

Secure and Trustworthy Mobile Participatory Sensing over M-Sec Platform

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I. Abstract

M-Sec project has been providing a set of components for security and integrity of data traffic with a modular approach for the IoT and Smart City domain. Fujisawa City hosts two pilot studies: Secure and Trustworthy Mobile Sensing and Secure Affective Participatory Sensing.

II. Secure and Trustworthy Sensing: Pilot Studies in Fujisawa

The former illustrates how environment monitoring data can be captured from the real world, handled in the cloud system, and delivered to citizens securely (Figure 1). In the latter, the participatory sensing data from the smartphone apps “SmileCityReport (Figure 2)” is leveraged for sharing fun with “smile” photo.



Figure 1. Sensor box mounted over trucks (left), visualization of PM2.5 density (middle), and image-based road damage detection (right)

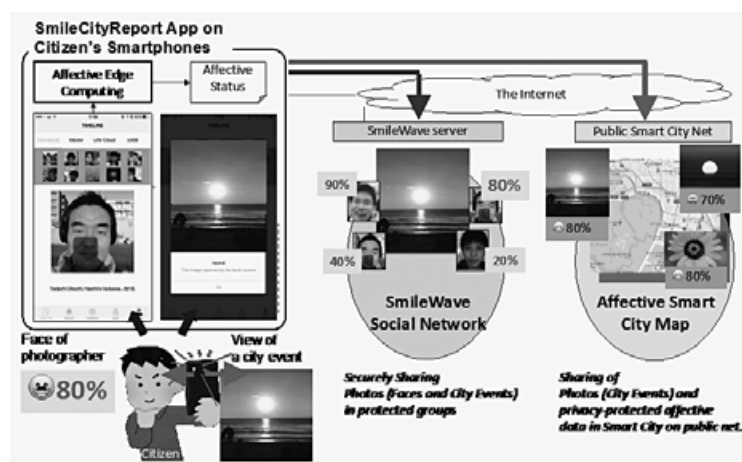


Figure 2. SmileCityReport: Hyper-connected participatory sensing application

III. Multi-Layered Security and Blockchain-based Marketplace

In these studies, the IoT devices, the cloud system, and applications consuming sensor data streams are extended with Multi-Layered security mechanisms. One of the key components is Secure SOXFire (Figure 3), a distributed middleware system that enables matching between the data providers and consumers without being conscious of the other party. Another is GANonymizer that automatically removes the privacy-related objects from images using deep learning.

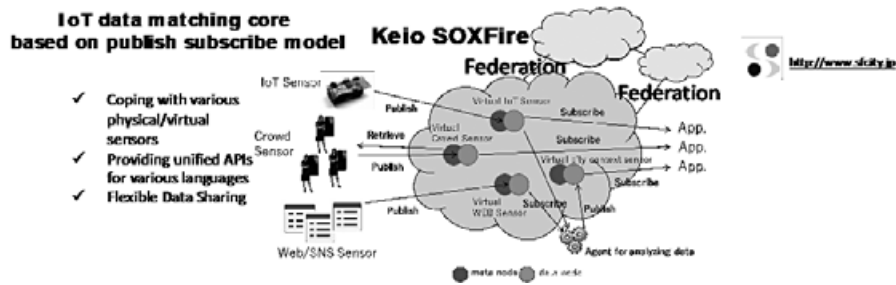


Figure 3. Publish/Subscribe-based scalable data distribution platform “SOXFire”

The data, which are not personal or sensitive, generated by the whole service are sent to the blockchain-based MSec Marketplace to foster a secure IoT data exchange. This Marketplace includes a Trust & Reputation component capable to evaluate the actual content being shared, resulting to form secure end-to-end data transaction over the Internet among stakeholders (Figure 4).

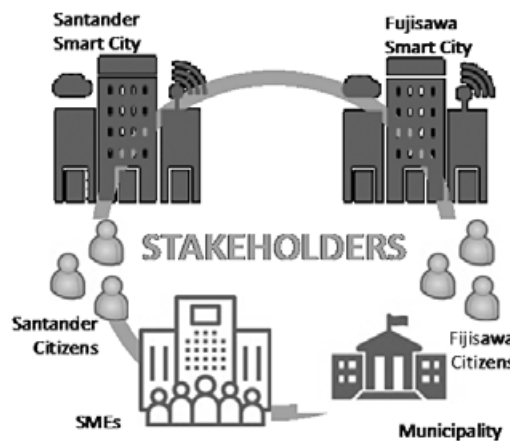


Figure 4. Stakeholders securely connected over M-Sec marketplace

IV. Conclusion

Fujisawa City, as one of the advanced IoT-rich cities in Japan, has been collaborating with the M-Sec consortium.

This collaboration will continue to make Fujisawa smarter, leveraging its strong partnership of leading EU+JP universities, research centers, and companies in the area of Big Data, IoT, Cloud Computing, Blockchain.