Owens Luis – A Proposal of a Smart Office Chair in an Ambient Environment

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ABSTRACT

This demonstration introduces a smart office chair, Owens Luis, whose pronunciation has a meaning of "an encouraging chair" in Japanese. For most of the people, office environments are the place where they spend the longest time while awake. To improve the quality of life (QoL) in the office, Owens Luis monitors an office worker's mental and physiological states such as sleepiness and concentration, and controls the working environment by multi-modal displays including a motion chair, a variable color temperature LED light and a hypersonic directional speaker.

KEYWORDS: Multi-modal Displays, Ambient Intelligence, Context-aware Systems

1 INTRODUCTION

In an ambient environment, where in our definition ambient intelligence functions and watches people within, a variety of appropriate services are provided depending on the user and environmental contexts in a timely fashion. As an ambient environment, we study on an ambient office, where a variety of sensors are embedded to recognize individual workers' status and to improve the quality of life (QoL) in the office by controlling lighting, air conditions, BGM etc.

More specifically, we aim to develop a rest control system in an ambient office. In Japan, 60 to 80 percent of people are said to feel stressed physically and / or mentally at office. It is often the case an office worker continues to work even when it is actually recommended to take a rest from a point of view of health or work efficiency. In an ambient office, a worker will be suggested to take a rest when necessary, and on the other hand, be encouraged to continue working when appropriate. As a first step, we prototyped a smart rest control system in a form of an office chair, named Owens Luis.

2 OWENS LUIS: SMART OFFICE CHAIR

Figure 1 shows a configuration of Owens Luis, our smart office chair. Owens Luis is composed of a motion chair (Panasonic, EU-JA50), a directional speaker (HSS Japan, H450), a variable color temperature LED light (Color Kinetics Japan, iW Blast Powercore), a high-speed camera (PointGrey Flea3, VGA, 120Hz) and two PCs. Owens Luis estimates sleepiness and concentration of a worker simply from blinking speed and body motion (Figure 2). Then, based on these parameters, Owens Luis's action is determined using an attracter selection model. Attracter selection is a biologically inspired approach found in E. coli cells to self-adaptively react to changes of a nutrient in the environment. In our scenario, Owens Luis is configured to shake the worker up by horse-riding motion when he/she is sleepy, and to slightly and randomly change the inclination of the seat when the concentration level is low. Owens Luis also changes the lighting and BGM settings to cheer up or relax the worker according to the worker's status.

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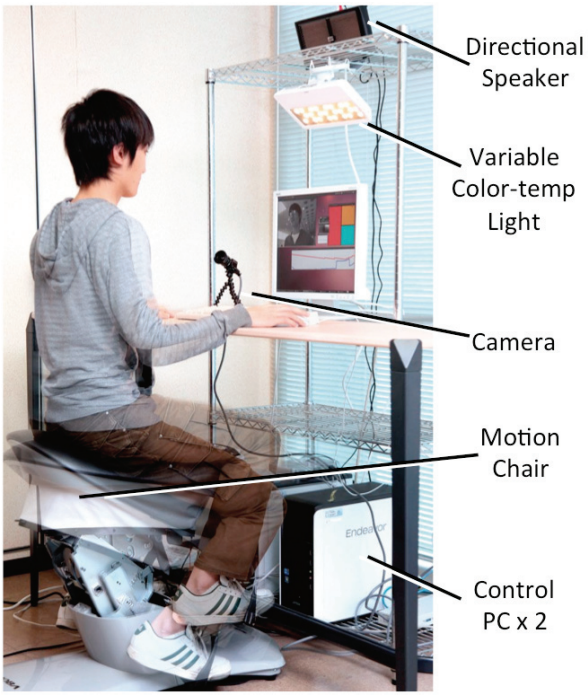

Figure 1. Configuration of Owens Luis, our smart office chair (Courtesy of the Mainichi Newspapers Co., Ltd.)

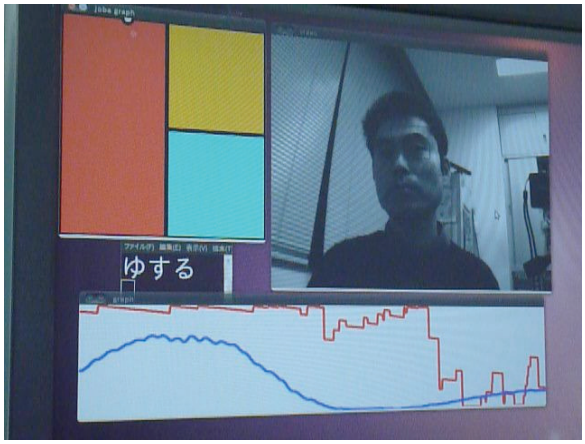

Figure 2. Sleepiness and concentration estimation from camera.

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