



VISUALIZATION OF PEOPLE-FLOW PATH IN ENVIRONMENT AND IDENTIFICATION OF OUTLIER

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Fluid: people crowd

Visualization method(s): optical flow, PIV

Other keywords: image processing, history of people flow

ABSTRACT: When people walk, a road is made. When there is a road, people walk there. Following a simple optical method, we identify the paths and find the abnormal walking behavior (outlier) that does not follow the road. The current trend of human tracking is based on learning¹. The method we introduced does not need learning and it is not only applicable to detect the people flow but also to trace a particle in the fluid flow, and it is aimed to improve the accuracy of PIV method. First, each human is identified by the characteristic point detection method. Then the each human region is tracked and the trajectory is recorded. This recorded data represents the human path. From the accumulation of the paths, a stream of human is regarded as a road. When someone makes a path that does not match the road, it is concluded that the one makes an abnormal behavior. In the PIV case, the particle that departs from the main stream is regarded as an outlier. We develop this camera-based system using OpenCV. Figure 1 shows the example of the working process. By observing the people flow (Fig. 1, upper left), the history of the paths are made (Fig. 1, upper right). In the figure, the color means the moving direction. The accumulation of the paths makes two roads (Fig. 1, lower right), then the behavior not following the roads is found as objects enclosed by red rectangle. This example is processed by the real time speed. We have confirmed the tracing facility and finding outlier facility is high, and can conclude that this method is useful to improve the pre-processing of the PIV method.

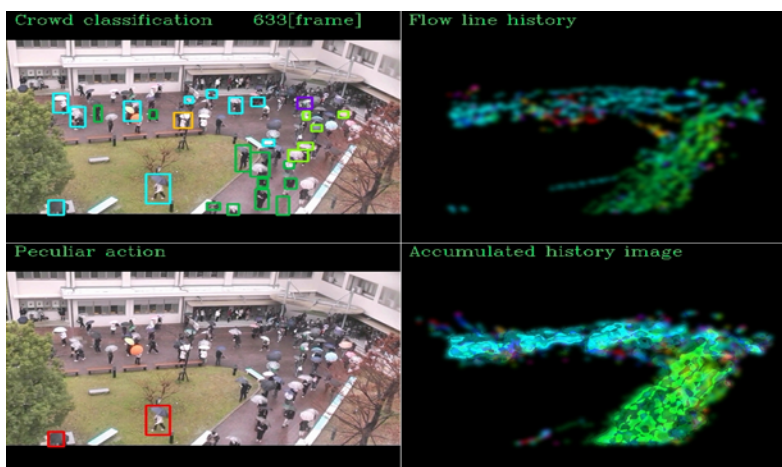


Fig. 1 Working process. Tracking people (upper left), accumulating path (upper right), Abnormal behavior (lower left), road made of accumulated paths (lower right).

References

1. Aleotti J., Caselli S. Robust trajectory learning and approximation for robot programming by demonstration, *Robotics and Autonomous System*, 2006, **54**, p. 409.