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Monitoring Occupational Stress and Analysis by Capturing Facial Expressions and Heart Rate - (MSA)


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Declaration

We declare that this thesis is our own work and has not been submitted in any form for another degree or diploma at any university or other institution of tertiary education. Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given.

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Dedication

**To my beloved parents -
For their endless support, love, understanding**

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Abstract

In a medical or biological context, stress is a physical, mental, or emotional factor that causes bodily or mental tension. Stress can be caused externally (from the environment, psychological, or social situations) or internally (illness or from a medical procedure). In fact, sometimes stress may be necessary to get you motivated and mobilized. There are some symptoms which indicate too much stress that can arise from yourself, or caused by the work and/or home environment. It can be caused by any combination of, or all three of these factors. Some such symptoms are heart problems/high blood pressure, panic attacks, physical tiredness, angry, mood swings, defensive, memory lapses etc. The human body begins to suffer as a result of excess stress, however with the busy life styles of most people, they do not immediately realize this.

An in depth literature survey was done in order to obtain a better understanding about the current problem domain and the solution identified. The findings indicate there are limited resources available for measuring occupational stress. The expansion of Information and Communication Technology has obstructed all aspects of the human life, therefore we intend to solve this problem by using heart rate detectable wearable device together with facial expression detectable Information Technology solution.

Monitoring Occupational Stress and Analysis by Capturing Facial Expressions and Heart Rate (MSA) is a psychology based research, that has been conducted to track variations in occupational facial expressions and heart rate with and without project deadline. It is hypothesized that level of occupational stress has fluctuated during project deadlines. The overall design of the solution include three modules, namely, Facial Expression Monitor, Heart Rate Monitor and Result Analysis Module. These modules are developed using .NET framework 4.0 with Microsoft SQL and third party libraries, including a wearable sensible device useful to capturing the heart rate variation. The FEM is capable of detecting individual facial characteristics in each video frame and the decision on the stress level is made on the sequence level. Moreover another module, HRM, is developed for detecting heart rate variation at the given durations. Also stored result has been analysis with module RAM. Testing is based on 20 subjects from two different department within the organization. The study lasted more than one week and was conducted in real working environment. Our expected results depend on human facial expression and heart rate vary with

number of days remaining to the project deadline. The result shows that our solution can evaluate the human stress variation by using facial expression and heart rate with high accuracy.

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