Q&A
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Artificial Intelligence for Safer Urban Spaces
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Q1: What software platform did you use for your classifiers (SciKitLearn, H2O, Mathematica, …)?

It's all coded in Python by Allesandro, using YOLO v5.0 …so this is the early investigation work we're doing, but we're going to push towards a GPU platform as a data science platform that we are purchasing in the New Year to actually deal with the scalability of the work.

Q1: What does a "crowd simulation" do and how does it work?

This is an activity done by our colleagues in a in the Czech Republic as well as in Spain, an academic partner from Cantabria University near Bilbao. And also Crowd Dynamics, a company in Manchester, basically the simulation of crowd is based on first principles. There are models that are related to social interactions, which are understood over the years and implemented from such theories, ….but models from these theories are not fully expert in crowd behaviour modelling, but the simulations, they produce, are actually very realistic. They take into account the boundary conditions of the space therein and how the crowd can be evacuated safely. So, this additional piece of information actually goes to level 4, of high-level fusion, for further reasoning. In addition to what we produce in terms of detections of behaviour. So, our part of the work actually deals with machine learning or data driven machine learning based on understanding of behaviour, whereas crowd modelling simulations are based on first principles theories.

Q2: How is it possible to make a digital twin of humans since human beings cannot be simulated?

I think we're going towards that, the reason I'm saying that is that in my group I haven't mentioned those who are doing other activities, but it's all falling into the processes and behaviour understanding. These processes are natural or industrial in nature, so we work on all of these. So, one example is that we look at humans and try to understand their behaviours in terms of health. I don't know if I'm answering this question here, but it is possible in principle to develop a digital twin of a human. Should we have for example the measurements of this human in terms of their phenotypic related data, and/or related parameters. This way we will understand their health, but we will understand whether they are under stress or basically in need of particular help. This is being developed in collaboration with partners in the health sector, so I'm looking for instance at specific patients with respiratory problems and we monitor them in their homes instead of, leaving them alone and then when they come to a very, very difficult situation, they will have to go to the hospital, A&E for instance, and that would increase the number of patient workload in hospitals. Instead, AI comes in and under their agreement so.. you have to have a legal framework to do that to develop digital a twin of a human. But we're not at the stage with fully developing it;…. For me it is possible to do that, providing you get the full observations of this human embedded sensing in place. You have embedded sensing but also non-intrusive sensing outside the body, cameras, sound sensing and smell sensing, and all of these can create the digital twin of the human inside a virtual space or smart space, so….., it's not impossible.