



2nd PerAda Workshop @ SASO 2010

Fourth IEEE International Conference on Self-Adaptive and Self-Organizing Systems
Budapest, Hungary, September 27-October 1, 2010

Self-Organisation in Pervasive Systems Workshop

28th September 9.30am-1pm

9.30am-10.30am	Invited Talk: Pervasive Adaptation in Affective Workplace Design <i>Dr Jeremy Pitt, Imperial College London</i>
10.30am-11am	Driver drowsiness identification by means of passive techniques for eye detection and tracking <i>A.Cristiani, M.Porta, D.Gandini, G.M. Bertolotti and N. Serbedzija</i>
11am-11.30am	Coffee Break
11.30am-12pm	Self-adaptive mutation in on-line, on-board evolutionary robotics <i>A.E. Eiben, G. Karafotias and E. Haasdijk</i>
12pm-12.30pm	Self-adaptive Prototype for Seat Adaption <i>G.M. Bertolotti, A.Cristiani, R.Lombardi, M.Ribaric, N. Tomasevic, M. Stanojevic</i>
12.30pm-1pm	Adaptive Task Support Based on Dynamic Human State Measurement <i>A. Stuiver, B.Mulder, K. Brookhuis, D. de Waard and C. Dijksterhuis.</i>
1pm	Workshop close and lunch

Abstracts of Accepted Papers and Invited Talks

Affective Workplace Design

Monica Santos and Jeremy Pitt

This talks presents our motivation, groundwork and progress in developing a generic socially-intelligent ICT system for enhanced Quality of Experience (QoE) in workplace environments using affective, adaptive and pervasive computing. Our motivation is the prevalence of incivility in the open plan offices, and the observation that rules are often best made by those whose behaviour is regulated by them. We aim to build a system which detects norm violations through pervasive and affective sensors, and attempts ameliorates the impact of unintentional norm violation through forgiveness and other interface cues of affective state (e.g. avatars). By resolving conflict through mediation we aim to increase social connectedness and a sense of belonging, thus contributing to an overall increase in QoE.

Driver drowsiness identification by means of passive techniques for eye detection and tracking

A.Cristiani, M.Porta, D.Gandini, G.M. Bertolotti and N. Serbedzija

The aim of this paper is to describe a system whose final goal is to detect if a driver is drowsy, in order to prevent potentially danger situations. The system is based on the processing of the driver's face image, acquired by a webcam installed on the dashboard of the car. After a brief introduction explaining the connection of the present work to the European project REFLECT, the relationship between drowsiness condition and fatal car crashes is discussed. Then, an overview of the most used techniques for face and eye detection is given, and the developed algorithm is described in detail. Finally, preliminary results of in- laboratory and in-car tests are presented and commented.

Self-adaptive mutation in on-line, on-board evolutionary robotics

A.E. Eiben, G. Karafotias and E. Haasdijk

On-line, on-board evolution of robot controllers implies an inherent need for adjusting the parameters of the evolutionary algorithm on-the-fly. In this paper we argue that the most influential factor to govern evolution in our application is the mutation operator. To address the problem of adjusting its parameter(s) we identify different on-line parameter control mechanisms and perform an experimental comparison among them. The experiments are carried out in a high quality simulator, Webots, for three different tasks for the robots. The results are not fully consistent over the tasks considered, yet they support a preference for the de-randomised self-adaptive mutation step size control.

Self-adaptive Prototype for Seat Adaption

G.M. Bertolotti, A.Cristiani, R.Lombardi, M.Ribaric, N. Tomasevic, M. Stanojevic

Self-adaptive prototype for seat adaptation aims at enhancing the physical comfort of a driver by taking into account not only the state of the environment (state of the road, car settings), but also the driver's emotional, cognitive and physical state. To implement this prototype we used a REFLECTive middleware, which provides a programming framework for the development of pervasive-adaptive applications. The REFLECTive middleware supports self- adaptive behavior and is generally composed of three tiers: Tangible tier contains services that read sensors data and send commands to actuators; REFLECTive tier is responsible for analyzing the data collected from sensors and for defining the actions that will be performed by actuators; Application tier facilitates high-level decision making. The seat adaptation prototype uses the information about Center of Pressure (COP) speed and number of bumps to determine the driver's physical state, and then it combines this information with the driver's cognitive and emotional state to figure out if the driver feels uncomfortable, and to change the state of seat cushions in an attempt to make driver feel more comfortable. The components of the seat adaptation prototype in the REFLECTive and Application tier are implemented using reaction rules.

Adaptive Task Support Based on Dynamic Human State Measurement

A. Stuiver, B.Mulder, K. Brookhuis, D. de Waard and C. Dijksterhuis.

Adaptive systems that provide task support when needed can be a solution to the problems of traditional automation. One way of initiating support is automatically: let the system assess operator functional state based on continually monitored physiological, performance, and environmental factors. For this concept to work in practice several human-related problems need to be solved. This has been a focus of the COMPANION and REFLECT projects, which were and are aimed at developing adaptive systems. Some of the knowledge gained in those projects is addressed in this paper. In addition, a design cycle of adaptive systems is presented to provide an overview of issues in the field.