The User Motion Pattern Control System for The Simulated Vehicle

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ABSTRACT

The purpose of this paper is to design and implement the user motion pattern control system for the simulated vehicle. After analyzing the user motion patterns in the system, the patterns are used to control the moving direction of the simulated vehicle such as forward, backward, turn right, turn left, etc. The patterns in the system around are sent to the simulated vehicle in real time. To execute the suggested user motion pattern control system, the Kinect is used for executing the system. The Kinect recognizes the specified user motion patterns and it transmits the data to the user motion pattern control system. There are nine kinds of the user motion patterns in the system for controlling the simulated vehicle. In addition to this, some sensors are used to detect the condition of the simulated vehicle. GPS is also used to estimate the current location of the simulated vehicle and to obtain the driving information.

Keywords: Simulated Vehicle, User Motion Pattern, Kinect

I. Introduction

Coming era of advanced information in earnest, the machines with built-in computer are already became the component of today society and it’s impact in our daily life is increased day by day. We still use keyboard, mouse, joystick and more as an interface for the computer manipulation. The technologies of more natural interface between the computer and the person is not widely adapted to various industries not yet.

A human motion is best natural tool as a language and a relationship of people for an interaction. The researches for implementing the best natural interface between the human motion and the computer are progressed now dynamically. But researches in our country are still the slight stage when compared with other countries what have the developed science. The component technologies are greatly expected for economic and social industrial effects.[1–5]

To recognize human motions, we will use the Kinect module that is used for a side of recent gaming industry. The Kinect recognizes the human actions and it can control

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II. Design Considerations

In order to design the user motion pattern control system, three design considerations are analyzed and used to the suggested system as follows:

- The most important factor for the user motion pattern control system is to feel his mind easily and to control correctly for users, so the Kinect based control concept is adapted to the suggested system.
- The sufficient analysis of the user motion patterns should be sent to the server because the patterns are very large, they are executed to the server for fast processing.
- Because the correct awareness of the various status in the surrounding environments is very important, the sensors such as ultrasonic sensor, gyro sensor, accelerated sensor, light sensor, temperature sensor, GPS and camera are necessary for executing the user motion patterns.

III. System Design and Implementation

1. System Overview

The system overview of the user motion pattern control system for the simulated vehicle is shown in Fig. 1. The system is consisted of two parts: the monitoring part and the simulated vehicle part. The user motion data from the Kinect is transmitted into the server in the monitoring part by the wireless communication module in the simulated vehicle part of the simulated vehicle. Then, the simulated vehicle part is remotely controlled by the user motion pattern control system in the monitoring part. Some status data of the surrounding environments are acquired and it is transmitted into the server in the monitoring part for monitoring the surrounding environment of the simulated vehicle.

2. System Configuration

The overall system configuration of the user motion pattern control system for the simulated vehicle is shown in Fig. 2.

A. Monitoring Part

The monitoring part is consisted of the kinect module, the processing module and the interface module. Those modules are executed in the server. The kinect module