



# Social Sensing Toolkit for Predicting Technology Acceptance in Smart Border Control Technologies

EAB RESEARCH PROJECTS CONFERENCE (EAB-RPC) 2022

13<sup>th</sup> September, 2022

**MR PET:** Multidisciplinary Research group on Privacy and data protEctTion



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 883075.

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WP6 Main Objective & Tasks



Social Sensing Toolkit Architecture



Social Sensing Toolkit Architecture – Components



Possible knowledge, recommendations generation for the stakeholders from Social Sensing Toolkit



Summary of the scientific publications

SLIDES No:

3 - 4

5

6 – 16

17

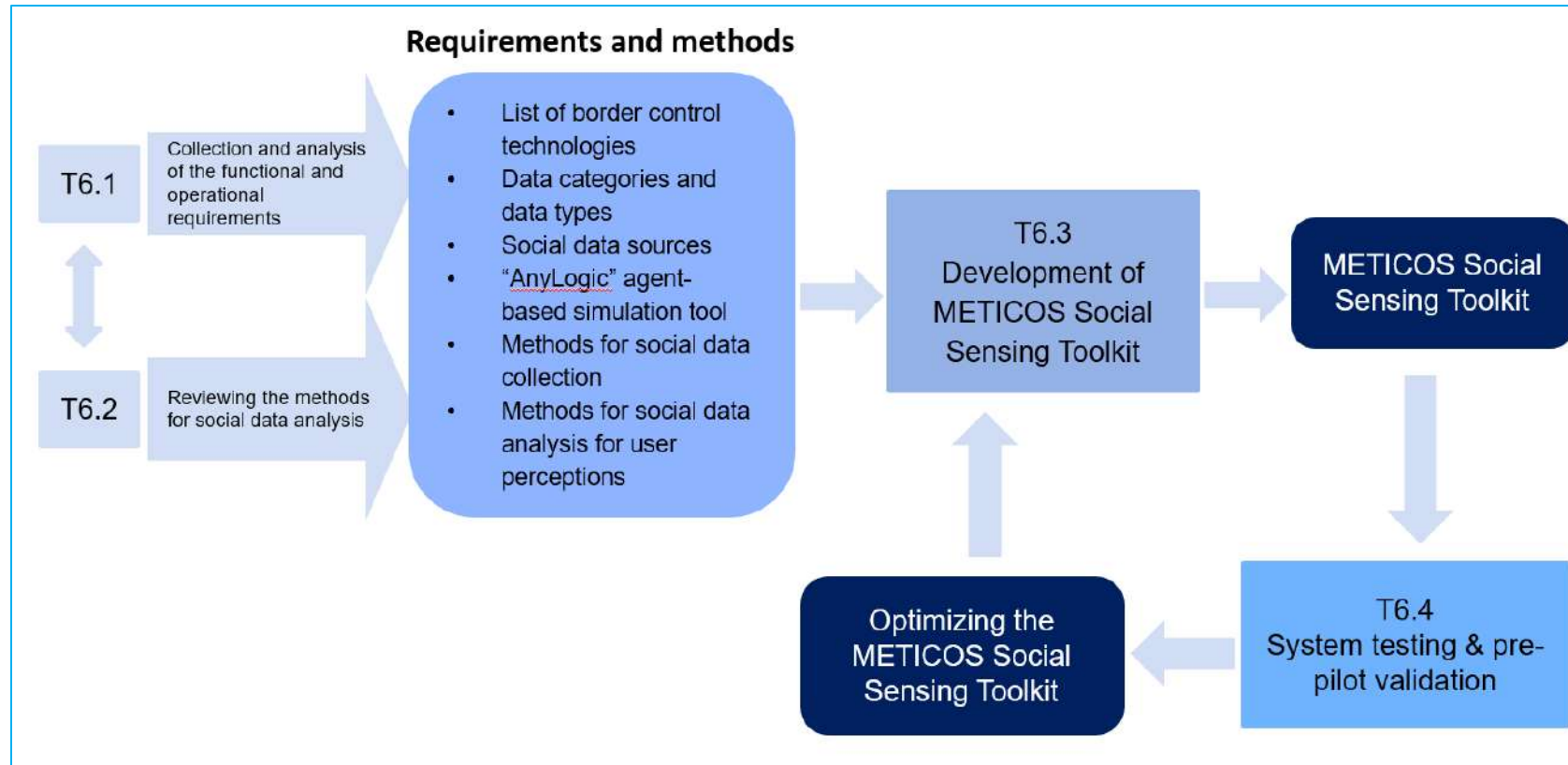
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## WP6 Objective

The main objective of **WP6** is the development and implementation of a **social sensing toolkit** to analyse and estimate the activity and interactions between migrants/travellers, border staffs and **border control technologies** for **technology acceptance prediction**.





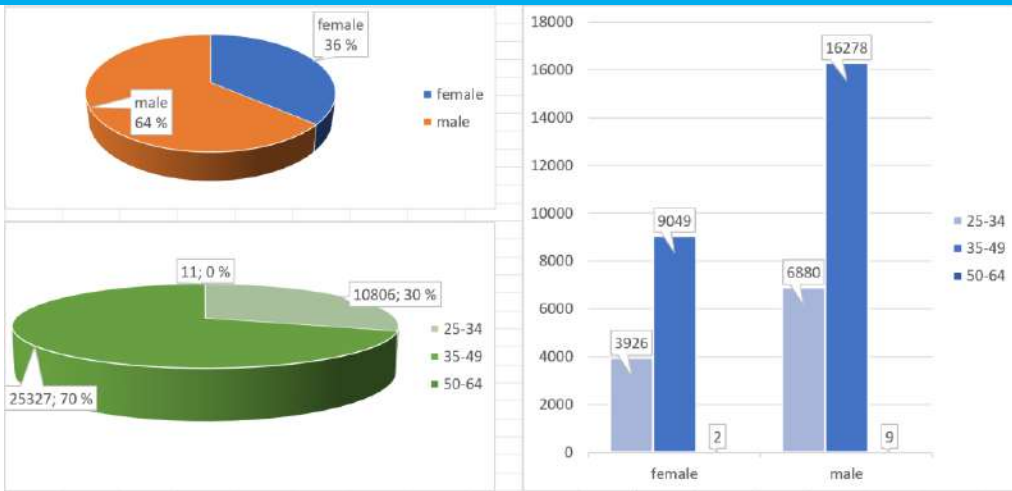
Please contact the presenters for details regarding the high-level architecture.

The work is confidential to consortium partner for now.

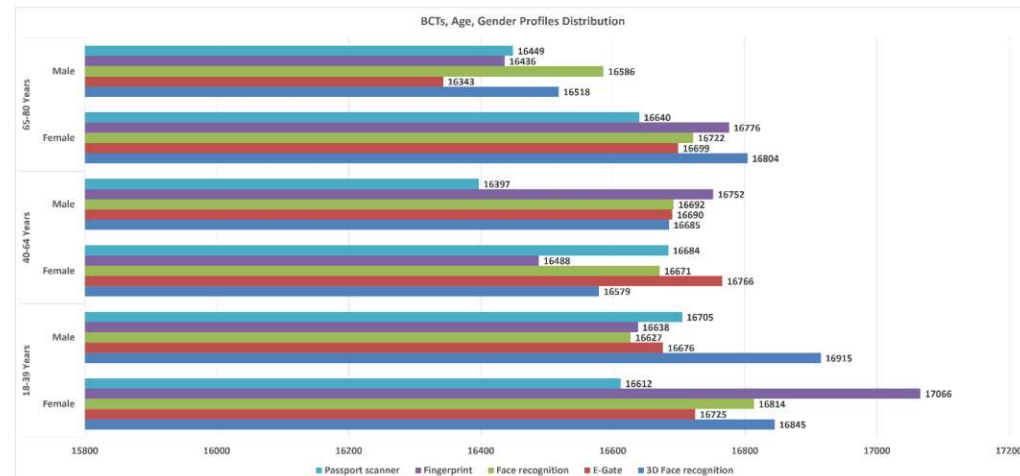
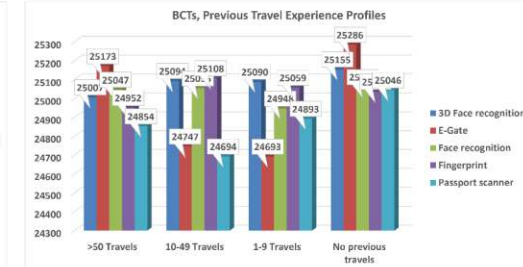
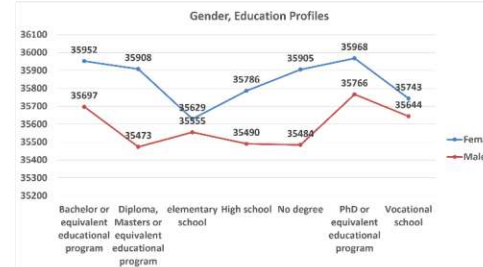
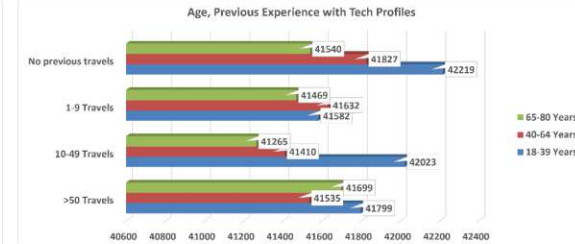
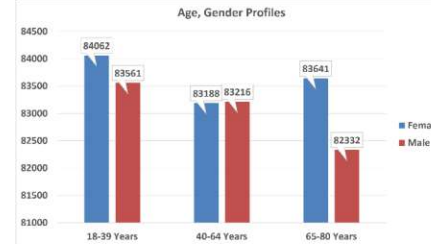




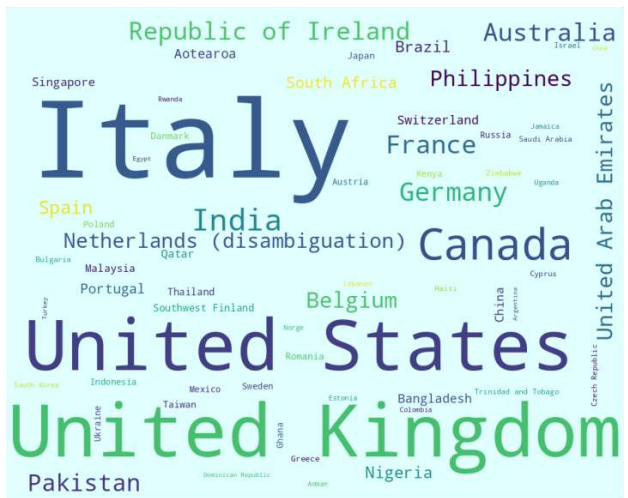
# Social Sensing Toolkit – Profile extraction using SCFM



Age-group and gender distribution of extracted profiles (Twitter dataset)



SQGDs' distribution for different profiles/demographics



Location based distribution of extracted profiles (Twitter dataset)



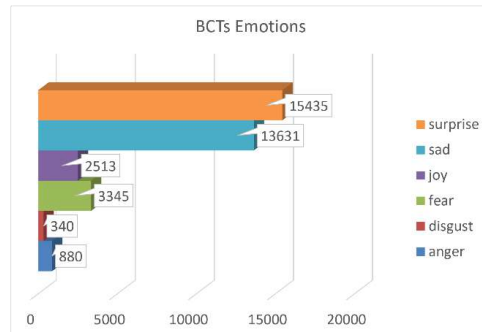
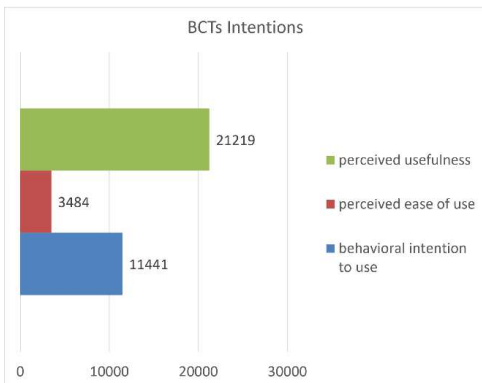
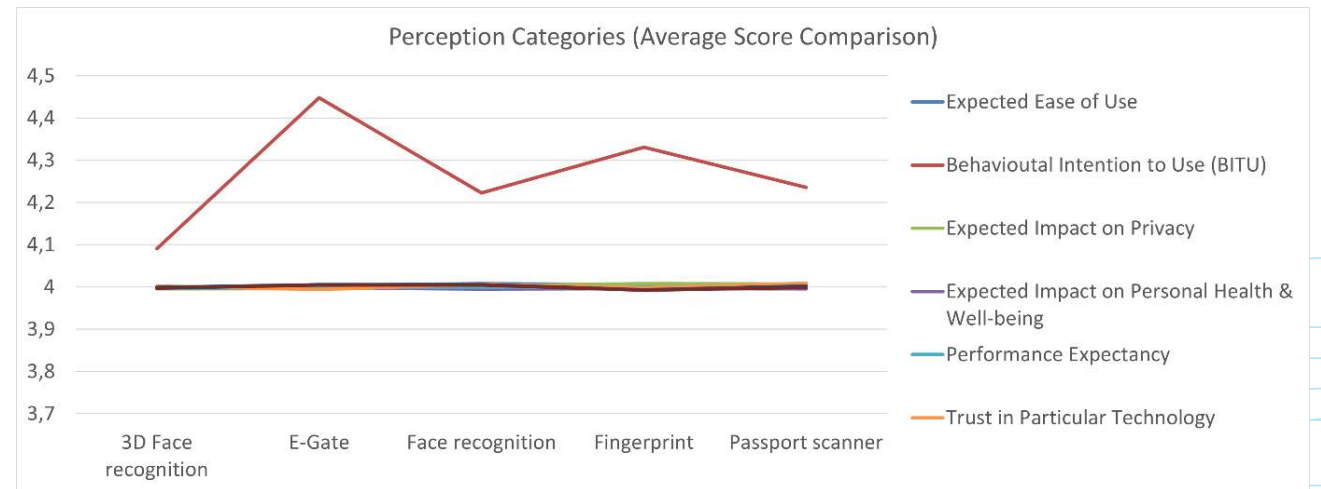
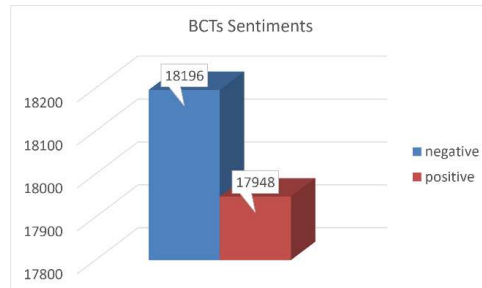
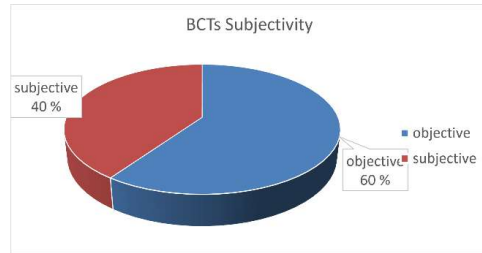
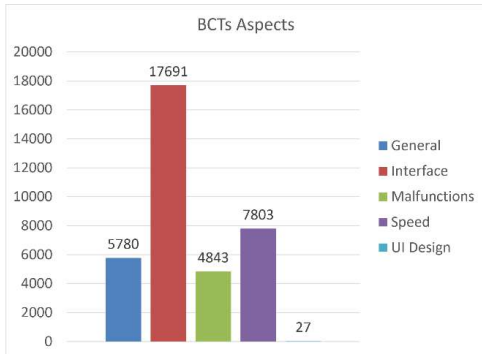
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Faculty of Information Technology and Electrical Engineering  
Department of Information Security and Communication Technology



# Social Sensing Toolkit – Perception extraction using DPM

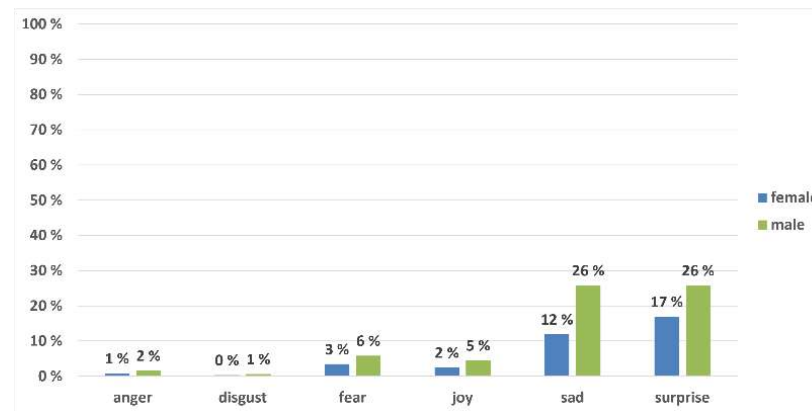
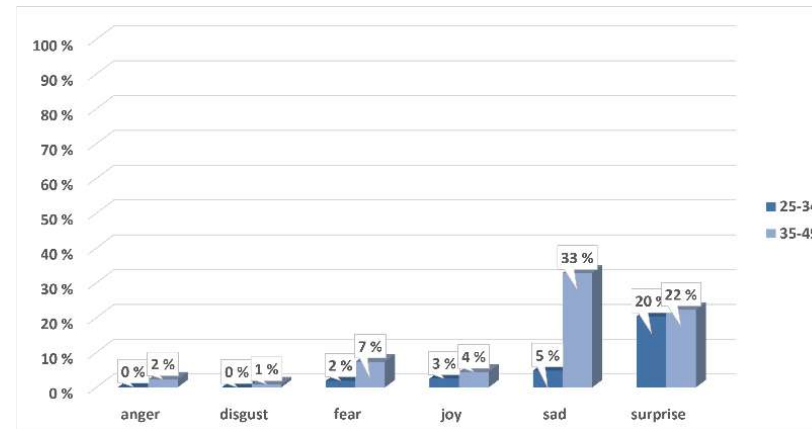
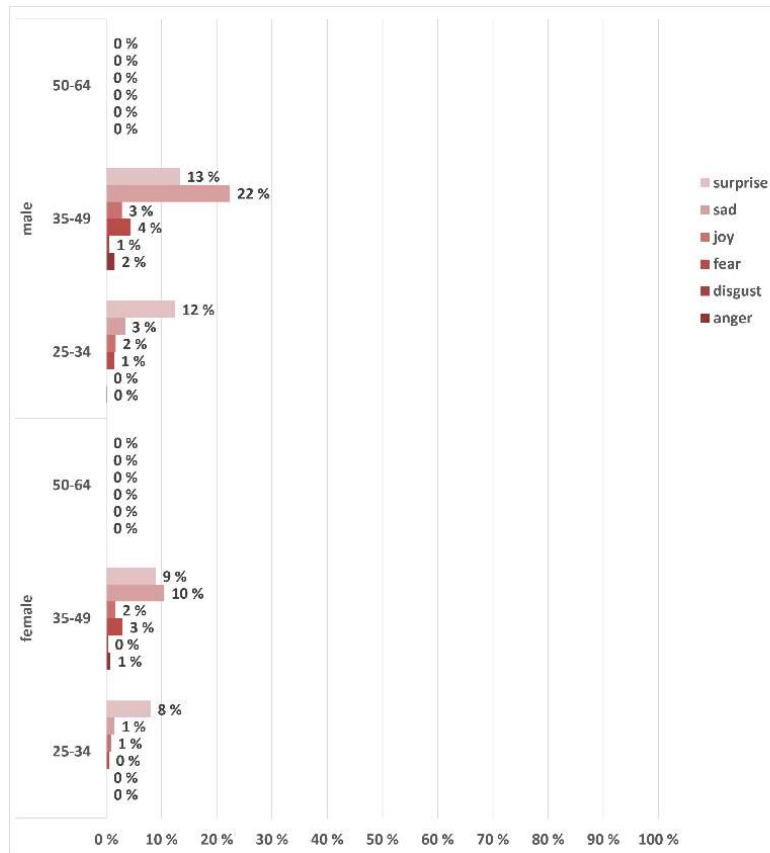


Extracted perceptions from the SQGD

Extracted perceptions from the Twitter dataset



# Social Sensing Toolkit – (Profile, Perception) pairs matching using DPM



(Profile, Perception) pairs for emotion categories (Twitter dataset)



# Social Sensing Toolkit – (Profile, Perception) pairs matching using DPM



(Profile, Perception) pairs of BITU score (SQGD)



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## Twitter dataset

Please contact the presenters for details regarding the dataset.

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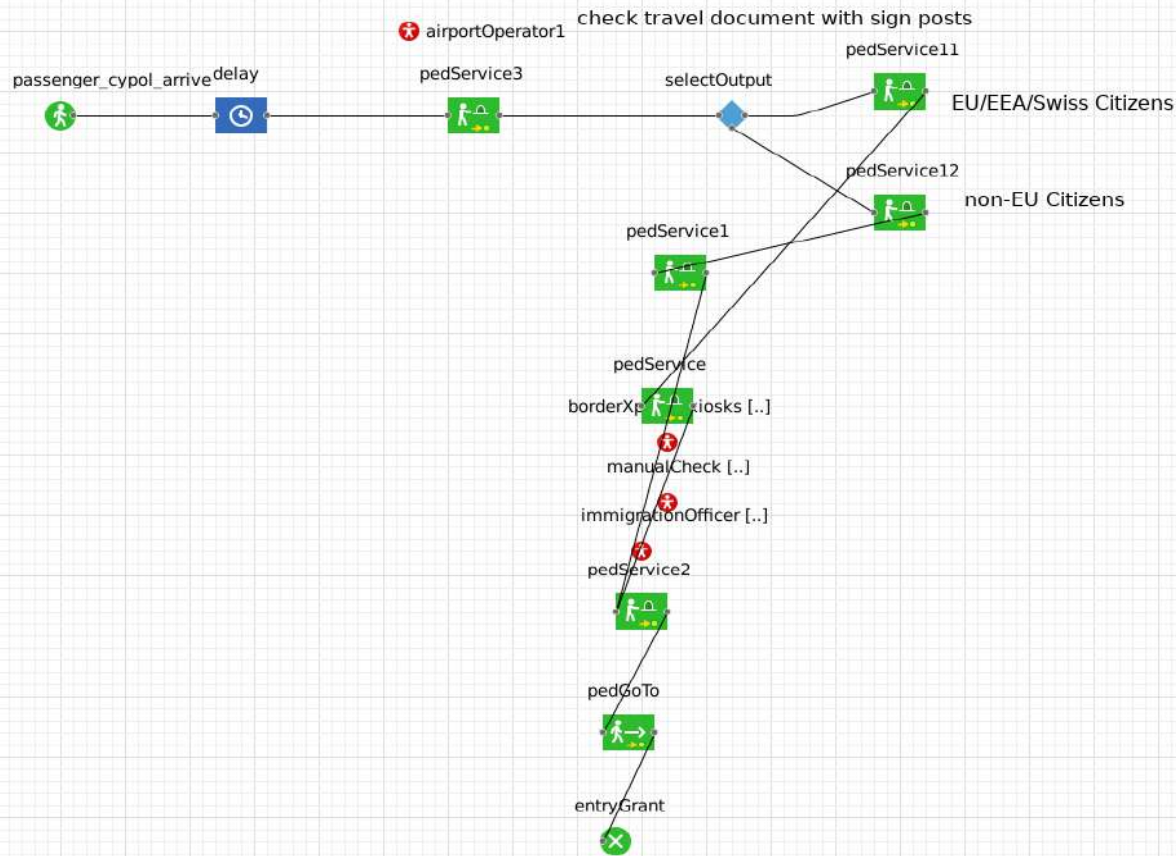
## Synthetic Questionnaire Generated Dataset (SQGD) based on TAM Proxy Model

Please contact the presenters for details regarding the dataset.

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## Cyper Airport Travellers Arrival Flow



Implementation of the scenario in AnyLogic tool

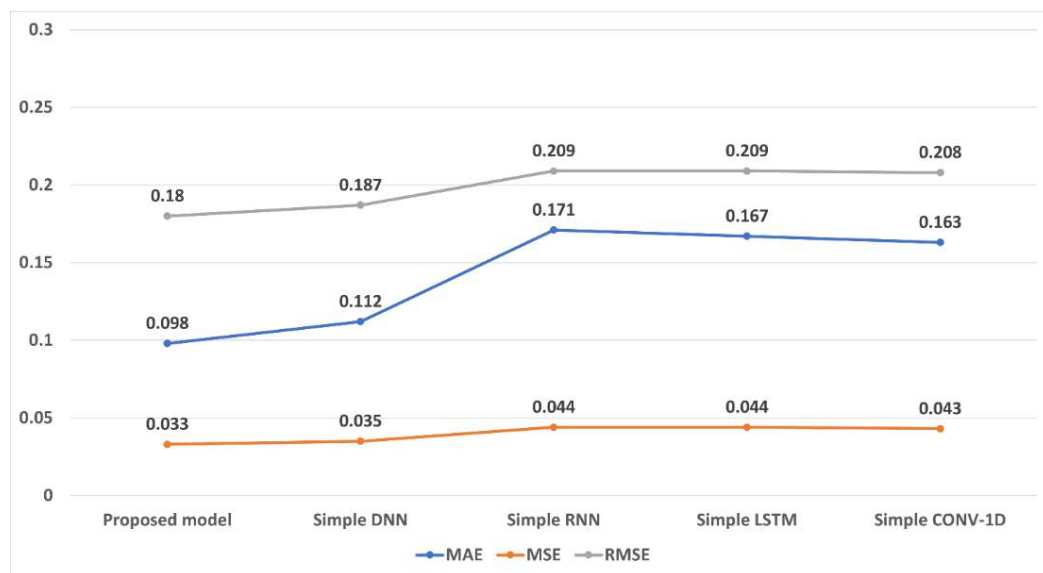
1. Entry into the arrival hall.
2. Allocation of passenger into two separate lanes, one for EU/EEA/Swiss Citizens and one for Non-EU citizens (signposted "all passports"). This is performed by airport operator.
3. Immigration Check: Here, the travelers can make the use of "BorderXpress" (an example of border control technology) is an interactive kiosk available only to citizens enjoying the right of free movement in the European Union. **This is the major step in which we are trying to understand what a traveler perceives while using the technology, to perform these verification tasks and to also understand how perception varies based on different profile/demographics which ultimately affects the acceptance score of the technology being used.**
4. A human immigration officer will check all the necessary documents.
5. Either grant or refuse the entry.

Please contact the presenters for details.

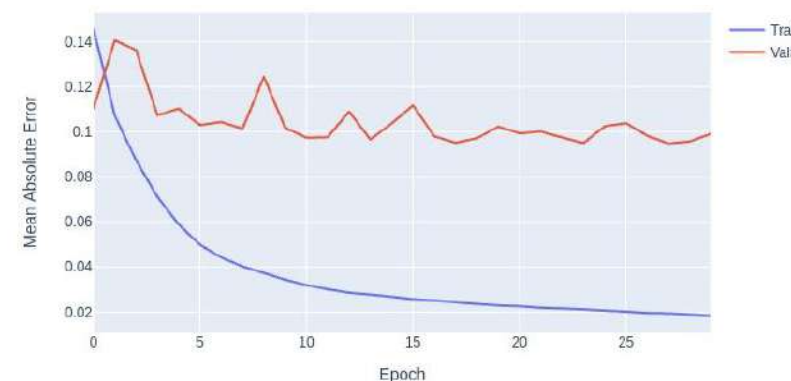
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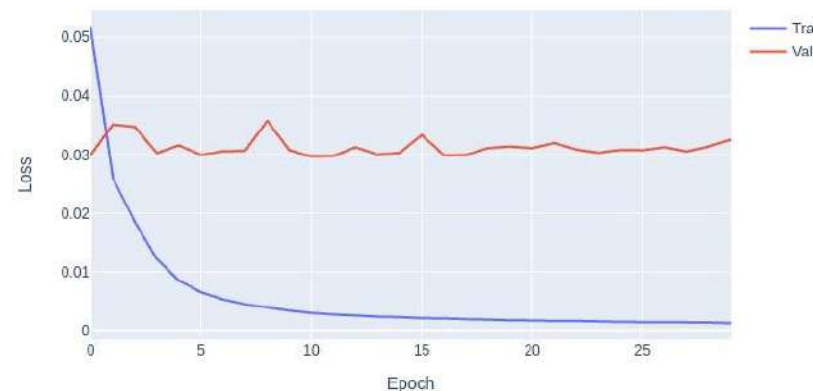
# Social Sensing Toolkit – ABMS model & its performance comparison



MAE, MSE and RMSE scores of the proposed deep regression model



MAE curve of training vs validation for the proposed deep regression model



Loss curve of training vs validation for the proposed deep regression model

- MAE: Mean average error
- MSE: Mean square error
- RMSE: Root mean square error
- DNN: Deep neural network
- RNN: Recurrent neural network
- LSTM: Long-short term memory
- CONV-1D: Convolutional-1 dimensional



Please contact the presenters for details

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# Plan for the scientific publications of WP6



#	Tentative Title	Venue	Planned Date
1	Designing an innovative toolkit for assessing user acceptance of border control technologies	International Conference "Rebound, Rebuild, and Reinvent for a Sustainable and Equitable Development (3R4SED)."	Presented
2	Towards understanding of user perceptions for smart border control using fine-tuned transformer approach	Northern Lights Deep Learning (NLDL) Conference, 2022	Published
3	A survey of artificial intelligence techniques for user perceptions' extraction from social media data	Computing Conference, 2022	Published



# Thank you!!

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