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論　文　内　容　要　旨

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学位論文題目	Automatic Human Detection and Tracking in Crowded Scenes using Histogram of Oriented Gradients (HOG) and Particle Filter (HOG特徴量及びパーティクルフィルタを用いた混雑状況下における人物の自動検出と追跡に関する研究)		

内容要旨

Recently, it has attracted considerable attention in crowded areas to monitor the video surveillance system and ensure security safety, monitor human activity. In video surveillance systems human detection and tracking is a very important obligation in crowded scenes.

In our system video surveillance addresses human identification and tracking problems. Although it is a well-known subject, most challenges stand with information from the real world situation. The differences present in these challenges, changes in illumination, camera motion, shocking scenes and exit. Due to safety effects, automatic control system area is currently extremely important. Shipwrecks and activities monitoring people's activities provide a context for the movement of views, accumulated statistics, and classification of objects, human identification and incomprehensible identification, as well as human resources, among interesting information such as interaction between people or between them, human and vehicles. Human is similar to the extensive search for visual surveillance and tracking. Recently, it has attracted considerable attention in crowded areas to monitor the video surveillance system and ensure security safety, monitor human activity. In video surveillance systems human detection and tracking is a very important obligation in crowded scenes. The Crowded scenes in public places such as airports, bus station, concerts, subway, religious festivals, football matches, Railway station Shopping Market and where gathering a lot of peoples are a challenge for those interested in safety and security systems. In this case, for video surveillance we need to see a specific place or area such as crowded area. One of its applications is in crowd control to maintain the general security in public places.

The main problem of video surveillance system is the required continuous manual monitoring especially in crime deterrence. In order to assist the security monitoring for live surveillance system, target detection and tracking techniques can send the warning signal to the monitoring officers automatically. To solve the problem, in this thesis, we propose an innovative method to detect and track a target person in crowded area using the individual's feature. In our thesis, we realize automatic detection and tracking combines Histogram of Oriented Gradient (HOG) feature detection with a particle filter. The HOG feature is applied for the description of contour detection for human, while the particle filter is used for tracking the targets using skin and clothes color based on a feature of target person. In this thesis we use HSV (Hue, Saturation, and Value) color space for detecting and tracking specific person because RGB (red, green, blue) color is not strong,

who is affected by the environmental conditions where lighting is changed. We have developed the evaluation system implementing our thesis, we have achieved high accuracy detection rate and tracked the specific target precisely. However, one major weakness of these systems is their inability to deal with crowded scenes. The challenge of research in crowded scenes is frequent and instantaneous occlusion of the target by other objects. The visual occlusions and ambiguities in crowded scenes are complex, making scene semantics difficult to analyze. In this thesis, we have focused on the overlapping issues in the case of a target person wearing similar clothes aiming to overcome the occlusion problem. In this thesis, we have focused on the overlapping issues in the case of a target person wearing similar clothes aiming to overcome the occlusion problem. Video surveillance systems currently are undergoing an alteration where more and more conventional analog solutions are being replaced by digital ones. In this thesis we introduce specific people detecting and tracking in video surveillance system. In crowded area where surrounding a lot of people.

In crowded area when people are moving someone have abnormal movement who w ant to make some problem. In our research detect and tracking this person.

In crowded area our experimental results, our system achieved more than 90% of human detection and particle filter tracking specific person around 99% of the spe cific person in all dataset.

In scene A, This datasets is a structure crowd scene, but HOG detection's failure rate was high caused by occlusion but particle filter tracking specific person per fectly even all people are moving by motion.

In scene B, in this structure crowd scene people are moving too much far from c amera. Our Histogram Oriented Gradient (HOG) detection's failure rate was high c aused by occlusion problem. But in our system particle filter tracking specific per son perfectly.

In scene C, in this datasets people are moving randomly during that time our His togram Oriented Gradient (HOG) detection all moving person and particle filter tra cking specific target perfectly.

In scene D, in this crowd scene people are moving very near of camera. In our s ystem Histogram Oriented Gradient (HOG) detecting and tracking target person nic ely.

In scene E, in our previous experimental dataset have no other environment excep t human, for this reason we create more dataset with car, bicycle, etc. When appl ying SVM using the new data set, than we find SVM classifier only human not a nother objects.

Finally, we confirm even the HOG detection failure rate was high caused by occlu sion; the particle filter has tracked the target instead of the HOG detection. With these results, we have to confirm our proposed method combined the HOG-SVM an d particle filter with the target feature is robust toward the occlusion problem.