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Modern machine learning approaches on self-medication practices

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Abstract--Self medication is a self care practice, in which anseparate takes medicines on own without proper knowledge of medication. The most frequent disease for self medication are fever, headache, cough, cold etc., Self medication not only means purchasing non-prescribed drugs but also refers to self medicating oneself over food or other substances like caffeine and alcohol. This study was assumed to regulate the details for self-medication and the pattern of self-medication amongst medical, engineering and arts students. To implement machine learning techniques self medication practices among medical and non medical students in South India. The current study was a cross-sectional study which was showed for a period of one year between patients hospitalized at RVSIMS Chittoor, Andhra Pradesh. Sample size taken was 744 and the sample size was collected by google forms. Data was composed using a consistentsurvey. Data entered in MS Excel and analyzed using Weka 3.8.3 and results interpreted. The machine learning algorithm recommends that a novel approaches of self medicine practices among medical and non medical students in South India. The present study was conducted to discover knowledge, occurrence and attitude of self medicine among medical and nonmedical students of RVSIMS Chittoor, Andhra Pradesh.

Keywords---Logistic, SVM-RBF Kernel, self-medications, SVM-Poly Kernel, knowledge, SVM-Normalized Poly Kernel, SVM-PUK Kernel, occurrence and attitude.

Introduction

Common sources of self medication includes families, friends, newspapers, magazines, pharmacist and internet websites. A look at performed among 731 Chinese college students pronounced that forty.2% of the scholars self-dealt with antibiotics [1]. The preceding research indicates that the cause in the back of the common use of OTC tablets includes a preference to store time and money, earlier experience with drug efficacy, for minor health problems they need now not need to visit a physician [3]. The take a look at carried out on tertiary care the scientific university of West Bengal mentioned antibiotics to be the most generally used self-medicated drugs. The different look at assessed on the mind-set and behavior of antibiotic use a number of the medical and non-scientific students in a college additionally mentioned at high costs [2]. Though medical students are not legally permitted to recommend medicines they implement their knowledge in pharmacology to practice, therefore self-medication has been frequently seen among medical students [4, 5]. Major problem of self medication is the use of non prescription drugs amongst the students on subjection to various advertisements and internet websites. The analysis of 27 Studies of self remedy amongst physicians and scientific students reported a self-treatment incidence of >50% in 76% of the studies [6]. The examination which became finished in Maharashtra a few of the first-year clinical students additionally showed excessive costs of occurrence on the self-medicinal drugs [7]. The tremendous use of self medicine especially for prescription most effective capsules which includes antibiotics is off the subject [8]. In a take a look at from Portugal it changed into discovered that there has been a loss of popular know-how on the usage of antibiotics effectively among college students [9]. A survey carried out in the USA resulted that; 58% of the contributors had been now not aware of the danger associated with antibiotic use [10]. The study carried out in the North West Ethiopia showed 27.2% [11]. A review on promoted medications reveals that most college students have used at minimum one of the promoted products without consulting doctors or physicians [12, 13]. The study on occurrence of self-medication in the southern part of Ethiopia ranges from 15% [14]. The other study which was conducted in Addis Ababa and central Ethiopia, showed 50% of the persons with illness practice self-medication [15].

In this present study focuses in section two explains the materials and methods adopted, in section 3 presents the experiments and discussions. Finally section 4 concludes the paper by sharing our inferences and future plans.

Materials and Methods

The current study was a cross-sectional study which was showed for a period of one year among patients hospitalized at RVSIMS Chittoor, Andhra Pradesh. Sample size taken was 744 and the sample size was arrived by google forms. Data was collected using a standardized questionnaire. Data entered in MS Excel and analyzed using Weka 3.8.3 and results interpreted. The below machine learning algorithms have applied in this study for classification approaches of this dataset.

- Logistic
- SVM-Poly Kernel
- SVM-Normalized Poly Kernel

- SVM-PUK Kernel
- SVM-RBF Kernel

Results and Discussions

In this session focuses on the results and discussions of this study. The actual dataset contains 800 instances and 12 attributes with 20 questionnaires. Through preprocessing and removed the redundant instances in this dataset. Finally, the dataset has reduced 744 instances and 12 attributes namely Timestamp, Full name, Age, Sex, Course, Year of Study, Place of school, private/government, board of study, day scholar/hosteller , Suffering from any chronic disease and Distance from the nearest health care facility. The below table represents the list of attributes involved in current study.

Table 1. List of the Attributes

S.No	Name of the Attribute	Category
1	Timestamp	Date
2	Full Name	Text
3	Age	Numerical
4	Sex	Text
5	Course	Text
6	Year of Study	Numeric
7	Place of School	Text
8	Private /Government	Text
9	Board of Study	Text
10	Day Scholar / Hosteller	Text
11	Are you suffering from any chronic disease?	Text
12	Distance from the nearest health care facility	Numeric

Table 2 Demographical Distribution

Table 2.1 Age Distribution

S.No	Static	Value
1	Minimum	18
2	Maximum	45
3	Mean	20.016
4	StdDev	1.911

Table 2.2: Sex Distribution

S.No	Label	Count
1	Female	297
2	Male	298

Table 2.3: Course Distribution

S.No	Label	Count
1	Medical	387
2	Engineering	180
3	Arts	58

Table 2.4: Year of Study Distribution

S.No	Label	Count
1	Minimum	1
2	Maximum	5
3	Mean	2.54
4	StdDev	0.881

Table 2.5: Year of Study Distribution

S.No	Label	Count
1	Chennai	216
2	Out of Chennai	352

Table 2.5: Distribution of Board of Study

S.No	Label	Count
1	State Board	534
2	Central Board	140

Table 2.6: Distribution of Day scholar / Hosteller

S.No	Label	Count
1	Day Scholar	561
2	Hosteller	122

Table 2.7: Distribution of suffering from chronic disease

S.No	Label	Count
1	No	729
2	Yes	10

Table 2.8: Distribution of Accessibility to health care faculty

S.No	Label	Count
1	<5 kms	528
2	5-10 kms	114
3	10-15kms	24
4	>15 kms	6

Table 3: Questionnaire

S.No	Questionnaire	Label	Count
1	Self-medication is	Intake of drug, herbs or home remedies on ones own initiative or on advice of another Person without consulting a doctor	555
		Intake of drugs, herbs/home remedies on the advice of the pharmacist	60
		Intake of drugs, herbs Or home remedies on the advice of a staff nurse	18
		intake of drugs, prescribed for another Person for similar illness.	48
2	OTC drugs are	dispensed by pharmacist on physician order	128
		always dispensed by the pharmacist himself	122
		procured by patient himself without prescription	226
		procured by relative/friends	20
3	Self-medication is entirely safe?	Yes	82
		no	414
4	Do you buy medicines without Prescription?	yes	226
		no	230
5	If yes, reasons for preferring self-medication?	quick relief	82
		time saving and economical	34
		lack of health care professionals	6
		prior experience	66
		non-serious illness	164
		Emergency use	106
		quick relief	16
Others	26		
6	How often you self medicate?	always	10
		sometimes	206
		rarely	246
		never	34
7	For minor ailments, I always	visit physician	108
		Rely on local pharmacist & buy medicines as per his/her advice	102
		Rely on my friends/relatives & buy medicines as per his/her advice	28
		take drugs left over from prior use	38
		Try herbal/home remedies	136
		will not take any medication	84
8	Did symptoms relieved on self medication?	always	96
		sometimes	350
		rarely	24
		never	26

9	Conditions for which you self medicate?	cold, fever, cough	336
		headache, stomachache	106
		vomiting	20
		diarrhea	12
		Others	22
10	According to you which drugs can be self medicated?	Analgesics/pain killers (diclophenac, ibuprofen)	110
		Antipyretics (paracetamol)	128
		multivitamins	108
		Antacids/Anti-ulcer drugs (Ranitidine, pantoprazole, Gelusil)	90
		Antibiotics (azithromycin, cefixime)	60
		cough syrups	26
		Anti-diarrheas	22
		skin creams/ointments	20
11	When do you take these medications?	when there are symptoms	282
		when the symptoms are moderate and sudden for more than 3days	90
		when the symptoms are increasing in severity	88
		Before symptoms to prevent against disease	22
		others	14
12	Knowledge regarding drugs for self medication practice were obtained from?	pharmacy	108
		previous prescription from health care professional	36
		Internet and advertisement	68
		Books	254
		others(specify)	30
13	Experienced side effects on self medication?	Yes	78
		No	418
14	Do you discontinue the prescribed drug when symptoms are relieved?	Always	232
		Sometimes	204
		Never	60
15	Do you suggest your friends or neighbor any drug?	Always	22
		Sometimes	276
		Never	198
16	Do you check the expiry date of the drug?	Always	438
		Sometimes	75
		Never	8
17	Do you go to the physician if the self medication is not effective?	Yes	464
		No	32
18	Are you habituated to any drug due to self medication?	Yes	434
		No	62
19	Do you repeat the same self	Yes	332

	medicated drug, if the same symptoms turns up?	No	
			164
20	When a medication has no effect, what do you do?	Stop taking the medicine and see the physician	408
		Stop taking the medicine and see the pharmacist	52
		I would increase the dose on my own	18
		I would decrease the dose on my own	4
		Others(please specify)	6

The below table represents that the classification approaches of several machine learning algorithms are implemented in our dataset.

Table 4: Classifiers with accuracies and time taken for each models

S.No	Classifiers	TP Rate	FP Rate
1	Logistic	0.97	0.98
2	SVM-Poly Kernel	0.66	0.42
3	SVM-Normalized Poly Kernel	0.68	0.60
4	SVM-PUK Kernel	0.68	0.61
5	SVM-RBF Kernel	0.65	0.56

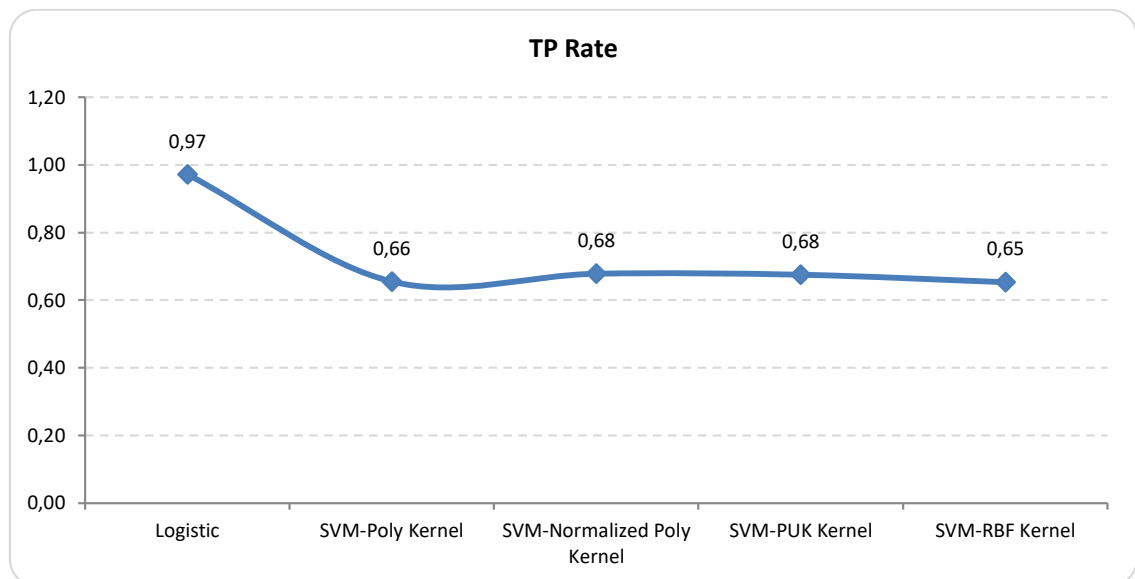


Figure 1: Representation of True Positive Rate

The above graph shows the true positive rates for different machine learning algorithms and it was found that for logistic classifier the TP rate is maximum with 97% and for SVM using poly kernel and SVM using RBF kernel it's around 65%. For SVM using normalized poly kernel and SVM using PUK kernel the TP rate is similar.

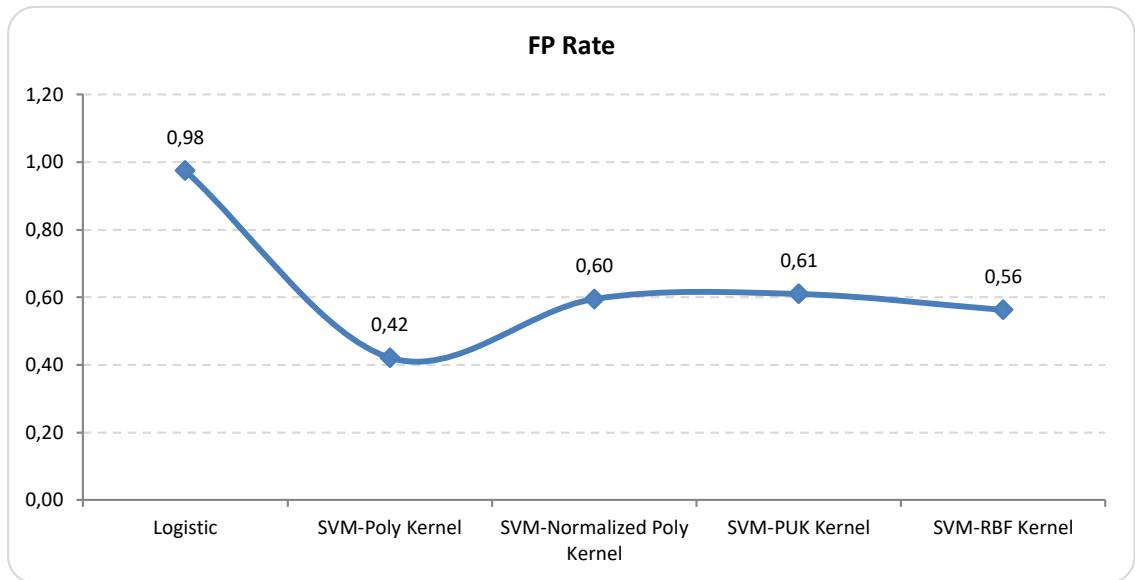


Figure 2: Representation of False Positive Rate

The above graph shows the false positive rates for different machine learning algorithms and it was found that for logistic classifiers the FP rate is maximum with 98%. For SVM using poly kernel, the FP rate is 42%. For SVM using normalized poly kernel, the FP rate is 60%. For SVM using PUK kernel, the FP rate is 61%. And for SVM using RBF kernel the FP rate is 56%.

Conclusion

This study concludes that this model recommends that the the true positive rates for different machine learning algorithms and it was found that for logistic classifier the TP rate is maximum with 97% and forSVM using poly kernel and SVM using RBF kernel it's around 65% .andSVM using poly kernel, the FP rate is 42%.

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Conflict of interest: None

References

1. Lv B, Zhou Z, Xu G, et al. Knowledge, attitudes and practices concerning self-medication with antibiotics among university students in western China. *Trop Med Int Health*. 2014;19(7):769–779.

2. Suaifan G, Shehadeh M, Darwish D, Al-Ijel H, Yousef A-MM, Darwish R. A cross-sectional study on knowledge, attitude and behavior related to antibiotic use and resistance among medical and non-medical university students in Jordan. *Afr J Pharm Pharmacol.* 2012;6(10): 763–770.
3. Osemene KP, Lamikanra A. A Study of the prevalence of self-medication practice among university students in southwestern Nigeria. *Trop J Pharm Res.* 2012;11(4):683–689.
4. Badiger S, Kundapur R, Jain A, Kumar A, Pattanshetty S, Thakolkaran N, et al. Self-medication patterns among medical students in South India. *Australas Med J.* 2012;5:217-20.
5. Banerjee I, Bhadury T. Self-medication practice among undergraduate medical students in a tertiary care medical college, West Bengal. *J Postgrad Med* 2012;58:127-31.
6. Montgomery AJ, Bradley C, Rochfort A, Panagopoulou E. A review of self-medication in physicians and medical students. *Occup Med.* 2011;61(7):490–497
7. Mumtaz Y, Jahangeer SM, Mujtaba T, Zafar S, Adnan S. Self-medication among university students of Karachi. *J Liaquat Univ Med Health Sci* 2011;10:102-5.
8. Azevedo MM, Pinheiro C, Yaphe J, Baltazar F. Portuguese students' knowledge of antibiotics: a cross-sectional study of secondary school and university students in Braga. *BMC Public Health.* 2009;23:359.
9. Sawalha AF. A descriptive study of self-medication practices among Palestinian medical and nonmedical university students. *Res Social Adm Pharm.* 2008;4(2):164–172.
10. VandenEng J, Marcus R, Hadler JL, Imhoff B, Vugia DJ, et al. Consumer attitudes and use of antibiotics. *Emerg Infect Dis.* 2003;9(9):1128–35.
11. Hughes CM, McElnay JC, Fleming GF. Benefits and risks of self-medication. *Drug Saf.* 2001;24:1027–37. [PubMed: 11735659]
12. Abula T, Worku A. Self medication in three towns of North West Ethiopia. *Ethiop J Health Dev* 2001;15:25-30
13. Burak LJ, Damico A, College students' use of widely advertised medications. *J Am Coll Health* 2000; 49: 118-21.
14. Gedif T. Self-medication and its determinants in Butajira, Southern Ethiopia. Masters thesis, Addis Ababa; 1995.
15. Kitaw Y. Self-care: A study of three communities in Ethiopia. *Ethiop J Health Dev* 1987;2:2.