Recognizing the Human Head Motion

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*Abstract*—These instructions give you basic guidelines for preparing camera-ready papers for conference proceedings.

# Introduction

In the last decades several new IT technologies appeared, but some of them failed because the users were not able to learn how to use them. So many users are afraid of the complex systems and technologies. Behind of this phenomenon maybe the following matter is, the changing of IT technology generations is faster and faster, and the users are not able to keep up. After paradigm shift there is a new idea about human-computer interaction, which means this load ought to be taken off from the users’ shoulders. The information system ought to be got a new ability to communicate with a user human-like way.

The main goal of the research on the human-computer interaction area is to develop the proper technologies to reach the human-like communication. The curious readers can found more information about it in [1].

In a classical model the input is based on keyboard and mouse device, output appears on the screen of a display. In the case of multi-modal human-computer interaction, the input is recognized by a camera and speech recognition system, and the output is created by a speech synthesizer and an animated avatar on the screen. The audio and video channels are used in a strong connection with each other.

Let us focus at video input, because the techniques from digital image processing can be useful here. The main task is recognizing the hand- and body gestures. There are several publications about facial gesture recognition in the literature [2].

The palette of the face- and body gestures is very reach. The recognition all these gestures is very complex task, so we focus at only the facial gestures, specially the head movements. This is not a new problem in the literature, but the final solution is still not ready. For example there are some early publications, such as [3].

Of course, because new sensors, for example Kinect appeared on the market, the same problems can be solved different ways. In the case of stored videos only the video-based approaches can be used, so the use of new sensors with good properties (e.g. lighting-independent sensing) is not an option.

The direction and the speed of the head’s movement are very important parameters to describe what and how happen. This trajectory can be used for controlling devices [3] or recognize gestures’ primitives.

The main goal of this paper is to describe the first results of our research, concerning recognition of the user’s head movements. The first stage of this research is to give a classification of head movements into seven classes. As the reader can understand, it can be solved robustly with our method. In the future work we would like to test our method in real situation and extend this algorithm for extract the full trajectory of head’s movements.

# Visual patterns of face motion

In this chapter, we present the proposed visual representation of face motion based on the motion history of image sequences. We first estimate the motion history image [REF]

##### Acknowledgment

The preferred spelling of the word “acknowledgment” in America is without an “e” after the “g.” Try to avoid the stilted expression, “One of us (R.B.G.) thanks ...” Instead, try “R.B.G. thanks ...” Put sponsor acknowledgments in the unnumbered footnote on the first page.

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