B.Sc. (Special) Degree in Computer Science
University of Sri Jayewardenepura

An Independent Research Proposal

A companion robot for employees in a company to increase productivity by reducing their stress level

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1 Introduction

Most of people in the society have to do any of occupation for earn money to live with the society around them, because they have to buy things from outside, such as their meals, dressing, sanitary needs etc.. According to the "International Standards Classification of Occupations", there are 10 categories of occupations. From that list, the top 3 of those categories are mostly works using their mental power rather than physical power. As well as about half of sub-categories of those 3 major-categories are working near a table with some stationeries, a computer or something like that.

Working in the same and consistent environment for a long time causes most people to get bored of that environment and it leads to reduce the productivity of that person. This may happen at any place that is very steady and even. As mentioned above, a person who sits on a chair in front of a computer or books for a long time may face this problem frequently. Not only for an employee in an office, but a child in a study room also may face this problem.

I decided to find a solution for this problem, while narrowing down the to scope into "Employee in an software development company" scenario. Here I decided to use a companion robot, that can identify the stress level, drowsiness, loneliness and such uncomfortable situations of the employee by observing some behaviours of that particular employee and analyze them against the time, and finally take some actions to make employee away from that loneliness, drowsiness and get rid of them to make them less stressed, high productivity employees.

2 Significance of the Research

The major problem face by most of (almost all of) people is the boredom of working due to some uncomfortable reasons. Non-physical discomfort is highly affected to get bored even if the working environment is physically comfortable. Loneliness and consistency of the working space have been identified as the most effective reasons for the situation mentioned above.

So is there any way to do small changes in the environment without disturbing to that person (employee), and is there any way to build up a feeling in that person, that he/ she is not isolated, then those things may make that person comfortable in an non-physical way and then that person may tend to work happier and agog. The workload that person handle is absolutely higher than the workload which is handle when the person is in a bored and stressful mood.

So this robot may cause to improve the productivity of that particular person by reducing the boredom and stress of that person and, at the end of the day, improve the productivity of the company.

3 Research Objectives

- Make the working environment joyful from the employees' perspective
- Increase the productivity of employees to develop the company from the employer's perspective
- Increase the non-physical (mental) health of employees from the company's HR's perspective

4 Methodology

4.1 Hardware Implementation(s)

- Currently I have planed to build a small robot, that contains both interface and processing part in same module which can be hold on the monitor of the employee's machine. Then that robot will analyze facial muscles and eye movements of that employee.
- If the technical limitations occurred in university level, only camera and such IO devices may embedded with interface module, which may placed on the monitor, and the module which stands for processing may moved as an separated module, which is connected to interface module via cables or Wi-Fi.
- Or else can make it a USB plugable device that do the processing part from that employee's machine itself with driver software and the interface module may be there same as the early case.
- To detect the uncomfortable situations of a human, I have to analyze row data taken from camera, by processing that video frames. That video processing may require some higher computation power. So a powerful micro-controller (likes Raspberry PIE) or an external computer (mini-pc) may be required for that. So not only the size and shape of hardware, the performance also should be considered.
- Actuators and motors for do movements to make the employee happy

4.2 Software Implementation(s)

- Have to recognize the owner, using video frames we got from camera.
- Detect uncomfortable situations of that particular owner.
- Command actuators and motors to do appropriate movements.