Prediction of Drug Addiction in Punjab with Fuzzy Expert System
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Abstract:
Indian state of Punjab has been long considered as one of India’s most prosperous states, having highly fertile land and regarded as nation’s bread basket. Drug addiction has been perceived as a serious problem in Punjab in recent times and a lot of debate is going on this issue. This paper presents our work which is based on a survey based technique for prediction of drug addiction in Punjab. In this predictive study, we used fuzzy verdict mechanism which analyzes the various factors selected from the data obtained from people and does the prediction based on a fuzzy expert system. The evaluation of the results obtained shows 70% accuracy in predicting the behavior of drug addiction. From the survey we conclude that student having scored more than 5 required to be safe from the bad company. This system is an open source so researchers can add to it as applications of expert system in the science are expected to increase in the near future.

Keywords: Drug Addiction, Fuzzy Expert System, Predictive Analytics, Punjab

I. INTRODUCTION
There has been a lot of debate and discussion going on in the recent past about the drug misuse in Punjab. Scale of problem [1] can be disputed in Punjab not its existence. Drug addiction [2] is also called a chronic or can we say a brain disease which can cause or leads to changes in the structure and functions of brains with abuse use of it. When one gets addicted toward the drugs, he is not able to control the drug use and may continue using the drug in spite of the harm it causes. Addiction can cause an intense desire for the drug. Even if one may want to quit, it has been observed that the majority people find it difficult to do it on their own. Addiction to drugs can cause serious, worst, long-term consequences, including problems with physical and mental health, relationships, employment, and the law. Mostly drug addictions start with experimental use of a drug in social situations. For some people, the use of drug becomes more common. Risk of addiction and how fast you become dependent varies by drug. Several drugs have a higher risk and cause dependency more swiftly than others.

With the passage of time, one may need high dose of the drug to get high. As the drug dose increases, one may find it difficult to go without the drug. Trying to stop drug use may cause deep cravings and make you feel physically ill.

Drug addiction symptoms include, among others:
Feel to use the drug daily or even more than once a time in a day
• Having intense desire for the drug
• Eventually, needing more of the drug to get the same effect
• Making sure that you keep up a supply of the drug
• No obligation meetings and work responsibilities, or cutting back on social or activities because of drug use
• Doing wrong things, such as, stealing
• Doing other risky activities driving when you’re under the influence of the drug

II. BASICS CONCEPT OF FUZZY EXPERT SYSTEM
Expert System [3] is one of the most common applications of artificial intelligence. Fuzzy system is a computer agenda that simulate the decision and events of a person or an association that has special facts and experience in a particular field. Such a system contains a knowledge base containing accumulate experience and a set of rules for applying the knowledge base to each particular situation. The common features of expert system are increased reliability, reduced cost, multiple expertise, reduced error, database, reduced danger etc. Limitations of expert system are absence of common sense and no change with shifting environment. A fuzzy expert system is artificial intelligence that uses a gathering of membership functions (fuzzy logic) and rules (rather than Boolean logic) to reason about information. The rules in a fuzzy system are usually of a form similar to this: If x is low and y is high, then z = medium, where x and y are input variables (names for known information values), z is an output variable (a name for a information quality to be registered), low is membership function (fuzzy subset) defined on x, high is membership function defined on y, and medium is membership function defined on z. The antecedent describes to what scale the rule applies, although the conclusion assigns a membership function to one or more output variables. The generic architecture of a fuzzy expert system showing the flow of data through the system is shown in figure1.1.

Fig. 1.1 Generic architecture of a fuzzy expert system
ILLITERATURE REVIEW

Christopher J. Correia et al. [4] develops a predicting drug use: application of behavioral theories of choice results from relapse examinations demonstrate that forecasts of drug use are enhanced with the expansion of support got from medication free exercises, which enters the model with negative coefficient esteem. The expansion of a fortification proportion, taking into account coordinating law conditions, additionally represented exceptional difference. Results show the utility of applying behavioral speculations of decision to medication utilize and highlight the significance of review practices inside their more extensive environment.

Azar Pirdelghan1 et al [5] creates Demonstrating the Fundamental Foreseeing Elements of Substance Misuse among Youths. In this explanatory cross-sectional study, in view of an arbitrary bunch testing were enlisted 733 pre college understudies, youth age ran somewhere around 16 and 22 yr from Iran (Yazd). The information of demographic, group - school, family and individual mental related variables were obtained by means of a self managed poll. Progressions of multivariate logistic relapses were performed separately to compute balanced Chances Proportions using SPSS 19 programming. Various 53 young ladies (20.7%) and 225 young men (50.2%) had encountered no less than one of the substance. Moreover youths' wrong disposition to medication misuse, frustration, sensation looking for, family clashes, guardians' wrong mentality to drug misuse, milieu disorder, unseemly mental social school environment were acquired as autonomous indicators of substance misuse. These outcomes alongside recognizing the importance level of all the dangerous elements can be a proper guideline to organize arrangements predictable with existing issues.

ShobeirFakhraei, [6] develops the “drug-Target Interaction Prediction for Drug Repurposing with Probabilistic Similarity Logic”. In this paper, we propose a novel medication target connection expectation system taking into account probabilistic likeness rationale (PSL). Collaboration forecast relates to connection expectation in a bipartite system of medication target cooperation’s reached out with an arrangement of likenesses amongst medications and between targets. Utilizing probabilistic first-arrange rationale rules in PSL, we demonstrate how governs portraying join expectations taking into account groups of three and quadruplicates can successfully make utilization of an assortment of similitude measures. We learn weights for the standards taking into account preparing information, and report relative significance of every comparability for association expectation. They demonstrate that the educated standard weights essentially enhance expectation accuracy. We assess our outcomes on a dataset of medication target communications acquired from Drug bank enlarged with five medication based and three target-based likenesses. They incorporate space information in medication target collaboration expectation and match the execution of the cutting edge drug-target association forecast frameworks with our model utilizing basic group of three based guidelines. Moreover, we apply procedures that make join forecast.

John D. Hundle [7] develops personality and the prediction of delinquency and drug use A Follow-up Study of Training School Boys John D. Hundleby (Guelph)* A sample of early adolescent boys (N=150) was tested and interviewed at entry to training school on a battery of personality and ability measures. A sample of public school boys (N=196) was also tested but not interviewed. A follow-up interview of 85 per cent, of the training school sample was carried out when the boys were 16 V2years old, this being three years after the initial testing. Indices of recidivism were only poorly predicted. Indices of drug use and alienation, however, were predicted by Extraversion, Fluid Intelligence, Lack of Acculturation, and Independence.

Charles W. Davidson, et al [8] develops the prediction of drug use through discriminate analysis from variables common to potential secondary school dropouts which presents a group of 78 secondary school students satisfied selected criteria as dropouts was interviewed to determine the following: employment status of parents, the presence or absence of an adult male in the home, the self-image of the students, the perceived ability of the students to communicate with their parents, the sex of the students, and drug use by the students. An effort was made to assure the students of the confidentiality of their responses. Discriminate analysis was used to produce a regression equation to predict drug use from the five predictor variables. The best weighted combination of the five variables yielded a multiple R of .63 with drug use. The presence or absence of an adult male in the home contributed most to the prediction system. The next best predictors were (b) perceived ability to communicate with parents and (c) self-image. The relationships between all three of these variables and drug use were significant at the .01 level. Sex was the only variable that was not a significant predictor of drug abuse.

NirAtias and RodedSharan [9] build up an Algorithmic System for Anticipating Reactions of drug addicts. In this work, we provide details regarding a novel way to deal with anticipate the symptoms of a given medication, thinking about data on different medications and their reactions. Beginning from an inquiry medication, a blend of standard relationship investigation and system based dispersion is connected to foresee its symptoms. We assess our strategy by measuring its execution in a cross acceptance setting utilizing an exhaustive information set of 692 medications and their known reactions got from bundle embeds. For 34% of the medications, the top scoring reaction coordinates a known symptom of the medication. Strikingly, even on concealed information, our strategy can surmise symptoms that profoundly coordinate existing learning. Furthermore, we demonstrate that our technique beats a forecast plan that considers every symptom independently. Our strategy consequently speaks to a promising stride toward shortcutting the procedure and lessening the expense of symptom instruction.

F. Zahedil and M. R. Zare-Mirakabad [10] creates Utilizing information mining to investigate association rules in drug addicts in which given the tremendous information sources, information mining can be utilized to investigate learning certain in them; their outcomes can be utilized as information based emotionally supportive networks to settle on choices with respect to habit anticipation and treatment. We contemplated 471 members in such centers, where 86.2% were male and 13.8% were female. The study pointed to extract rules from the gathered information by utilizing affiliation models. Results can be utilized by recovery centers to give more learning with respect to connections between different parameters and help them for better and more effective medicines. The discovering demonstrates that there is a critical relationship between individual qualities and LSD misuse, singular attributes, the sort
of opiates taken, and perpetrating wrongdoings, family history of medication habit and relative medication dependence. Angela Torrest and Juan J. Nieto [11] build up a fuzzy expert in drug and bioinformatics. The reason for this paper is to display a general perspective of the present utilizations of fluffy rationale in medication and bioinformatics. We especially audit the restorative writing utilizing fluffy rationale. They then review the geometrical translation of fluffy sets as focuses in a fluffy hypercube and present two solid representations in pharmaceutical (medication addictions) and in bioinformatics (correlation of genome).

IV. RESULTS
The following figures 2 to 7 show the results of various survey forms regarding Drug Addiction.

1. Personal Info For Online Survey Form

Figure 2 shows the print screen through which user can enter personal info to start the survey like Name of the candidate, gender, etc. After filling the personal information, user should click on the start survey button.

2. Questionnaire Form (Educational Performance)

Figure 3 shows the questionnaire form in which student can enter their educational performance like his attendance, marks in the class.

3. Student Information Form

Figure 4 shows the basic information (like name, age and gender) of students that participate in online survey form for drug addiction.

4. Final Result Form

Figure 5 shows the final result of all the students giving prediction for drug addiction according to the questions of survey form filled like according to their personal and educational details. Students scoring high have more chance to drug addiction and students scoring low, low chance to drug addiction.

5. Result by graph of Total Students

Figure 6 shows the graphical representation of status.
Figure 6 shows graphical representation of status that how many students have high chance, low chance, medium chance or no chance in total students with percentage to drug addiction.

6. Graphical representation of each student

Figure 7 shows the percentage of each student to predict drug addiction individually. As shown in figure Nisha, Ramesh, Maninder have high chance to drug addiction whereas Gaurav, Raj have no chance to drug addiction.

From the survey we conclude that student having scored more than 5 required to be safe from the bad company.

III. CONCLUSION

This paper presented our proposed work in which we have studied the existing algorithms used for predictive analytics and the history of drug addiction or drug usage in Punjab. Then we examined various factors which motivate the human behavior towards the drugs and developed the Fuzzy Expert System that predict the results of risk of drug addiction with greater accuracy. Both fuzzy rules and membership functions are considered together for each factor according to its behavior. In this predictive study, the information was taken from people by study the various factors in online questionnaire forum as inputs in form of data sets. This survey was online filled by 80 students. We evaluate the results on all the students. From the result we conclude that our developed system is 70% accurate in result to finding the behavior of drug addiction. From the survey we conclude that student having scored more than 5 required to be safe from the bad company.

IV. REFERENCE


