An IoT Participatory Sensing System for Making our Cities Safer and Increasing the Perception of Security among Citizens

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Todays for European cities, it is a number one priority to provide a safe and secure environment. Mitigation of Risks and reducing the fear of crime is getting a top priority for city authorities. This paper presents the deployment of an innovative Participatory Sensing System developed in the context of H2020 City.Risks project to enhance citizen security by protecting their personal belongings. The System is empowered by crowd sensing and utilizes simulation derived strategies to engage citizens and hardware resources in an optimal way.

The solution provides an in-house Theft detection sensor that can be attached to personal belongings. A custom mobile application and an in-house IoT gateway are used to track the sensor. The process is orchestrated by an operation center. The ability of the system to track and lo-cate the stolen items is based on the area coverage achieved through the engagement of available resources.

In order to optimize the tracking process and produce the best possible outcome the Stolen Item Tracking Simulator was developed, which assesses via simulation the impact of different parameters and strategies regarding the selection of how many and which users to activate when searching for a stolen item within a given area. The simulation supports the following parameters: the location and time of the reported theft; the number, and optionally the location, of users and gateways in the area; the detection range of mobile devices and gateways; the probability of the stolen item being detected if it is within range; the speed and type of movement of the users and the offender; the strategy to be used for activating users; and, finally, the duration of the simulation and the decision frequency. The simulator supports different strategies for selecting which users to activate at each cycle. These vary in

complexity, from the simplest one being to activate all available users, or a randomly selected subset of them, to more elaborate ones that use the aforementioned parameters to estimate the possible location of the offender and then activate users in a way that maximizes area coverage while minimizing resources spent. The output of the simulation is a detailed log of the events and decisions occurring at each cycle, as well as aggregate statistics for various performance indicators. Optionally, the simulator generates also an animation that allows to visually inspect how the simulation has evolved at each cycle.

City.Risks aims to provide city authorities with new tools not only to protect and control but also to foster the participation and empowerment of citizens and to provide better services and governance. Technologies like these can make cities safer and more inclusive; and provide with new methods to stay and feel safe with the active participation of citizens in online communities for exchanging information and sharing in-formation. The can engage people in the process of creating safety. Once more and more people get involved and engaged in the issue of safety that is going to change the behavior of people and create safer cities and inclusive public spaces.