Hand Gesture Recognition with Microsoft Kinect –

A Computer Player for the Rock-paper-scissors Game

Vladan Jovičić, Marko Palangetić

University of Primorska
Faculty of Mathematics, Natural Sciences
and Information Technologies
vladan.jovicic@student.upr.si
marko.palangetic@student.upr.si

Abstract

This paper is about using Microsoft Kinect for hand detection and hand gesture recognition. Compared with other devices that capture images by using mainly the standard RGB camera, Kinect uses an additional depth sensor that provides depths for every pixel in its view area. On the begining this technology was used only for playing Xbox games but later inventors saw that Kinect can be used for making interesting softwares on PC. It's API allows to us recognize most important 26 human's body points and to manipulate with them. Also despite Microsoft Kinect SDK there are some open source softwares for manipulating with Microsoft Kinect. Hand gesture detection is one of the most researched problems and here is one way how to do it using modern Microsoft inventions. This paper provides efficient algorithms for hand detection in space and making hand gesture using Kinect depth sensor (Central hand point detection using Microsoft Kinect API and detecetion rest of a hand using distance of rest hand points and cetral point in space), algorithms for clockwise sorting points of gesture (this was necessary for finger detection) and finger detection on hand (using angles od hand when we was looking it as a polygon). Once a hand is detected, gesture recognition is done by detecting the number of extended fingers. Also there is explanation about main difference about body-parts detection using Kinect and using ordinary WEB camera. (Difference between using color of hand and distance of hand for hand gesture recognition). As extra this paper provides implementation of the well-known "Rock-paper-scissors" game using previous results for hand and finger detection.