DEVELOPING A QUIT SMOKING ENVIRONMENT IN AN ORGANIZATION

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ABSTRACT

This study aims on analyzing the risk of mortality due to complications using employees' present body conditions. Smoking cessation programs are carried out to help smokers for quitting smoking. Continuosly, smoke related health issues are the primary preventable causes of demise. Many researches have proven that a cessation counselling program can lessen smoking and tobacco usage. Chronic disease had the greatest effect on psychological functioning which has an impact on workplace. Thinking about the issue of finding human counsellor for each and every smoker, we propose a system to monitor the activities of employees in smoke zone. Imparting workplace health interventions is diagnosed as an effective approach to reduce persistent chronic disease. This paper mainly focuses on employee intervention with mortality risk rates.

INTRODUCTION

Healthcare databases have massive quantities of information and with effective analysis tools, a great deal of hidden knowledge may be discovered. Data mining is especially useful for studying and extracting hidden knowledge in huge amounts of data such as those obtained from smokers. It has found an application in the healthcare systems. Smoking causes both medical and financial problems which affects the life quality of smokers [1].

Existing cessation methods such as nicotine gums, patches does not work for many individuals. Behavioral therapy helps to work with the counsellor and offers motivation in the course of cessation length. An employee smoking 25 cigarettes/day inhales 0.43mg nicotine/kg and has nicotine blood attention in the range 4-72 ng/ml. Worksite healthcare programs directed at a small number of personnel at higher risk of chronic disease have yielded greater effectiveness and fee saving. Our system verifies the activities of the employees in smoke sector and per day smoke value is calculated for every smokers and then the medical report is generated individually [2].

The idea of this paper were to (1)review the existing literature regarding healthcare interventions for employees with elevated risk of chronic diseases including cardiovascular disease, diabetes and obesity (2) providing intervention to employees by generating medical reports (3)analyzing the overall performance [3].

We analyzed our approach with a real world dataset which consists of administrative data. The goal of this study was to provide the intervention characteristics of programs which is delivered at the workplace for high risk employee including targeted diseases. Our dataset consists of high risk employee details and only selected attributes are classified [4]. The information consists of sex, age, risk, smoke count etc. The training dataset is classified using

naive Bayes classification. The weekly medical report is generated and the threatening notification is send to the smokers individually using SMTP protocol. The smokers are made to refrain from smoking through these workplace intervention.

RELATED WORK

The prevalence of tobacco dependence in the United States (US) remains alarming. Invariably, smoke-related health problems are the leading preventable causes of death in the US. Research has shown that a culturally tailored cessation counselling program can help reduce smoking and other tobacco usage [17]. In this paper, the authors proposed a mobile health (mHealth) solution which leverages the SMS or text messaging feature of mobile devices to motivate behavior change among tobacco users [5][11]. Since smokers are not actively involved in this session, we focus on automated smoking detection.

Cognitive Behavioral Therapy (CBT) is a psychological approach which is increasingly used in smoking cessation programs. On the other hand, the recent advancements in smartphone technologies have been widely explored to develop smoking cessation apps as a tool to assist with quitting smoking [12]. However, most of existing smartphone apps lack follow up and adherence to clinical guidelines for treatment. Therefore, there is a need for implementing behavioral change mechanisms in smoking cessation apps to help smokers quit effectively [6].

Tosee is a smart cigarette holder, which assists people in seeing the harmful substances they inhale when smoking. This smart device will alert the user by indicating the red light during heavy smoking. The LED color is often changed to green during low frequency of smoking. The volume and harmful chemicals like tar or nicotine are detected by the sensors present inside the device and then it is shown in a smartphone with a Bluetooth connection [16]. It is expected to disincline the users from smoking when they are aware of their actions and it serves a cigarette filter to reduce harmful substances. The main disadvantages of this product is that the device has to be actively used during smoking [7].

The chronic, relapsing nature of tobacco use represents a chief task in smoking cessation treatment. Currently, novel intervention programs have emerged that seek to modify treatments over the years for you to to meet affected persons changing desires [8]. This paper demonstrates that Hybrid Model Predictive Control (HMPC) offers an attractive framework for designing those optimized, time-various smoking cessation interventions [15]. HMPC is a specially appropriate approach because it acknowledges that intervention doses ought to be assigned in predetermined, discrete units while preserving receding-horizon, constraint-handling, and mixed feedback and ahead abilities [15]. HMPC based intervention seeks to optimally alter manipulated variables with specific units. HMPC is employed in this problem setting as it helps treatment optimization in terms of efficacy and useful resource while adhering to affected person care counselors [9].

METHODOLOGY

Feature Selection

Dimensionality reduction is a commonly used step in dealing with a high-dimensional space of features, for it can mitigate the curse of dimensionality and other undesired properties of high-dimensional spaces [10]. There are many techniques to achieve dimensionality reduction, the minimization of loss of information and improve performance by reducing dimension from a given dataset by feature selection [17]. Feature selection can be used to find out which features are useful for classification. Here, we delete one feature at a time and re-conduct the classification task to find out which features have no impact on the classification performance. The pseudocode is shown below:

Algorithm- Feature /selection

1: procedure FEATURE SELECTION

2: dataset ← Full Dataset

3: accuracy ← Accuracy of Model on dataset

4: changed ← True

5: for column ∈ dataset do

6: dataset← Delete Column (dataset, column)

7: accuracy ← Accuracy of Model on dataset

8: if accuracy < accuracy_ then

9: dataset ← dataset

10: accuracy ← accuracy

11: return dataset

NAIVE BAYES CLASSIFICATION

To test our machine learning approaches, specifically, Naive Bayes methods, we used a dataset collected from over 300 participants who had initiated a quit attempt in workplace environment. The activities of the employees in the smoke zone is monitored and then smokers are encouraged to refrain from smoking by sending threatening notifications through email. The smoker's weekly data is classified from their usage using naive Bayes classification method [11].

The keyword are divided into three categories. The first group was related to the workplace or worksite and the intended employee population. The second group of terms focused on targeted physical health problems such as chronic disease. The last group of terms focused on what has been done to deal with the problems such as intervention and management (Table 1).

Intervention and Management keywords [Ref 10]

Setting/population	Problem	Outcome
Worksite	Obesity	Management
		Intervention
Workplace	Cardiovascular disease	
Employee	Diabetes	
	Chronic disease	

RESULT ANALYSIS

Targeted diseases

The targeted chronic diseases in the intervention includes overweight/obesity, diabetes, cardiovascular disease, lung cancer. The smokers weekly intake of cigarette is monitored and the smoked count is compared with the per day count. Both tobacco smoke and tobacco products contain a number of carcinogenic substances such as polycyclic hydrocarbons and tobacco- specific N-nitrosamines (TSNA), which contributes to tobacco related cancer. Recent studies shown that nicotine can affect several important steps in the development of cancer and found that it may cause aggravation and recurrence of the disease [12].

Intervention technology

The internet was used to facilitate the communication among participants and health professionals, in the form of weekly e-mail for individual support and self-monitoring reminders or online interaction. Computer based technology was designed to facilitate the intervention such as online launch pre-ordering system. In a physical activity based intervention, pedal machines were distributed to the sedentary employees. Currently telephone/cellphone communications were used most for health consultation and other phone functions were also used as reminders for attending appointments or sessions [13].

Incentives

Incentives are frequently used in the health promotion programs and in this paper, financial incentives were given to employees for different purposes which includes achieving health goals, completing data collection. In a diabetes study, participants were given a free glucose monitor as an incentive [18]. Other type of intervention includes paid leave time, free water bottles [14].

CONCLUSION

In this paper, we focus on workplace interventions for the risk of chronic diseases and providing machine learning algorithm to improve the accuracy. Naive Bayes classifiers can help to identify smoking situations, and the search for the best features and classifier parameters significantly improves the algorithms performance, In addition, this study also supports the usefulness of new technologies in improving the effect of smoking cessation interventions, the management of time and patience by therapists, and thus the optimization of available healthcare resources. The outcome of the analysis shows that algorithms based on feature selection makes it possible to obtain high classification rates with only a few features selected from the entire dataset.

REFERENCES

[1] Agency for Healthcare Research and Quality, "AHRQ QI Research Version 5.0, Patient Safety Indicators 04, Technical Specifications, Death Rate among Surgical Inpatients with Serious Treatable Complications", 2015.

[2] E. Ertin, N. Stohs, S. Kumar, A. Raij, M. Al'Absi, S. Shah, "Autosense: Unobtrusively wearable sensor suite for inferring the onset causality and consequences of stress in the field", ACM SenSys*, pp. 274-287, 2011.*

[3] HC Koh, G. Tan, "Data mining applications in healthcare", Journal of Health Information Management*, vol. 19, pp. 64-72, 2005.*

[4] A. Aljumah, M. Ahamad, M. Siddiqui, "Application of data mining: Diabetes health care in young and old patients", Journal of King Saud University - Computer and Information Sciences, vol. 25, pp. 127-136, 2013.

[5] M. Poynton, A. McDaniel, "Classification of smoking cessation status with a back propagation neural network", Journal of Biomedical Informatics*, vol. 39, no. 6, pp. 680-686, 2006.*

[6] Fouad MN, Kiefe CI Bartolucci AA, Burst Nm, Ulene V, Harvey MR. A hypertension control program tailored to unskilled and minority workers. Ethn Dis 1997:7:7:191-9

[7] J.L. Obermayer, W.T. Riley, O. Asif, J. Jean-Mary, "College smoking-cessation using cell phone text messaging", Journal of American College Health*, vol. 53, no. 2, pp. 71-78, 2004.*

[8] A.D. Odetallah, S.S. Agaian, "Human visual system-based smoking event detection", SPIE Defense Security and Sensing*, International Society for Optics and Photonics, 2012.*

[9] K. Bhargavi. An Effective Study on Data Science Approach to Cybercrime Underground Economy Data. Journal of Engineering, Computing and Architecture.2020;p.148.

[10] M. Kiran Kumar , S. Jessica Saritha. AN EFFICIENT APPROACH TO QUERY REFORMULATION IN WEB SEARCH, International Journal of Research in Engineering and Technology. 2015;p.172

[11] K BALAKRISHNA,M NAGA SESHUDU,A SANDEEP. Providing Privacy for Numeric Range SQL Queries Using Two-Cloud Architecture. International Journal of Scientific Research and Review. 2018;p.39

[12] K BALA KRISHNA, M NAGASESHUDU. An Effective Way of Processing Big Data by Using Hierarchically Distributed Data Matrix. International Journal of Research.2019;p.1628

[13] P.Padma, Vadapalli Gopi,. Detection of Cyber anomaly Using Fuzzy Neural networks. Journal of Engineering Sciences.2020;p.48.

[14] Kiran Kumar, M., Kranthi Kumar, S., Kalpana, E., Srikanth, D., & Saikumar, K. (2022). A Novel Implementation of Linux Based Android Platform for Client and Server. In A Fusion of Artificial Intelligence and Internet of Things for Emerging Cyber Systems (pp. 151-170). Springer, Cham.

[15] Kumar, M. Kiran, and Pankaj Kawad Kar. "A Study on Privacy Preserving in Big Data Mining Using Fuzzy Logic Approach." Turkish Journal of Computer and Mathematics Education (TURCOMAT) 11.3 (2020): 2108-2116.

[16] M. Kiran Kumar and Dr. Pankaj Kawad Kar. "Implementation of Novel Association Rule Hiding Algorithm Using FLA with Privacy Preserving in Big Data Mining". Design Engineering (2023): 15852-15862

[17] K. APARNA, G. MURALI. ANNOTATING SEARCH RESULTS FROM WEB DATABASE USING IN-TEXT PREFIX/SUFFIX ANNOTATOR, International Journal of Research in Engineering and Technology. 2015;p.16.

[18] Moushumi Sharmin, Theodore Weber, Hillol Sarker, Nazir Saleheen, Shameen Ahmed, Mustafa Al'Absi, "Opportunities and Challenges in Designing Participant-Centric Smoking Cessation System", 2017 IEEE.

[19] Janet Brigham, Harold S. Javitz, Ruth E. Krasnow, Lisa M. Jack, Gray E. Swan, "A Tailoring Algorithm to optimize Behavior Change", 2014 International Conference on System Sciences.

[20] Mi Zhang, Chirstopher C. Yang, "Classifying User Intention and Social Support Types in Online Healthcare Discussions", 2014 IEEE International Confernece on Healthcare informatics.