Estimation of Maximum age group for the IT worker affected by diseases due to work pressure

M.Geetha Lakshmi, Mr. A.Rajkumar, Mrs.Jose Parveena

Abstract— In IT industry, almost all employees use desktop/laptop at their workplace. The average working hours per day on computer in call center and software development were more than 9 hrs and 8.3 hrs respectively. Some of the present study shows that the magnitude of computer related problems were around 93 percentage. It can be concluded seeing the responses that there is a need for constant monitoring and sporadic appraisal of health problems in IT professional to acquire appropriate remedial measures at the primal stage. This paper deals with the proposed solution for continuously monitoring, the gestures of IT people at their workstation by capturing it through web camera. The captured gestures are proceeded by flowing through a series of techniques such as Frame analysis, Foreground Segmentation and Feature extraction. The processed gestures are compared with ideal gesture and alerts will be notified immediately to the users in case of any discrepanicies. These alerts consequences the gesture change of the user to the classic position and paves way in preventing and reducing health hazards.

Index Terms— .Panacea stresses, mental illness, adverse effect, fuzzy matrix, health problem and health and wealth.

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1 INTRODUCTION

Currently, Indian Information Technology (IT) Sector is growing rapidly with 2,236,614 working in it. This has generated a new genre of occupational health problems such as musculo skeletal disorders, computer vision syndrome, psycho-social and sleep problems. Since researches addressing these issues are scarce, we planned to determine the health hazards faced by software engineers so as to crystallize the research question for a larger survey, to the most rampant and crucial issues. Since most IT professionals have access to internet, electronic mail (e-mail) survey was also done.

Among the monitoring networks, application configuration and management of technology projects, IT professionals spend an enormous amount of time in front of the computer screen. And because emergencies can happen at any time, workers often have to monitor IT systems outside normal working hours. Over time, long periods of time on the computer can take a toll on their health. Recently, British scientists discovered a link between computer use the depression. It professionals are handling the crisis and disaster recovery, which can be very stressful. In addition to causing mood swings and anxiety, recurrent stress can lead to variety of physical symptoms. Studies have shown an increased risk of heart disease among people who spend most of the day sitting. According to NPR, a 2010 study found that "men who reported more than 23 hours per week of sedentary activity had a 64 percent greater risk of dying from heart disease than those who reported less than 11 hours per week of sedentary activity. "for IT professionals who spend most of his time sitting at a computer, this should sound an alarm.

Hunched in an office chair for hours at a time can cause severe pain and discomfort, especially in the lower back. Over time, poor posture can permanently damage the structure of the spine resulting in acute, chronic. This survey is done from friends and relatives working as software engineers in Chennai, India. Some of the common problems are as follows: Musculosketetal discomfort, computer vision syndrome, Most of them were staying away from the family and their regular source of meal was hotel, overweight, were not satisfied with the time they spent with their family. As noted in the present study, that musculo-skeletal discomfort and computer vision syndrome are common among computer workers. Another main computer related health problem reported is stress.

Simple fuzzy matrix

- The raw data is gives the matrix representation. Entries corresponding to the intersection of rows and columns are values corresponding to a live network. The raw data, as it is transformed into a raw time dependent data matrix by taking along the rows the age group and along the columns the health problems suffered by teachers because of stress.
- Using the raw data matrix, convert it into the Average Time Dependent Data (ATD) Matrix (a_{ij}) by

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dividing each entry of the raw data matrix by the number of years that is, the time period. This matrix represents a data which is totally uniform.

- At the third stage, the average or mean and the standard deviation (SD) of every column in the ATD matrix, are determined. Using the average μ_j of each jth column and σ_j the S.D of each jth column, a parameter α from the interval [0, 1] is chosen and the Refused Time Dependent Data Matrix (RTD matrix) (e_{ij}) is formed using the formula.

If $a_{ij} \le (\mu_j - \alpha^* \sigma_j)$ then $e_{ij} = -1$
else if $a_{ij} \in (\mu_j - \alpha^* \sigma_j,\ \mu_j + \alpha^* \sigma_j)$ then $e_{ij} = 0$
else if $a_{ij} \ge (\mu_j + \alpha^* \sigma_j)$ then $e_{ij} = 1$

where, a_{ij}'s are the entries of the ATD matrix. The ATD matrix is thus, converted into the Refered Time Dependent Data Matrix. This matrix is also at times termed as the fuzzy matrix as the entries are 1, 0 and -1. Now, the row sum of this matrix gives the maximum age group, who are prone to health hazards. One can combine these matrices by varying the parameter $\alpha \in [0, 1]$, so that the Combined Effective Time Dependent Data (CETD) matrix is obtained. The row sum is found out for the CETD matrix and conclusion are derived based on the row sums. All these are represented by graphs and graphs play a vital role in exhibiting the data by the simplest means that can be ever understood by a layman.

μ_1	-	Alcoholism
μ_2	-	High blood pressure
μ_3	-	Back pain
μ_4	-	Depression
μ_5	-	Wrist problems due to uncomfortable handling of the computer mouse
μ_6	-	Stomach problem
μ_7	-	Mental stress

Initial Raw Data matrix of IT workers affected by disease due to work pressure of order 5×7

Years	μ_1	μ_2	μ_3	μ_4	μ_5	μ_6	μ_7
20-24	1	1	3	3	1	1	1
25-30	1	1	1	3	3	1	1
31-36	4	6	6	2	8	1	2
37-43	9	8	11	5	8	1	4
44-65	11	20	24	10	19	3	7

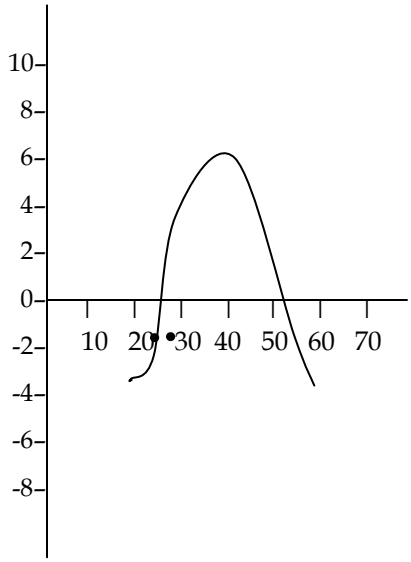
ATD matrix of IT workers affected by diseases due to work pressure of order 5×7

Years	μ_1	μ_2	μ_3	μ_4	μ_5	μ_6	μ_7
20-24	0.2	0.2	0.6	0.6	0.2	0.2	0.2
25-30	0.16	0.16	0.16	0.5	0.5	0.16	0.16
31-36	0.66	1	1	0.33	1.33	0.16	0.33
37-43	1.28	1.14	1.57	0.71	1.14	0.14	0.57
44-65	0.5	0.90	1.09	0.45	0.86	0.136	0.31

Average	0.56	0.68	0.88	0.51	0.76	0.08	0.27
S.D.	0.16	0.17	0.22	0.016	0.169	0.0008	0.02

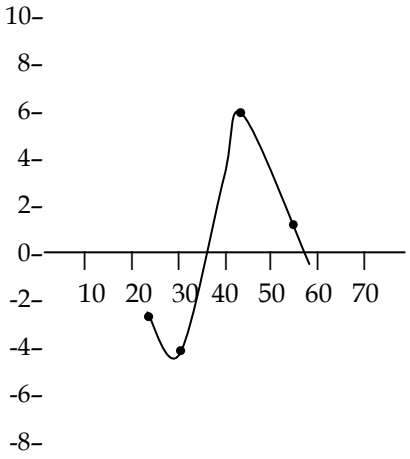
$\alpha = 0.1$

$$\begin{bmatrix} -1 & -1 & -1 & 1 & 1 & -1 & 0 \\ -1 & -1 & -1 & 0 & 1 & -1 & 1 \\ 1 & 1 & 1 & -1 & 1 & -1 & 1 \\ 1 & 1 & 1 & 1 & 1 & -1 & 1 \\ 0 & 1 & 1 & -1 & 1 & -1 & -1 \end{bmatrix} \qquad \begin{bmatrix} -2 \\ -2 \\ 3 \\ 5 \\ 0 \end{bmatrix}$$



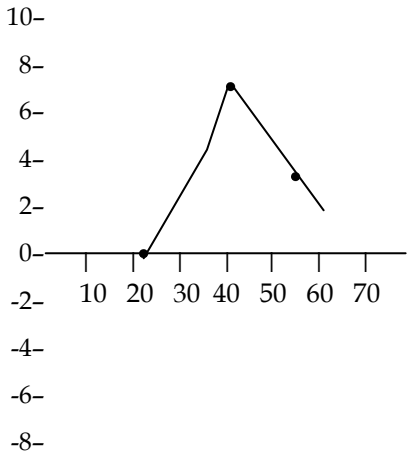
$\alpha = 0.15$

$$\begin{bmatrix} -1 & -1 & -1 & 1 & 1 & -1 & 0 \\ -1 & -1 & -1 & 0 & 1 & 1 & 1 \\ 1 & 1 & 1 & -1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 0 & 1 & 1 & -1 & 1 & -1 & -1 \end{bmatrix} \qquad \begin{bmatrix} -2 \\ -4 \\ 5 \\ 6 \\ 2 \end{bmatrix}$$



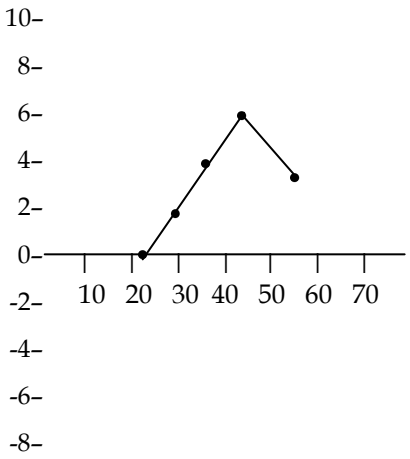
$\alpha = 0.35$

$$\begin{bmatrix} -1 & -1 & -1 & 1 & 1 & 1 & 0 \\ 1 & 1 & 1 & 0 & -1 & 1 & -1 \\ 1 & 1 & 1 & -1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 0 & 1 & 1 & -1 & 1 & 1 & 1 \end{bmatrix} \quad \begin{bmatrix} 0 \\ 2 \\ 5 \\ 7 \\ 4 \end{bmatrix}$$



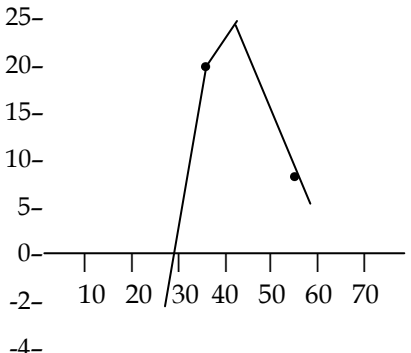
$\alpha = 0.2$

$$\begin{bmatrix} -1 & 1 & -1 & 1 & -1 & 1 & 0 \\ -1 & 1 & -1 & 0 & 1 & 1 & 1 \\ 1 & 1 & 1 & -1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 0 & 1 & 1 & 1 & 1 & 1 & -1 \end{bmatrix} \quad \begin{bmatrix} 0 \\ 2 \\ 5 \\ 6 \\ 4 \end{bmatrix}$$



CETD:

$$\begin{bmatrix} -4 & -2 & -4 & 4 & 2 & 0 & 0 \\ -2 & 0 & -2 & 0 & 0 & 2 & 0 \\ 4 & 4 & 4 & -4 & 4 & 2 & 4 \\ 4 & 4 & 4 & 4 & 4 & -2 & 4 \\ 0 & 4 & 4 & -2 & 4 & 2 & -2 \end{bmatrix} \quad \begin{bmatrix} -4 \\ -2 \\ 18 \\ 22 \\ 10 \end{bmatrix}$$



CONCLUSIONS

To overcome the health problems of IT Professionals the following step are to be taken:

1. Survey proves that the problem initializes at the age of 34, the damage is peak at the age of 40. Above results are confirmed by CETD matrix.
   From above analyses we observe that maximum age group giving stress problem has not changed with the change in values of the parameter from 0 to 1.

2. Make a habit of taking regular short breaks to get your legs moving for a few minutes. Some studies have shown that frequent breaks every 15 minutes or less, will help. You can also acquire the habit of making simple exercise when you're reading something and do not interact with a computer.

3. Regularly stretch your wrists can help fight the first symptoms, but it is especially important to ensure that your workstation is ergonomically. You should be 2 feet away from the screen, with the top of the display area at eye level. When writing, keep your wrists straight, elbows at an angle of 90 degrees.

4. In addition to taking regular short walks outdoors or taking a daily multivitamin, you can get vitamin D through your diet. For example, eating fortified cereals and fatty fish like salmon and tuna can help maintain normal vitamin D level.

5. Regularly clean the keyboard and other surfaces with an antibacterial wipe desk help prevent bacterial infections. If you spend much time working on the machines of others have a bottle of hand sanitizer around. If you tend to eat lunch or snacks at work, be sure to keep your hand clean.

6. For stress and anxiety, exercise is an effective way to burn safely steam. Soothing forms of exercise, including yoga may be especially helpful in reducing stress. Breathing methods meditation and relaxation techniques can help calm the body and mind.

7. To prevent back pain, pay constant attention to your posture. Placing a lumbar support pillow behind your lower back can help. Even using a rolled tower or a thin pillow support can be improved. Also be sure to remove any item from their back pockets to avoid creating pressure points and an angle of spine difficult.

8. For neck pain, adjust the chain and the monitor so that the screen is at eye level and not tilted neck while you work. If you're using a laptop, you can place any books or others solid support under it to reach the proper eye level. The tension of the eye, at the Mayo Clinic suggested to flow the 20/20/20 rule after 20 minutes of computer work, look at an object about 20 feet and away for 20 seconds. You should also consult with your ophthalmologist to make sure that your glasses or contact lenses are optimized for computer work.

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