

SUMMARY OF Ph.D. DISSERTATION

School	Student Identification Number	SURNAME, First name Matsushita Nobuyuki
Title 実世界指向インタフェースに関する研究 -ID を認識するスマートカメラ-		
Abstract <p>This dissertation describes a new ID recognition system for the Real-World Oriented Interface that integrates user's physical action into human computer interactions. Although it is effective to integrate physical action into interaction, there is no general method to do so. The purpose of the dissertation is to establish a general method to construct the Real-World Oriented Interface that integrates physical action.</p> <p>By analyzing conventional researches that integrate physical action into interaction, the importance of a robust ID recognition system for various purposes can be concluded. This dissertation describes our design and implementation of a new ID recognition system called ID Camera system. The ID Camera system recognizes Optical IDs using high-speed image sensor that captures images of blinking IDs faster than blinking speed of the IDs. To show robustness and flexibility, we apply the ID Camera system to two different types of Real-World Oriented Interfaces.</p> <p>We apply the ID Camera system to a Real-World navigation system that presents information according to what the user views in the real world. By combining of installing beacons that transmit ID into real world environment and exploring beacons by ID Camera system, the thing that user is looking at can be recognized by the system. Because ID Camera system can recognize IDs in close proximity as well as IDs that are far away, we can construct a Real-World navigation system that is used in a wide area. We performed various characteristic evaluations.</p> <p>As another application of ID Camera system, this dissertation describes our design and implementation of a new augmented live stage system. The ID Camera system recognizes movements of users holding beacons. Because the ID Camera is robust for disturbance light such as stage illuminations, ID Camera can recognize positions of beacons moving quickly. The feature is suitable for a positioning system for the live stage performance.</p> <p>Based on the above results, we experimentally provide that the ID Camera system can be widely applied to Real-World Oriented Interfaces that provide physical interactions.</p>		