

*Sustainability*, 15(13), 10270. Author list corrected in *Sustainability* 17, 5047 (2025)

doi.org/10.3390/su151310270

MDPI. Cited by: 29.

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2021

**Building back better: The COVID-19 pandemic and transport policy implications for a developing megacity**

Hasselwander, M., **Tamagusko, T.**, Bigotte, J. F., Ferreira, A., Mejia, A., Ferranti, E. J. S.

*Sustainable Cities and Society*, 69, 102864

doi.org/10.1016/j.scs.2021.102864

Elsevier. Cited by: 142.

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2020

**Data-Driven Approach to Understand the Mobility Patterns of the Portuguese Population during the COVID-19 Pandemic**

**Tamagusko, T.**, Ferreira, A.

*Sustainability*, 12(22), 9775

doi.org/10.3390/su12229775

MDPI. Cited by: 50.

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## Conference papers

2026

**Edge-Optimized YOLO Model for Active Mobility Detection in Citizen-Led Urban Analytics** In press

**Tamagusko, T.**, Niroschan, L., Soubam, S., Desnoyer, T., Rogers, B., Istrate, A.-L., Pilla, F.

*Transport Research Arena (TRA) 2026*. Presented; proceedings in press

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2025

**Pavement Performance Prediction using Machine Learning: Supervised Learning with Tree-Based Algorithms**

**Tamagusko, T.**, Ferreira, A.

*Transportation Research Procedia*, 82, 2521–2531

doi.org/10.1016/j.trpro.2024.12.202

Cited by: 14.

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2023

**Optimizing Pothole Detection in Pavements: A Comparative Analysis of Deep Learning Models**

**Tamagusko, T.**, Ferreira, A.

*Engineering Proceedings*, 36, 11

doi.org/10.3390/engproc2023036011

MDPI. Cited by: 21.

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2023

**Machine Learning Applied to Flexible Pavement Performance Prediction**

**Tamagusko, T.**, Ferreira, A.

*XV Congreso de Ingeniería del Transporte (CIT 2023)*, San Cristóbal de La Laguna, pp. 1033–1039

ISBN 978-84-09-48462-1.

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2022

**Data analysis applied to airport pavement design**

**Tamagusko, T.**, Ferreira, A.

*Road and Rail Infrastructure VII: Proceedings of the 7th International Conference on Road and Rail Infrastructure (CETRA 2022)*, pp. 419–425

doi.org/10.5592/CO/CETRA.2022.1364

Cited by: 1.

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2022

**Deep Learning applied to Road Accident Detection with Transfer Learning and Synthetic Images**

**Tamagusko, T.**, Gomes Correia, M., Huynh, M. A., Ferreira, A.

*Transportation Research Procedia*, 64, 90–97

doi.org/10.1016/j.trpro.2022.09.012

Cited by: 63.

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2016

**Test Site for Evaluation of High-Speed WIM and ITS Solutions in Brazilian Conditions**

Guerson, L., Otto, G. G., Gevaerd, B. M., **Tamagusko, T.**, Mattar Valente, A.

*ICWIM7: 7th International Conference on Weigh-in-Motion & PIARC Workshop*, Foz do Iguaçu, Brazil, pp. 65–74

ISWIM and Ifsttar. Eds. Jacob, B., Schmidt, F.

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## Book chapters

2026

**Asphalt Pavement Performance Prediction Using Ensemble Learning Methods**

**Tamagusko, T.**, Ferreira, A.

In *Transport Transitions: Advancing Sustainable and Inclusive Mobility*, Lecture Notes in Mobility, Springer Nature Switzerland, pp. 153–159. Online October 4, 2025; print 2026

doi.org/10.1007/978-3-032-04774-8\_23

Eds. McNally, C. et al. Cited by: 1.

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2020

#### Software Tools for Airport Pavement Design

Tamagusko, T., Ferreira, A.

In *Trends and Innovations in Information Systems and Technologies*, Advances in Intelligent Systems and Computing 1160, Springer, pp. 66–76

[doi.org/10.1007/978-3-030-45691-7\\_7](https://doi.org/10.1007/978-3-030-45691-7_7)

Eds. Rocha, Á. et al. WorldCIST 2020. Cited by: 8.

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#### Reports

2025

#### Data Study Group Final Report: Transport for London - Identifying physical assets on the London Underground

Data Study Group Team. T. Tamagusko: facilitator and team member

The Alan Turing Institute

[doi.org/10.5281/zenodo.15554124](https://doi.org/10.5281/zenodo.15554124)

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#### Under Review and in Preparation

5 manuscripts under review and 3 in preparation.

#### Technical Skills

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**Transportation engineering:** active-travel safety assessment, ITS deployment, pavement engineering and management, asset management, traffic simulation (PTV Vissim, Visum)

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**Computer vision and edge AI:** YOLO, OpenCV, multi-object tracking, vision-language models, LiDAR point clouds, on-device inference (Raspberry Pi, ESP32)

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**Machine learning and data:** Python (pandas, scikit-learn, geopandas), R, SQL; XGBoost, LightGBM, CatBoost; TensorFlow, PyTorch; Docker, GitHub Actions, AWS

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**Geospatial:** QGIS, ArcGIS, PostGIS; network analysis, accessibility modeling, spatial statistics, participatory mapping

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#### Scientific Community

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**Research proposal evaluator,** Research Foundation Flanders (FWO), Belgium (2024–present): six research project proposals evaluated as external expert, on AI applied to road infrastructure management, urban mobility, road safety, and civil engineering

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**Peer reviewer,** 40+ manuscripts: *Machine Learning*, *Scientific Reports*, *Journal of Geographical Systems*, *Discover Artificial Intelligence*, *Multiscale and Multidisciplinary Modeling*, *Experiments and Design*, *European Transport Research Review*, *International Journal of Pavement Engineering*, *Journal of Air Transport Management*, *Transportation Engineering*, *Municipal Engineer*, *Infrastructures*, *Sustainability*, *Smart Cities*, *Sensors*

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**Conference reviewer:** Transport Research Arena (TRA) 2026

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**COST Action CA24141** (Climatic Resilience Initiative for Pavement Infrastructure, CRIPi): member of WG3 Pavement and WG4 Pavement Health Monitoring and Resilient Index

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## Awards

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PhD awarded with Highest Distinction, University of Coimbra (2024)

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2nd place, Location Intelligence Hackathon (2023); 3rd place, Transatlantic Hackathon (2022)

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Merit Board, top 5% of students, University of Coimbra (2018–2019 and 2019–2020)

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## Professional Development

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2025, Statistical Analysis using SPSS, UCD CSTAR (Centre for Support and Training in Analysis and Research), Ireland

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2023, Innovation and Science Diplomacy School on Global Circulation of Research Data, University of São Paulo, Brazil

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2022, AI for Science Bootcamp, NCC Portugal / NVIDIA (University of Coimbra and University of Minho, online)

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2021, Mastering Big Data with Open Source Platforms, University of São Paulo, Brazil (online)

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2020, Machine Learning, Stanford University (Coursera); Think Road Safety, World Bank Open Learning Campus

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## Languages

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Portuguese (native) · English (fluent, professional use)

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