

Neural Network Based Control Algorithm for Inhabitable Spaces Applying Emotional Domotics

Authors : Sergio A. Navarro Tuch, Martin Rogelio Bustamante Bello, Leopoldo Julian Lechuga Lopez

Abstract : In recent years, Mexico's population has seen a rise of different physiological and mental negative states. Two main consequences of this problematic are deficient work performance and high levels of stress generating and important impact on a person's physical, mental and emotional health. Several approaches, such as the use of audiovisual stimulus to induce emotions and modify a person's emotional state, can be applied in an effort to decrease these negative effects. With the use of different non-invasive physiological sensors such as EEG, luminosity and face recognition we gather information of the subject's current emotional state. In a controlled environment, a subject is shown a series of selected images from the International Affective Picture System (IAPS) in order to induce a specific set of emotions and obtain information from the sensors. The raw data obtained is statistically analyzed in order to filter only the specific groups of information that relate to a subject's emotions and current values of the physical variables in the controlled environment such as, luminosity, RGB light color, temperature, oxygen level and noise. Finally, a neural network based control algorithm is given the data obtained in order to feedback the system and automate the modification of the environment variables and audiovisual content shown in an effort that these changes can positively alter the subject's emotional state. During the research, it was found that the light color was directly related to the type of impact generated by the audiovisual content on the subject's emotional state. Red illumination increased the impact of violent images and green illumination along with relaxing images decreased the subject's levels of anxiety. Specific differences between men and women were found as to which type of images generated a greater impact in either gender. The population sample was mainly constituted by college students whose data analysis showed a decreased sensibility to violence towards humans. Despite the early stage of the control algorithm, the results obtained from the population sample give us a better insight into the possibilities of emotional domotics and the applications that can be created towards the improvement of performance in people's lives. The objective of this research is to create a positive impact with the application of technology to everyday activities; nonetheless, an ethical problem arises since this can also be applied to control a person's emotions and shift their decision making.

Keywords : data analysis, emotional domotics, performance improvement, neural network

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