





Understanding pedestrian behaviour for sustainable urban (re)development

Towards GDPR compliance in distributed, time synchronised IoT pedestrian monitoring system

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Motivation

- Unprecedented urbanisation has brought cities that are already resource constrained under more pressure
- Population growth is linked to increased mobility
- Walking, a vital mode of transportation, has been identified as the basis of sustainable city that provides social, economical, and environmental benefits
- Understanding human interaction with the built environment is essential to promote and enhance pedestrian mobility

Sustainability



Data-driven (re-)development of urban spaces can provide a conducive environment for city dwellers to select walking as a means of transportation





Urban-ecosystem that supports sustainable modes of transportation will result in reduced emissions.



A healthy lifestyle and environment is proven to have positive impact on the mental and physical well-being of people



A means to assess interaction of pedestrians and urban biodiversity will support creation of co-habitable space

Partners and Stakeholders

- Local councils, and regional & campus planners
- Transportation authorities
- Environmentalists and conservationists, such as Bord na Mona

System's Design

Metrics

Work package 1
Bluetooth Low Energy

Work package 2
Thermal Imaging

Work package 3
Acoustics

Work package 4
Portal and Decision
Support System

Work package 1

- Smart device users count
- Direction of travel
- Pedestrian pace estimation

Work package 2

- Pedestrian count
- Crowd density estimation
- Green cover

Work package 3

- Bird species identification and population estimation
- Assessing pedestrian's age and gender

GDPR

- *Privacy-by-design* approach embraced through conceptualisation, example: choice of sensors
- Behavioural characteristics are asserted at a macro-level and not individual level
- Raw data processed on local device and only asserted information is shared with cloud
- Hash encoding of data at local device level adds another layer of anonymisation

Outcome

Deliverable

Multi-modal pedestrian monitoring framework

(validated through a real-world deployed system)

Knowledge Contribution

Pedestrian-monitoring process

Pedestrian-biodiversity model

Comprehensive evaluation metrics

Self-governed wireless monitoring modes

Decision Support System







