Smart camera is a device capable, aside from registering images, of "understanding" their contents thanks to the use of image processing and machine learning algorithms. The progress in silicon device manufacturing leads to the development of computational platforms that are increasingly more powerful in terms of performance power efficiency. This enables the integration of more and more complex and advanced functions within the camera. The use of smart cameras facilitates distributed processing, which unlike it is the case with centralized processing does not rely on a single, powerful central server. The use of distributed processing enables the reduction of data sent by the cameras, as the images are processed on-site. Complex, costly communication infrastructure is no longer necessary. Moreover, distributed systems are also by design more robust.

A natural development path for a system comprising of multiple smart cameras is to create connections enabling the communication between individual devices. Doing so, we create a network of smart cameras, enabling the development of more complex, but also more useful applications. For example, continuous, cooperative tracking of objects moving within the field of view of the cameras in the network is possible. Even if the object exits the field of view of one camera, it emerges in the field of view of another – a fact that can be taken note of if the nodes of the camera network can exchange information.

During the course of the project, a concept of a smart camera architecture based on a heterogeneous computational platform was developed. The platform contains, aside of a microprocessor, a pool of programmable digital elements, which can be used to put together dedicated, application-specific high performance coprocessors. The coprocessors are capable of performing object detection, labelling and movement tracking operations, recognizing the class of an object, as well as the detection, matching and tracking of characteristic features associated with the observed objects. Extensive use of the communication mechanisms made available by the computational platform makes it possible to perform the operations using the coprocessors without stressing the microprocessor, leaving if free for other tasks.

As the number of cameras within the sensor networks increases, the need for node management mechanism emerges. The role of such mechanism is to minimize the amount of data being sent and the amount of power consumed. Contemporary solutions are mostly focused on power-efficient design of network nodes or managing the individual sensors. During the course of the project, a more sophisticated governing scheme was developed. The power consumption and the amount of data sent is constrained by and depends on the amount of activity observed by the sensor node and its related neighbours. The amount of motion observed on the scene is used as activity indicator.

Finally, as another result of the project, a database of images registered in a typical urban space was made available to the research community. The images are supplemented with rich annotation, enabling the testing of detection, tracking and object recognition algorithms to be applied for autonomous vision-based surveillance. Aside from the image database, all the software developed during the course of the project is also publicly available.