# Computational Media Group

Computational Media are advanced information media on which high sensing functionality and huge computing resource over computer network are smartly unified. We aim to feed appropriate information to everyone wherever and whenever it is necessary by the computational media.

Computational media stand on advanced and intelligent visual information processing technologies. Surveillance cameras are one of our major data source. While they have been installed in public space, some people may feel uncomfortable with cameras though they play important role of keeping security and safety of our daily life. The computational media will give a new role to cameras by which people can enjoy the advantage of IT life. For example, people will be able to know their standing point by the power of camera registration. A new scientific approach of visualizing the recorded people in a scene is also proposed so that viewers can see what has been done there in Augmented Reality fashion.

Mobile Camera Localization Using Environmental Cameras

This project aims to research an advanced system that visually supports users by combining the advantages of mobile and environmental cameras. Since the positional information is useful for supporting user, we develop a mobile camera calibration method by using visual information captured by mobile and multiple environment cameras. A method for estimating the pose of a mobile camera in a dynamic scene by using an environmental stereo camera is an example of the outcomes. By utilizing the dynamic objects' 3D point as landmarks for camera calibration, a robust pose estimation method can be realized. In the outdoor scene, we proposed a method for estimating the position and orientation of a mobile camera by referring corresponding points between a mobile camera image and an aerial image. Experimentally, we confirmed that the accuracy of the proposed method is better than that of a GPS.
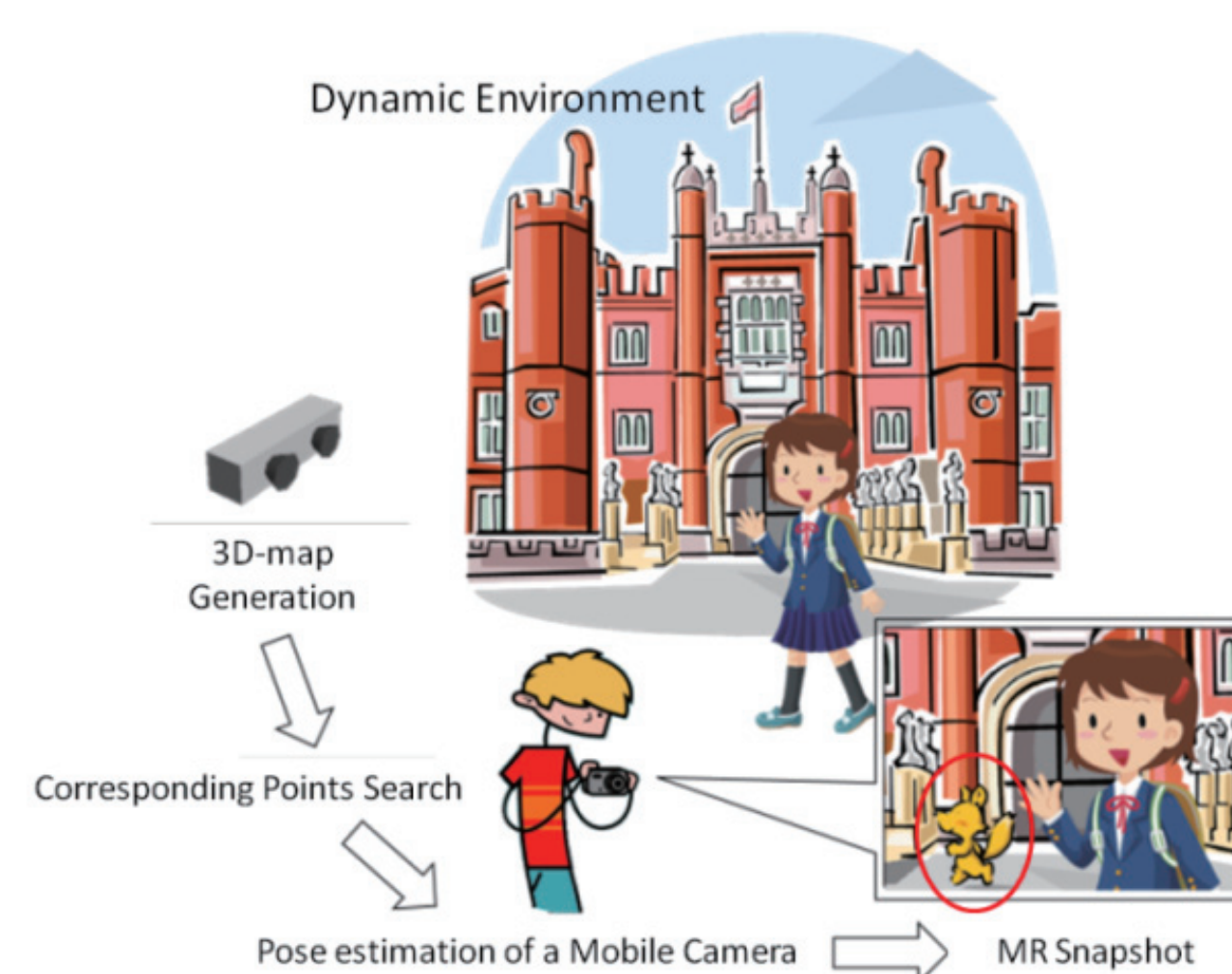
A mobile camera calibration method using an environmental stereo camera.
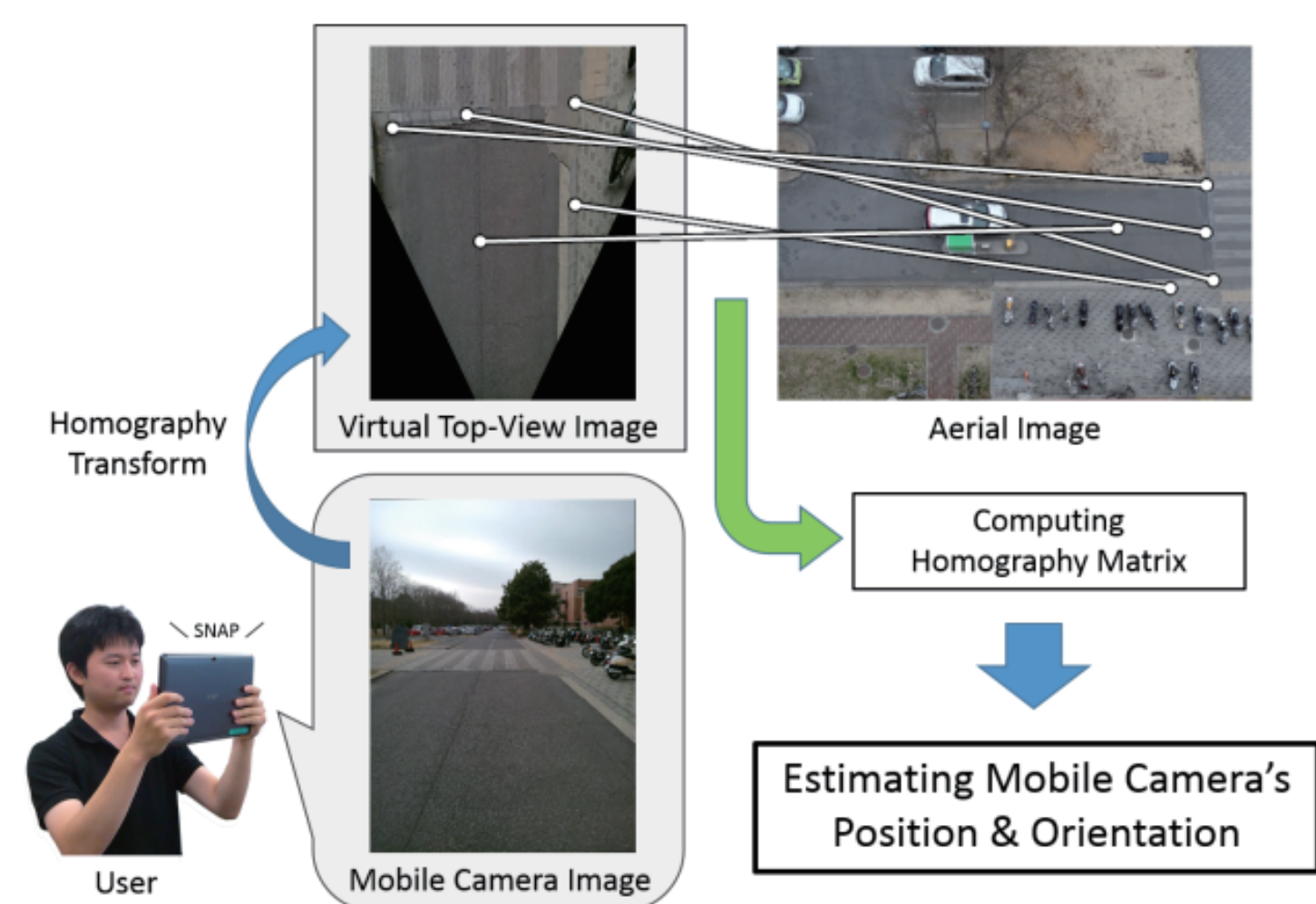

A mobile camera localization method using aerial-view images.

Compact Video Expression of Moving Objects at Outdoor Scene

Effective browsing of video recorded by surveillance cameras is one of the most challenging missions because it is a typical problem of high-level mixture of data mining, data browsing, and computer network.

One of our research works achieved in past few years is the proposal of a new Mixed-Reality presentation of spatio-temporal behaviour of a moving object in a reviewer's view. The behaviour of the moving object was recorded in advance as a sequence of pairs of spatial position and its texture by environmental camera. A reviewer can see parallel replays (Figure) of the moving object so that he/she can shorten the time to browse the behaviour. Since large number of simultaneous replays increases the chance of overlapping textures, we propose the method to determine the best number of replays. We also propose an enriched visualization of trajectory of the moving object so that the reviewer can recognize the moving direction of the object easily. We have conducted subject tests on our proposed trajectory visibility and simultaneous replays of the moving object and show the results.
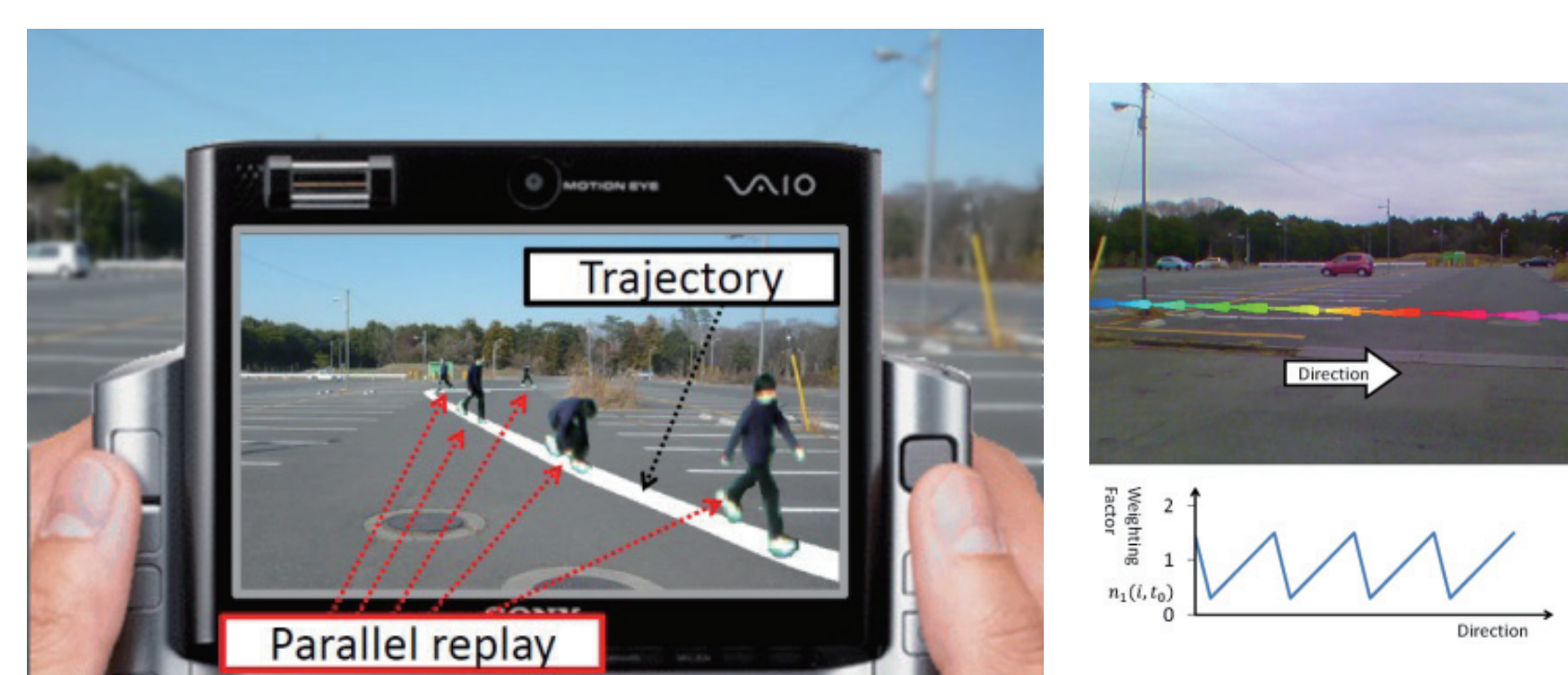
Parallel replay of moving objects and visual aid