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RESEARCH ARTICLE

A Critical Analysis of E-Learning during the Pandemic using Data Mining

S. Annie Christila*

Dept. of Computer Applications, St. Francis de Sales College, Bengaluru, Karnataka, India.

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*Address for Correspondence
S. Annie Christila
Dept. of Computer Applications,
St. Francis de Sales College,
Bengaluru, Karnataka, India.
E. Mail : anniechristilas@sfscollege.in

ABSTRACT

The main crux of this research study is to address the issues of the pandemic namely the COVID-19 that brought a Copernican revolution in the educational system and also to analyse the issues encountered by the students, teachers, and institutions and also by the parents. The pandemic brought a new method or style of learning into the education system popularly known as online learning or e-learning. Once the survey and research are done based on the topic, it is finally concluded using data mining algorithm derived for finding out the result or outcome of the survey conducted. Artificial neural network (ANN) and Support Vector Machine (SVM) data set is tested by different Data Mining (DM) algorithms using WEKA data science tool to develop the models. The result model manifested the major problem faced by students during COVID-19 pandemic. Student's data set which has been examined with Support Vector Machine is more accurate to identify the challenges of the students. The accuracy of this algorithm has been noted 90.85% which can be considered the best developed model among the different models which is being developed by other algorithms including Artificial Neural Network (ANN) and Decision Tree

Keywords: COVID 19, Data Mining, Data Analysis, Data Model, E learning

INTRODUCTION

Globally, COVID-19 has had an impact; as a result, colleges and universities were closed in many nations; while this is a temporary situation, it has had a significant impact on many people worldwide. This presents a significant challenge for both students and teachers in the teaching and learning process in the educational sector. Over 60% of the student population worldwide will be impacted by these widespread closures. In this study, various data models are created using student data on the biggest issues that students encountered throughout the COVID-19 survey. These models can be applied in government and educational institutions to determine the problem's strength and potential solutions. The models were developed using data that was gathered by survey questioner approach, and

dataset examples of the student's difficulty were taken into consideration. To create the models, various data mining algorithms were investigated.

LITERATURE REVIEW

In order to forecast student results in the form of efficiency, the authors Sharma and Mamta used the DT model in 2013 and compared it to the Naive Bayes algorithm [13]. In 2009, Siraj, Fadzilah, and Mansour Ali Abdoulha used various algorithms with the Weka tool to analyse and cluster graduate data more effectively [8]. In 2009, Hoo Yann Seong employed DT and neural networks to create a predicted model by comparing it to their organization's classification and grouping of student performance [14]. Espejo and César Hervás developed a data mining model in 2008 using several algorithms and came to the conclusion that DT is the best model for educational sectors in terms of decision-making [15].

METHODOLOGY

The dataset was obtained from questioner survey which has been collected from different college students in Bangalore. It contains 550 instances with 6 attributes like:

1. How effective was online learning?
2. What are the issues faced for attending online classes?
3. What amount of knowledge have you gained through online learning?
4. Are you Anxious about your Education during the pandemic and what is the level of your Anxiety?
5. What is the reason for lack of concentration during the online sessions?
6. What is the Scale on Lack of Clarity and Communication about topic delivered on online sessions?

These datasets have been gathered and properly parameterized using data analysis software and algorithms like KNIME, Rapid Miner, Oracle Data Mining, SQL Server Data Tools, WEKA, and others. These programmes help analyse data more effectively and predict errors and model behaviour using various methods. For the analysis of the data model based on the dataset, WEKA has been employed among these tools. When contemplating data mining's purposes, tracking patterns is one of them. Learning to spot patterns in data sets containing various faces is one of the most fundamental data mining techniques. The above figure shows the process in data analysis and methodology in the research using data mining to predict the model which is helpful to identify the major problems faced during the covid-19 pandemic situation.

Visualization of Output

The following pie charts denotes the graphical representation of the online classes where the students face a lot of problems related to studies. There are different types of questions which have a wide variety of unique answers for it received as an output of the survey conducted. The above pie chart contains the information regarding the effectiveness of the online classes. It contains three options from which anyone could be chosen. From the output obtained, it clearly shows that most of the online classes weren't that interesting to the students. The above pie chart contains the information regarding all types of issues faced by the students in attending the classes online. It is clearly understood that the students face all kinds of issues uniformly, few faces network issues due to the low network availability in the place where they stay, few encountered financial issues in getting mobiles phones or laptops for attending online classes and others face both the problems. The above pie chart indicates the graph regarding the amount of knowledge gained through online learning. Taking the output into consideration we can come to a conclusion saying that, it is almost an average amount of knowledge that the students have gained by attending online classes. However, the outcome of the traditional educational atmosphere would have been completely astronomic. The above pie chart indicates the graph representing the level of anxiety among the students about their education during the pandemic situation. It clearly depicts the fact that 60.7 percent of students have faced a lot of difficulties to cope up with situation. The above pie chart indicates the graph representing the reason

for lack of concentration among the students during online classes. It represents the session time duration with three scales. First scale is 0 to 30 minutes, the second scale is from 30 to 60 minutes and last scale is more than 60 minutes. Among these scales 51.4 percent of the students are facing concentration issues. It causes negative impact in the academic progress of the student. The above pie chart indicates the graph representing the scale on lack of clarity and communication about the topic that is taught during the online sessions. About 61.2 percent of students haven't had sufficient clarity on the specific subject and communication was a common challenge for the students during the online sessions.

FINDINGS AND DISCUSSIONS

The different data mining algorithm such as artificial neural network, decision tree and support vector machine were examined by using WEKA tool. The model evolved with artificial neural network algorithm was examined with height accuracy of 96.32% and this model is considered as the best model among others.

CONCLUSION

This research paper is a comprehensive analysis of the kind of impact the pandemic had on the education system and the ways by which it affected the students. By taking into consideration the results of the survey conducted, it can be very clearly concluded that online learning has more disadvantages than advantages. Due to the evident downside in this new modern way of e-learning/online learning and the continual struggles experienced by students as well teachers, the online learning poses a big threat to the quality of education and it raises a lot of question about the efficiency and experiences of students. No matter how efficient and powerful online education may be, it cannot replace the tradition classic education which creates, refines and edifies students not just a theoretical learning but also practical knowledge. Students not only grow tired of online learning but also grow less in social and academic competence which the traditional education provides.

REFERENCES

1. Wook, Muslihah, Yuhanim Hani Yahaya, Norshahriah Wahab, Mohammed Rizal Mohammed Isa, Noor Fatimah Awang, and Hoo Yann Seong. "Predicting NDUM Student's Academic Performance Using Data Mining Techniques." In Computer and Electrical Engineering, 2009. ICCEE'09. Second International Conference on, vol. 2, pp. 357-361. IEEE, 2009.
2. Waiyamai,K. "Improving Quality of Graduate students by Data Mining" Department of Computer engineering. Faculty of Engineering. Kasetsart
3. Dr. Niranjanamurthy M, Amulya M P Dr. Dayananda P and Pradeep H G, "Coronavirus – COVID-19 before and after solution through web application and App", International Journal of Advanced Science and Technology, Voulme-29, Issue: 5,2020
4. T.H. McCormick, C. Rudin, D.Madigan , A Hierarchical Model For Association Rule Mining Of Sequential Events: An Approach To Automated Medical Symptom Prediction.(2019))
5. Romero, Cristóbal, Sebastián Ventura, Pedro G. Espejo, and César Hervás. "Data Mining Algorithms to Classify Students." In EDM, pp. 8-17. 2008.
6. Nghe, Nguyen Thai, Paul Janecek, and Peter Haddawy. "A comparative analysis of techniques for predicting academic performance." Frontiers In Education Conference-Global Engineering: Knowledge Without Borders, Opportunities Without Passports, 2007. FIE'07. 37th Annual. IEEE, 2007.
7. S.Palaniappan, R. Awang, Intelligent Heart Disease Prediction System Using Data Mining Techniques (2019)
8. Sharma, Mamta, and Monali Mavani. "Accuracy Comparison of Predictive Algorithms of Data Mining: Application in Education Sector." Advances in Computing, Communication and Control. Springer Berlin Heidelberg, 2011. 189-194.

9. P. Sudeshna ; S. Bhanumathi ; M.R. Anish Hamlin Identifying symptoms and treatment for heart disease from biomedical literature using text data mining Electronic IEEE Xplore: (2018) ISBN: 978-1-5090-4324-8 Print on Demand(PoD) ISBN: 978-1-5090-4325-
10. Siraj, Fadzilah, and Mansour Ali Abdoulha. "Uncovering hidden information within university's student enrollment data using data mining." Modelling & Simulation, 2009. AMS'09. Third Asia International Conference on. IEEE, 2009.
11. K.Aftarczuk, Evaluation of selected data mining algorithms implemented in Medical Decision Support Systems (2019).
12. Sheikh,L Tanveer B. and Hamdani,S., "Interesting Measures for Mining Association Rules". IEEE-INMIC Conference December. 2014.
13. University, Bangkok, Thailand. 2013.

Table: Performance Evaluation

Sl no.	Examined data models	Accuracy in percentage
1.	Support Vector Machine	89.74%
2.	Artificial Neural Network	96.32%
3.	Decision Tree	887.15%

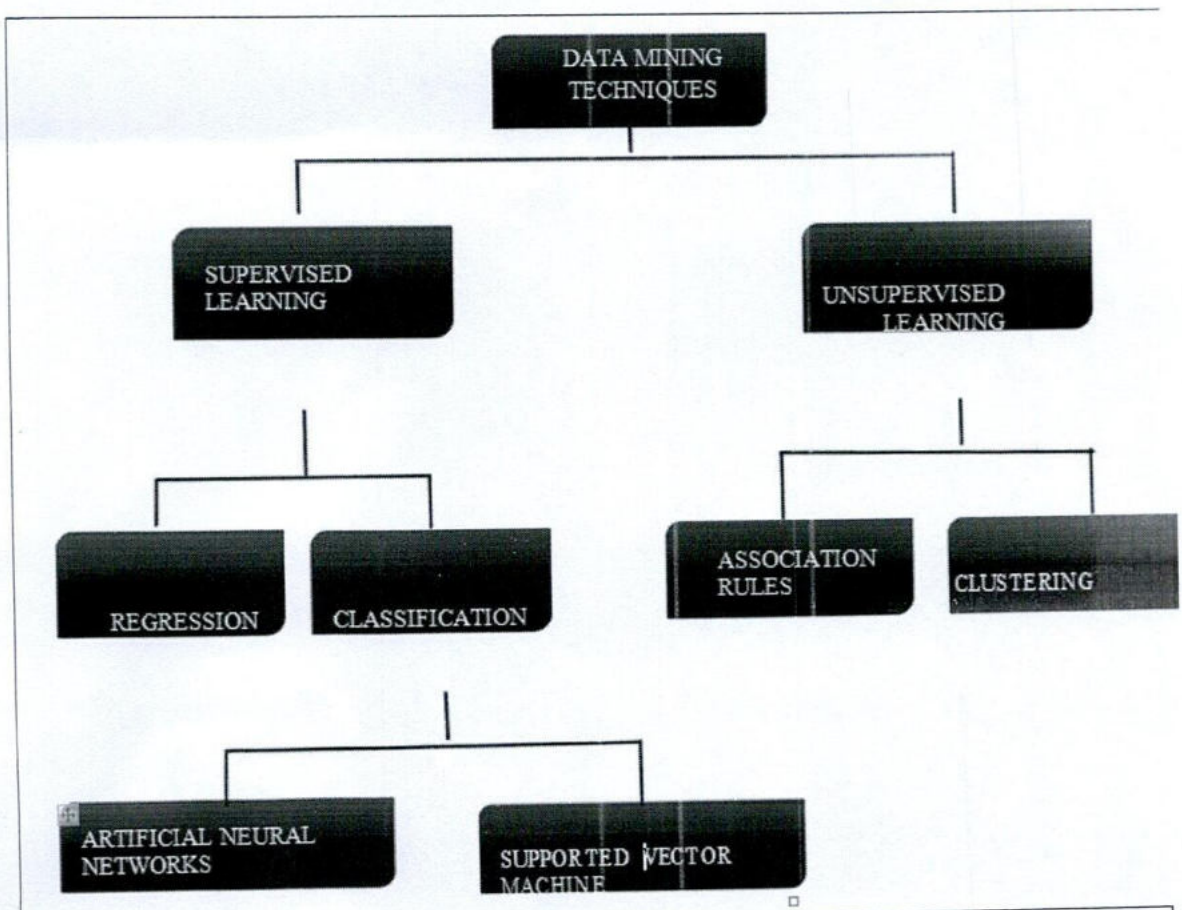
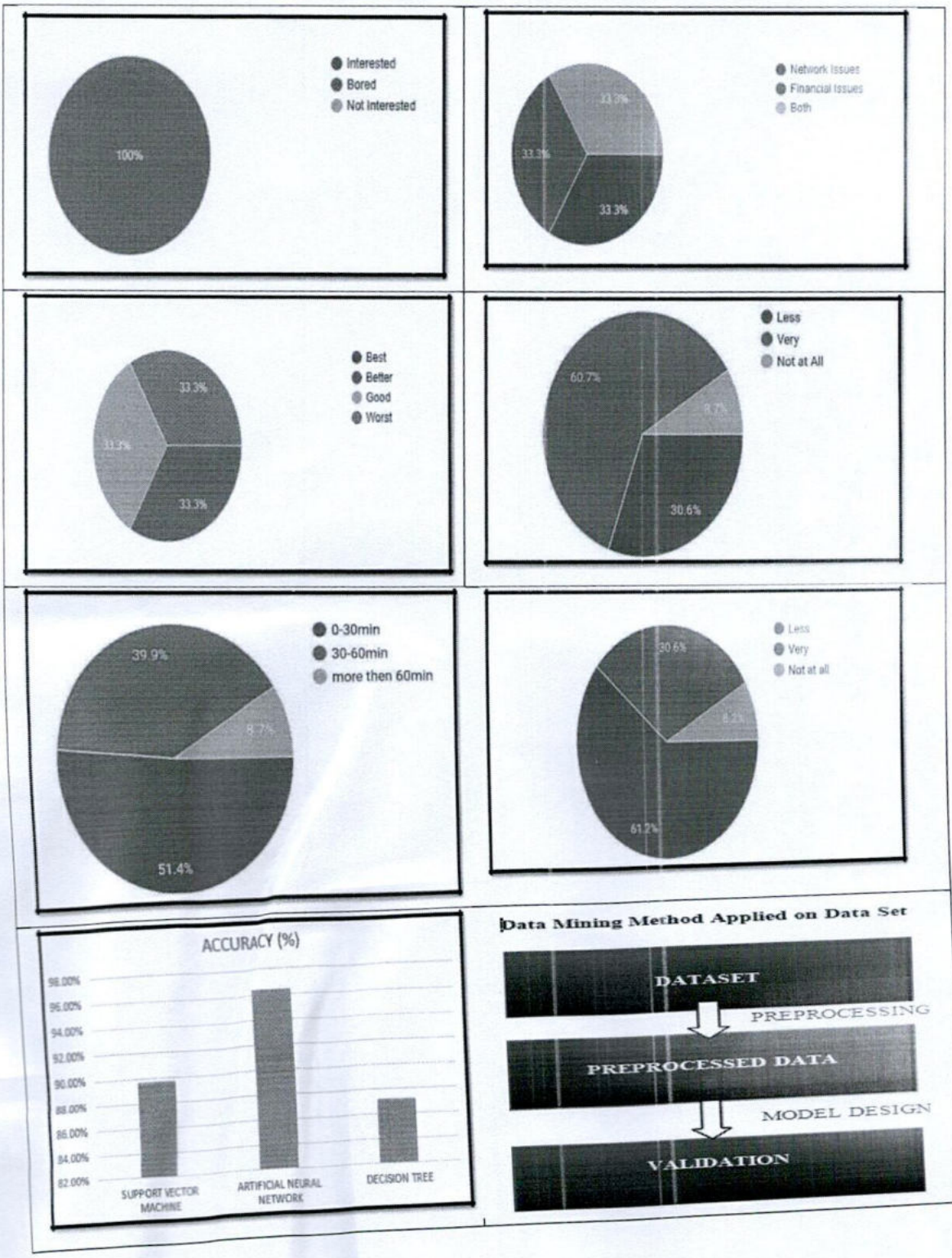
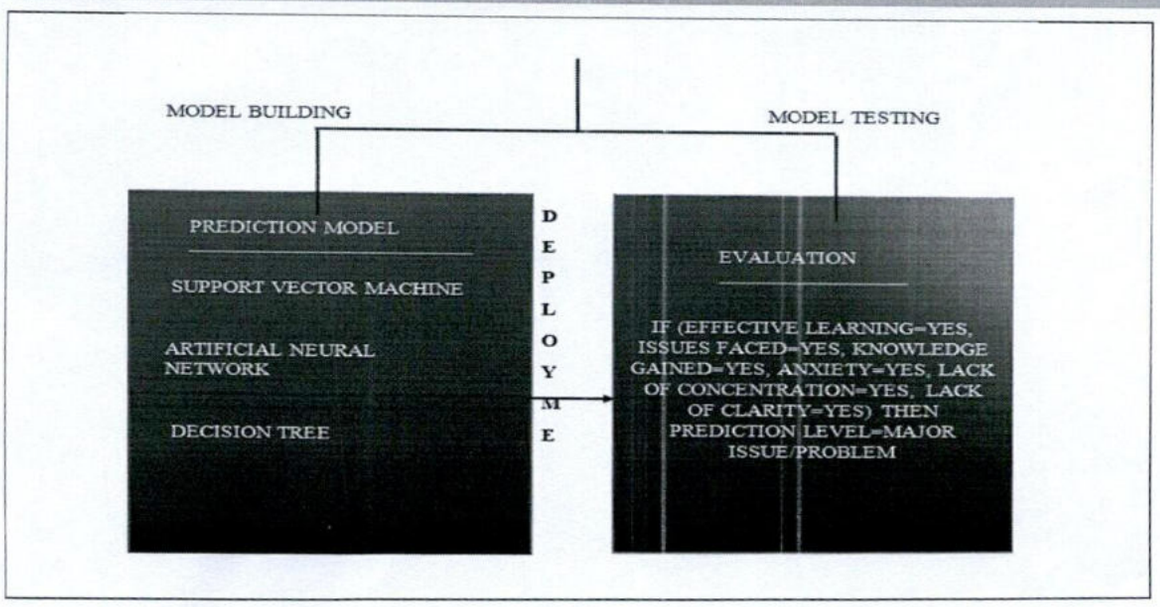
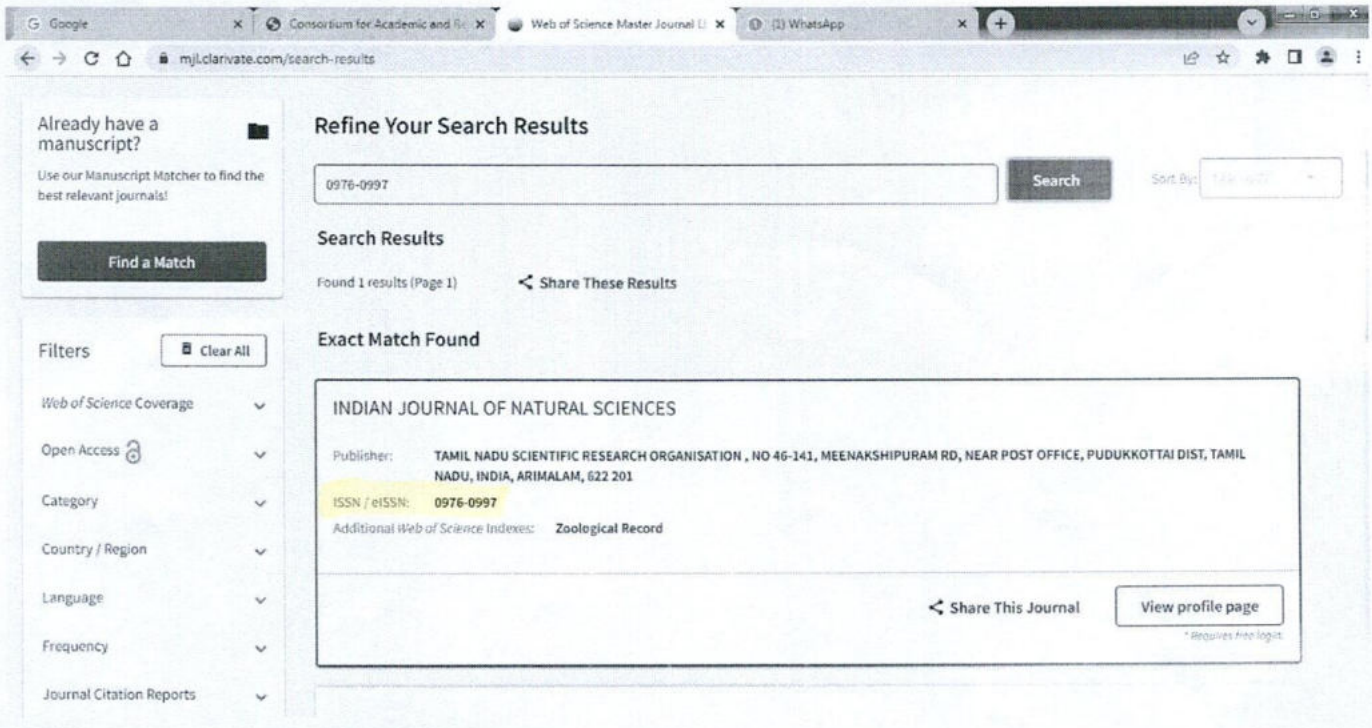


Fig. Method of Data Processing


Interested
Bored
Not Interested
100%
Network Issues
Financial Issues
Both
33.3%
33.3%
33.3%
Best
Better
Good
Worst
33.3%
33.3%
33.3%
Less
Very
Not at All
60.7%
8.7%
30.6%
0-30min
30-60min
more then 60min
39.9%
8.7%
51.4%
Less
Very
Not at all
30.6%
8.2%
61.2%
ACCURACY (%)
98.00%
96.00%
94.00%
92.00%
90.00%
88.00%
86.00%
84.00%
82.00%
SUPPORT VECTOR MACHINE
ARTIFICIAL NEURAL NETWORK
DECISION TREE
Data Mining Method Applied on Data Set
DATASET
PREPROCESSING
PREPROCESSED DATA
MODEL DESIGN
VALIDATION


MODEL BUILDING
MODEL TESTING
PREDICTION MODEL
SUPPORT VECTOR MACHINE
ARTIFICIAL NEURAL NETWORK
DECISION TREE
DEPLOYME
EVALUATION
IF (EFFECTIVE LEARNING=YES, ISSUES FACED=YES, KNOWLEDGE GAINED=YES, ANXIETY=YES, LACK OF CONCENTRATION=YES, LACK OF CLARITY=YES) THEN PREDICTION LEVEL=MAJOR ISSUE/PROBLEM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