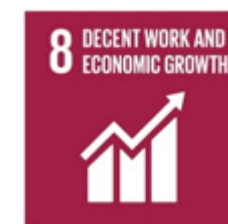


PREVENT CROWDING PROJECT

A Smart Tourism Approach to Prevent Overcrowding
and Improve Destinations Sustainability







TOURISM OVERCROWDING EVIDENCES IN LISBON





Social actors' benefits:



TOURISM PROFESSIONALS

Services more expeditious and improve the quality of visit



RESIDENTS

Reduce stress from over-occupation of personal space
Improve attitudes towards tourists and tourism professionals



LOCAL BUSINESSES

By putting socially and environmentally sustainable businesses on the road map, it contributes to greater retention of tourism income by communities.

Social actors' benefits:



HERITAGE MANAGERS

Avoid heritage degradation by over-occupation



TOURISTS

Greater satisfaction with the visit;

Greater authenticity;

Avoid queues and/or paths crowded with other tourists;

Guarantees of safety and cleanliness;

Adaptation of itineraries to user profile (physical dexterity, desired route duration, personal preferences)



LOCAL AUTHORITIES

Improvement of just-in-time decisions and planning in Urban Cleaning and Public Safety, as well as reducing operating costs



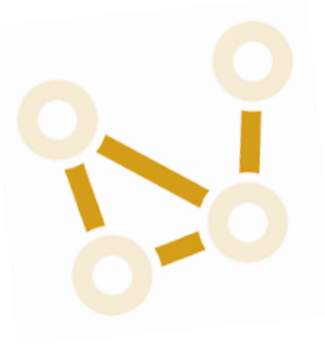
OpenStreetMap

GIS + Points of Interest



Crowding detection data
(dynamic heat maps)

Graph and multi-
criteria decision
algorithms



**SUSTAINABLE TOURISM
CROWDING PROJECT**

Sustainable walking routes recommendations

- Mitigating crowding by spreading visitors
- Promoting the visitation of more sustainable POIs
- Matching the expected effort / schedule and personal preferences
- Matching POIs opening hours



Our suggestion: Visit the Glória Lift



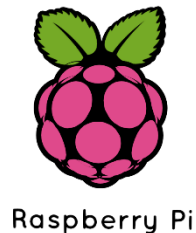
"SDR-based Crowding Detection"

*"Modeling, Deploying and Testing
Microservices Architectures"*

*"Optimizing User Engagement, Experience
and Retention in Mobile Apps for Walking
Routes Recommendation"*



LoRaWAN



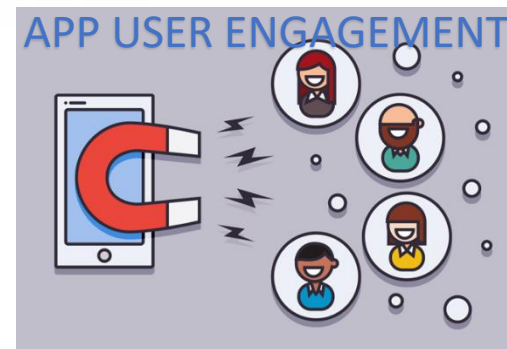
Raspberry Pi



*"Cloud-Based Analytics for Tourism
Sustainability: the Case of Lisbon Over Crowding"*



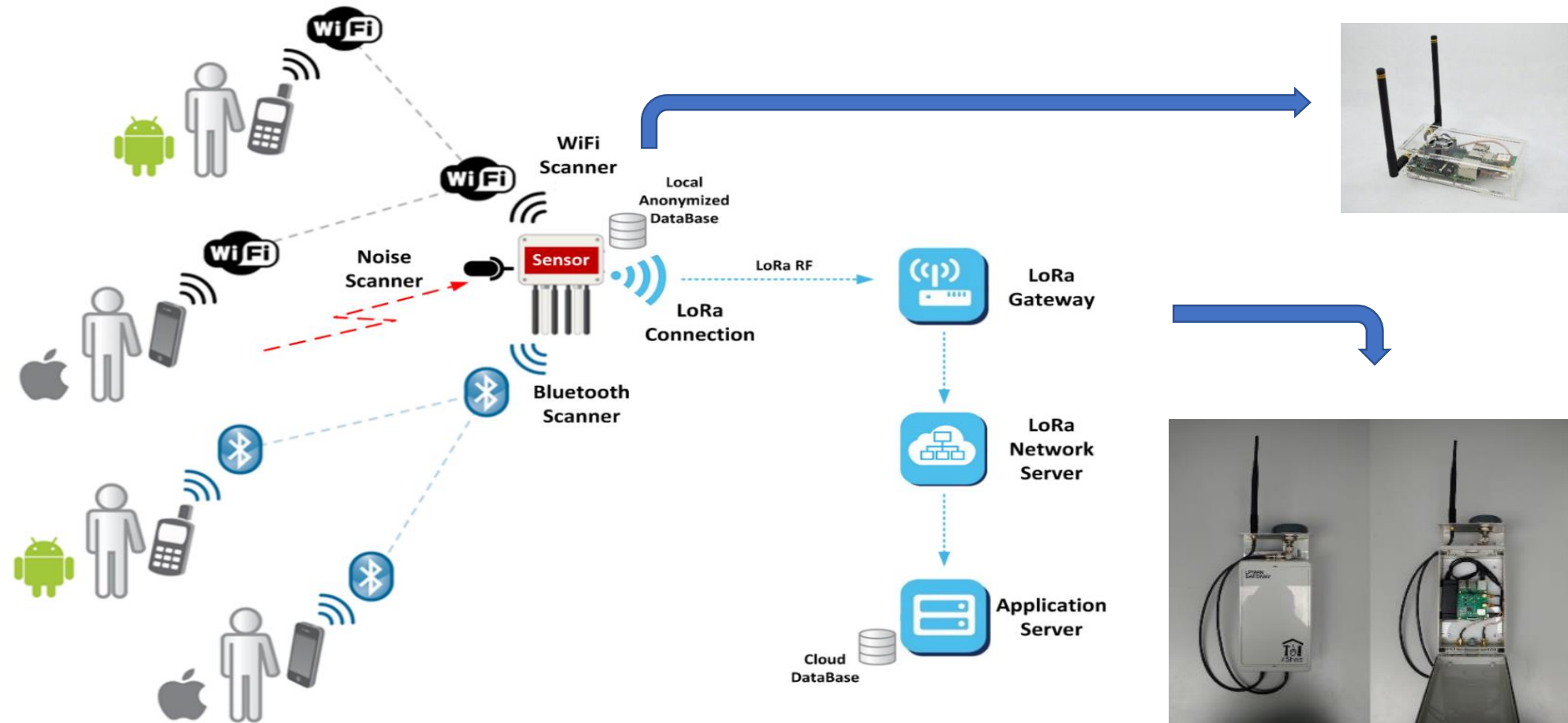
Graphhopper

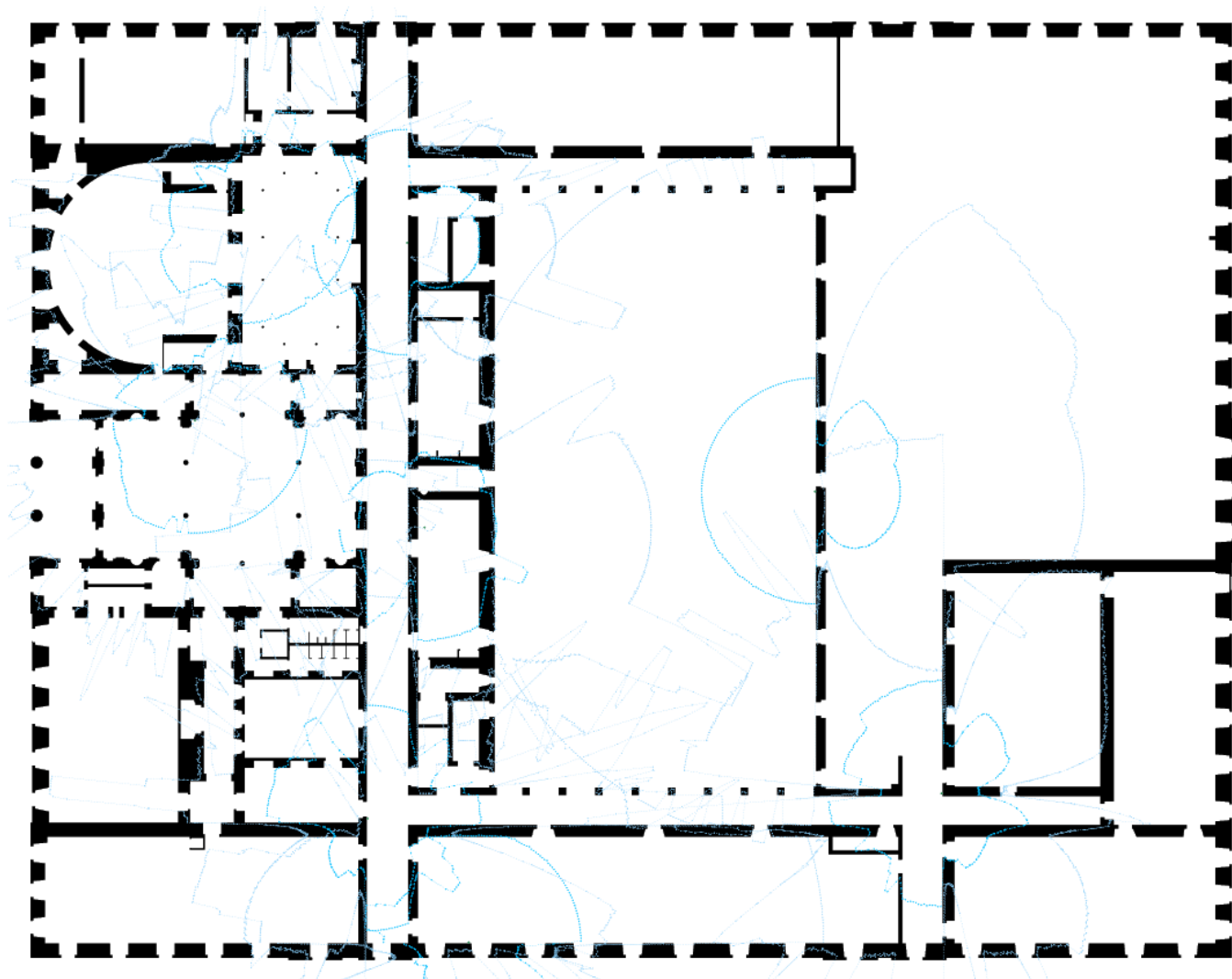


Crowd detectors capture the activity of mobile devices (Bluetooth, Wi-Fi, 3G, 4G)

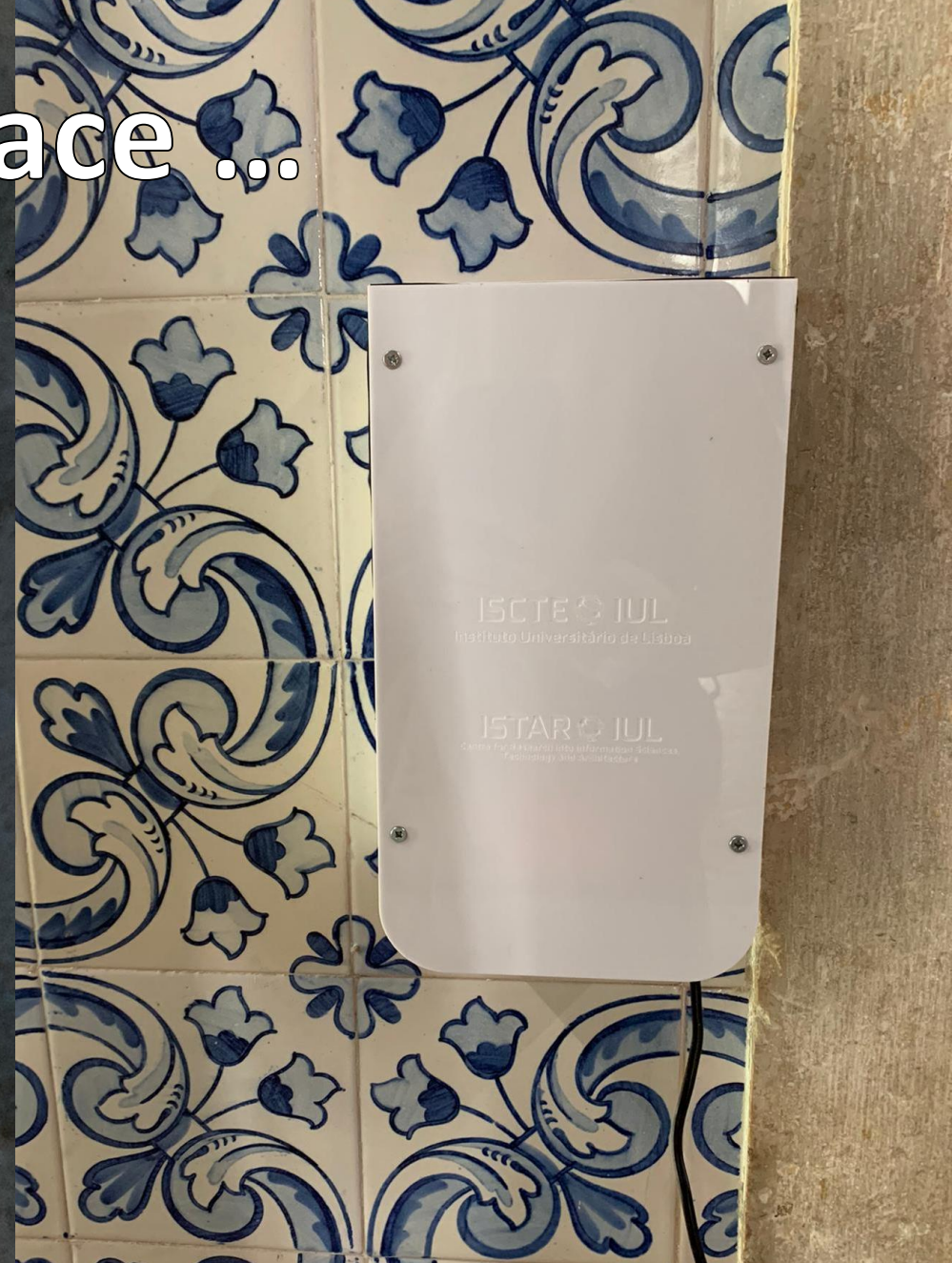
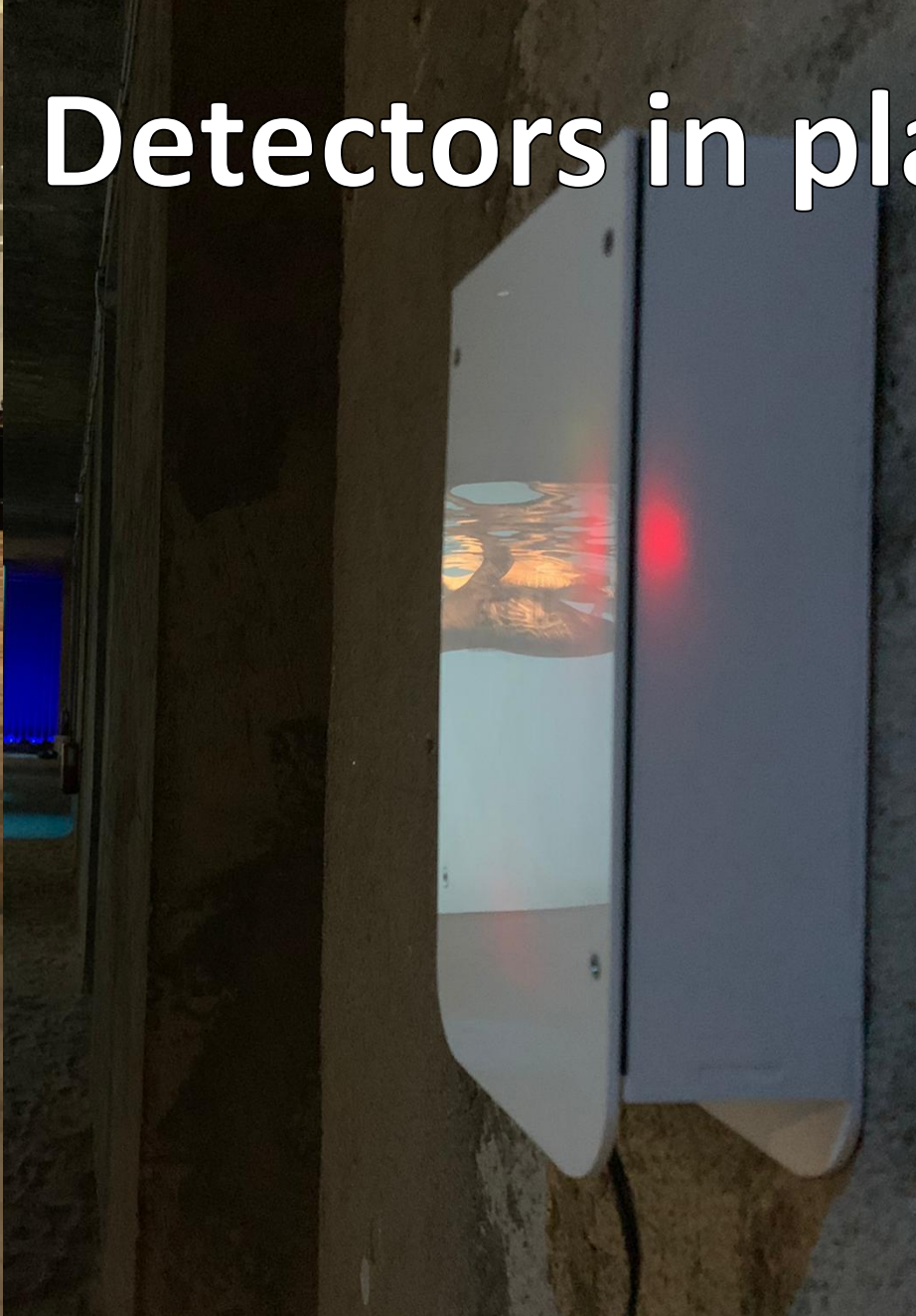


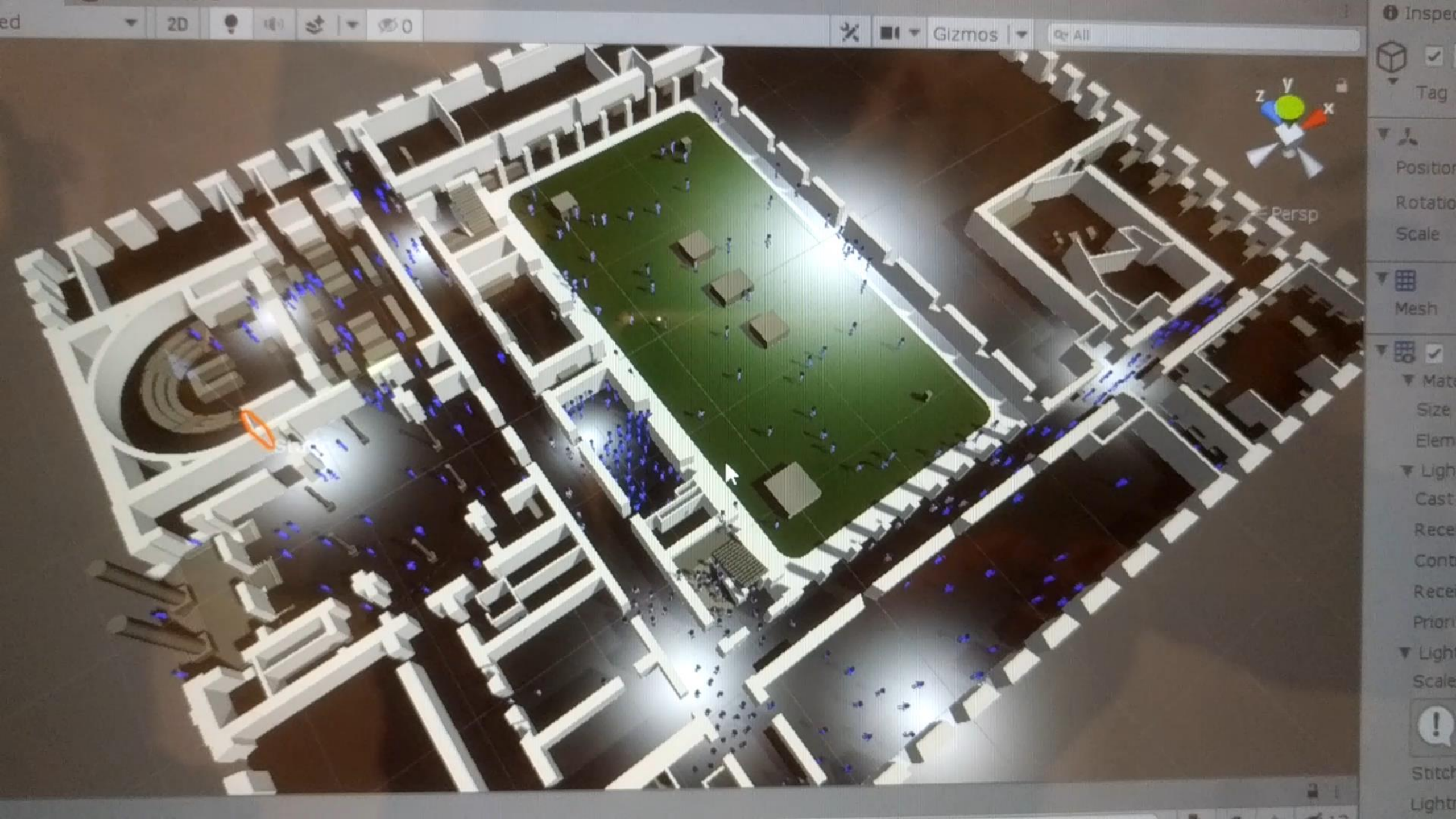
General architecture of crowding detection solution

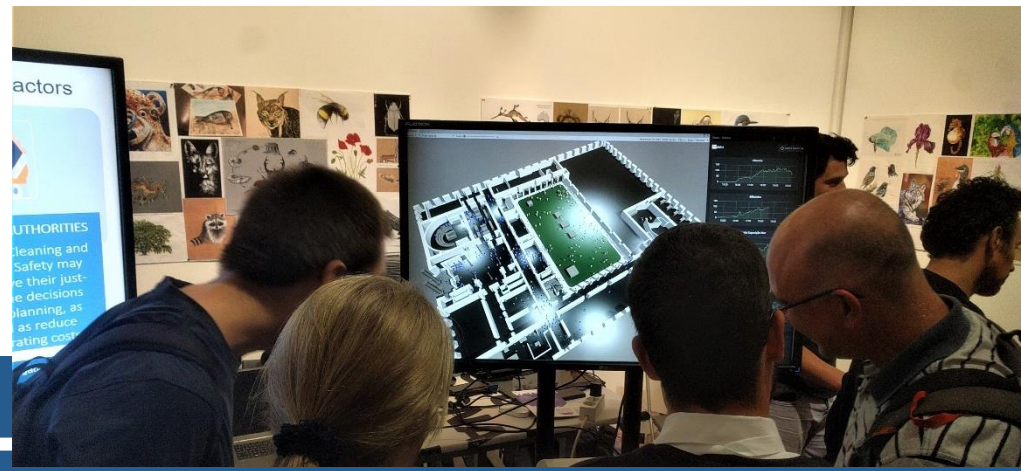
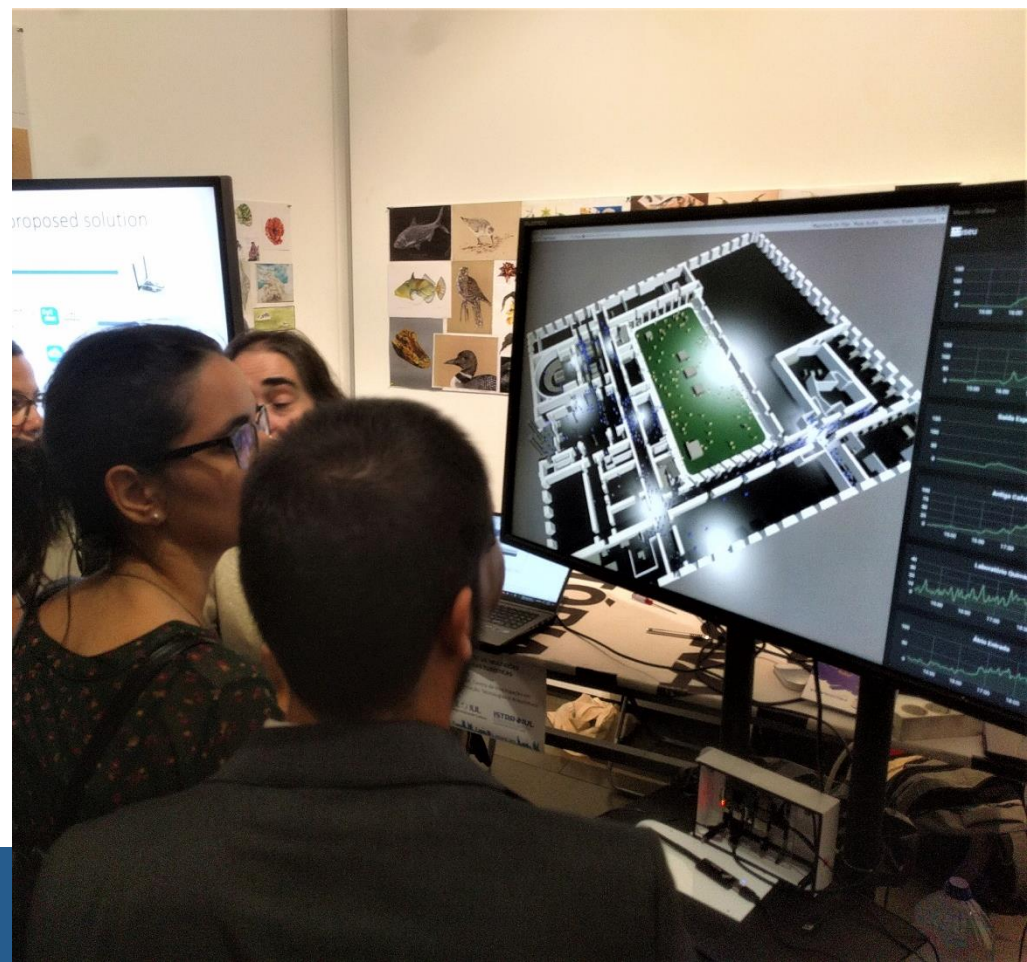
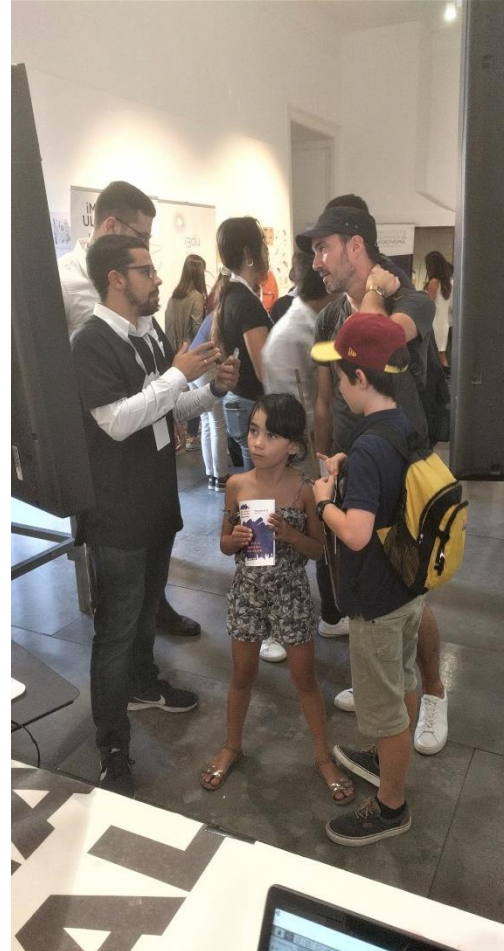




Detectors in place ...







Future work: big data-based tourism crowding forecasts

