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NALLAMUTHU GOUNDER MAHALINGAM COLLEGE

An Autonomous Institution, Affiliated to Bharathiar University, An ISO 9001:2015 Certified Institution,
Pollachi-642001



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One day International Conference

EMERGING TRENDS IN SCIENCE AND TECHNOLOGY (ETIST-2021)

27th October 2021

Jointly Organized by

Department of Biological Science, Physical Science and Computational Science

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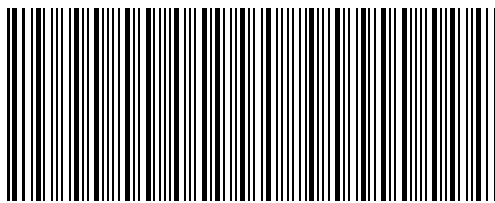
Proceeding of the
One day International Conference on
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ABOUT THE INSTITUTION

A nation's growth is in proportion to education and intelligence spread among the masses. Having this idealistic vision, two great philanthropists late. S.P. Nallamuthu Gounder and Late. Arutchelver Padmabhushan Dr.N.Mahalingam formed an organization called Pollachi Kalvi Kazhagam, which started NGM College in 1957, to impart holistic education with an objective to cater to the higher educational needs of those who wish to aspire for excellence in knowledge and values. The College has achieved greater academic distinctions with the introduction of autonomous system from the academic year 1987-88. The college has been Re-Accredited by NAAC and it is ISO 9001 : 2015 Certified Institution. The total student strength is around 6000. Having celebrated its Diamond Jubilee in 2017, the college has blossomed into a premier Post-Graduate and Research Institution, offering 26 UG, 12 PG, 13 M.Phil and 10 Ph.D Programmes, apart from Diploma and Certificate Courses. The college has been ranked within Top 100 (72nd Rank) in India by NIRF 2021.

ABOUT CONFERENCE

The International conference on “Emerging Trends in Science and Technology (ETIST-2021)” is being jointly organized by Departments of Biological Science, Physical Science and Computational Science - Nallamuthu Gounder Mahalingam College, Pollachi along with ISTE, CSI, IETE, IEE & RIYASA LABS on 27th OCT 2021. The Conference will provide common platform for faculties, research scholars, industrialists to exchange and discuss the innovative ideas and will promote to work in interdisciplinary mode.

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LIST OF ARTICLES

S. No.	Article ID	Title of the Article	Page No.
1	PICCS2101	A Review on Predictive Segmentation Analysis for Optimizing Future Targets and Insights <i>- Mrs.D.Gokila, Dr.R.Malathi Ravindran</i>	1-6
2	PICCS2102	A Review On Segmentation Analysis On Heterogeneous Interaction With Biosensors <i>- Mrs.D.Gokila, Dr.R.Malathi Ravindran</i>	7-12
3	PICCS2103	Deep Convolutional UNET using Biomedical Image Segmentation for Diagnosis of Diabetic Retinopathy with Optimized Hybrid Duck Traveler and Fruit Fly (hDTFFA) Algorithm <i>- P.S.Vijaya lakshmi, Dr.M.Jayakumar</i>	13-20
4	PICCS2104	Machine Learning Classifiers for Sentiment Analysis of Twitter Reviews <i>- Dr.E. Ramadevi, K. Brindha</i>	21-28
5	PICCS2105	Enhancing the Accuracy in Prediction of Heart Disease using Machine Learning Algorithms <i>- Ms. C. Keerthana, Dr.B.Azhagusundari</i>	29-37
6	PICCS2106	Analysis Of Alzheimer'S Disease And Mild Cognitive Impairment Using Convolutional Neural Network Based Classification <i>- Dr. A. Nancy, Dr. E. Ramadevi</i>	38-48
7	PICCS2107	Internet of things (IoT) and Secure <i>- Jenifer V</i>	49-57
8	PICCS2108	Analysis and Treatment for Mentally Retardation Using Machine Learning <i>- Ms. S.S.Shanthi, Ms. R.Sasikala</i>	58-64
9	PICCS2109	A Research direction on Green Internet of Things based Energy efficient Smart City <i>- S.Sharmila, Dr Antony Selvadoss Thanamani, Dr Finny Belwin, Dr Linda Sherin, Dr A.Kanagaraj, Mr.Tariku Birhanu Yadesa</i>	65-74
10	PICCS2110	A Comparative Study of Sentiment Analysis Techniques for Online Reviews <i>- Shini George, Dr.V. Srividhya</i>	75-84
11	PICCS2111	A Study of Cryptography Encryption and Compression Techniques <i>- Dr P. Logeswari, J. G. Banupriya, GokulaPriya, S.Sudha, S.Sharmila</i>	85-90
12	PICCS2114	A Survey on Big Data in Data Mining Techniques <i>- Dr P. Logeswari, J. GokulaPriya, G. Banupriya, S.Sudha, S.Sharmila</i>	91-107
13	PICCS2115	A Brief Survey on Topic Modeling Techniques <i>- T.Rajalakshmi, V.Srividhya, E.Ramadevi</i>	108-117
14	PICCS2117	Data Mining and Technologies Utilized in Aquaculture <i>- J.Gladju, Dr A.Kanagaraj, Dr Finny Belwin, Dr Linda Sherin, Dr. Jackson Akpojaro</i>	118-125
15	PICCS2118	Redefining Indian Banking Industry through Application of AI for Better Customer Experience <i>- Dr. Manjit Kour</i>	126-131
16	PICCS2119	Survey on Vulnerability of 4G/LTE Network Security and Enhancement <i>- Mrs. K. R. Prabha, Dr.B.srinivasan</i>	132-138
17	PICCS2120	Intrusion Detection System in Cloud Computing <i>- J.Vimal Rosy, Dr. S. Britto Ramesh Kumar, Dr.K.Haridas</i>	139-149
18	PICCS2121	A Low Cost Initial Screening Model for Corona Virus Infection from X-Ray Images Using Artificial Neural Networks <i>- S.Dhandapani, Dr. K.Haridas</i>	150-160

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S. No.	Article ID	Title of the Article	Page No.
19	PICCS2122	Wireless Sensor Network System for Clever Vegetation-IoT Using Convolutional Neural Network <i>- Mrs.R.Vidhu, Dr.S.Niraimathi</i>	161-169
20	PICCS2123	Analysis Of Placement Performance Prediction On Students Data Using Machine Learning Algorithm <i>- B. Kalaiselvi, Dr. S. Geetha</i>	170-175
21	PICCS2124	Review on Diabetic Retinopathy Detection and Classification Using Deep Neural Networks <i>- K.Geethalakshmi</i>	176-183
22	PICCS2125	Linear and Non-Linear Filtering Mechanisms for Detecting the Strawberry Plant Leaf Diseases <i>- S. Dhivya, Dr.R. Shanmugavadivu</i>	184-192
23	PICCS2126	Literature Survey on Depression Detection from Tweets Using Sentiment Analysis <i>- Reseena Mol N.A, Dr.S.Veni</i>	193-202
24	PICCS2127	Identification of Weeds Using Soft Computing Techniques <i>- C.S.Sumathi, M.Kalpana</i>	203-208
25	PICCS2128	Prevention of Cyber Attack Using Cloud IoT System <i>- Dr. B. Azhagusundari, Mrs. R. Latha</i>	209-215
26	PICCS2129	Robust Medical Image Compression Method Based on Improved Integer Wavelet Transform for Speedy Transmission <i>- N. Shyamala, Dr.S. Geetha</i>	216-231

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Analysis Of Placement Performance Prediction On Students Data Using Machine Learning Algorithm

B. Kalaiselvi¹ - Dr. S. Geetha²

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ABSTRACT : Machine learning plays key role in the modern higher education methodologies to enhance the performance of the students, predict the outcome of the student and personalized e-learning systems. It helps to produce the proficient graduates and increase the competence of the educators and learners. Academic performance prediction helps to enhance the student's performance in end semester exams and placements. Using classification and clustering techniques from Educational Data Mining (EDM) helps to visualize, classify and predict the academic performance of the students by utilizing the socio-economic and academic data. Prediction of student's performance in placement exams are more complex task for the staffs and placement cell since attaining good marks and getting placement offer from valuable concern will be the final goal for most of the students. Hence better and accurate system is required to predict and enhance the performance in placement exams. This system proposed a decision tree based framework model to predict the placement possibility for the students using passedout student data using j48 classifier. Passed out student data set is used to train the proposed model and also test the trained model to predict the placement possibility. The experimental results shows 87% of prediction accuracy in complete data set and shows the 95% of accuracy in training set after splitting the data set into train (70% of instance) and test (30% of instance).

Keywords: Placement performance, Decision Tree, j48.

I. INTRODUCTION

EDM plays significant role to extract the hidden patterns and information from the student's personal, socio-economic and academic data. EDM helps to predict the student's outcome and placement performance, analyses the learning difficulties and requirement of updating the curriculum and teaching strategies. Placements in the period of under graduation completion determine the quality of outcome and standard of the educational institution. Various factors influence the student to obtain good marks in the final exams and obtain the placements.

The proposed decision tree based model is mainly focused on exploring various indicators that have an effect on the placement performance of the students. The extracted hidden information from the training data set (passed out student's details) using J48 classifier is used to generate the decision tree to predict the placement possibility in the test data. It helps to the placement cell, faculties and management to improvise the quality of the students and

increase placement opportunities to the students. Extracted hidden information and obtained knowledge from the training data is used for predicting the student's performance in advance.

II. LITERATURE SURVERY

A M Sahiri [1] provides an overview on the data mining techniques used to predict student performance. In this work reviews on prediction methods such as decision tree, neural network, naïve bayes, k-nearest neighbour and support vector machine. It uses the CGPA and internal assessment of the Malaysian students as a dataset. Out of all prediction methods neural networks and decision tree is best to predict the students' academic performance.

Ardita [2] classifies the students using k-means cluster algorithm to reveal the hidden pattern and also classifies students based on their demographic data. It uses 300 student's data SPSS16 and forma three clusters such as low performance student, average student and smart student.F Shasmed [3] applied Decision Tree, Naïve bayes and rule based classification model in the student demographic data, previous academic records and family background information for 8 years data set to get best academic performance prediction model. Rule based classification is the best model with 71.3% accuracy which is highest of all. WEKA tool is used to conduct this experiment. The same dataset is divided as testing as well as training dataset.

E Osman [4] considers the student demographic variables, achieved results from high school and from the entrance exam, attitude towards studying. This research is conducted for first year economics students of university of TUZLA. Naïve bayes, multilayer perceptron and J48 algorithm is used for classification. Out of these three naïve bayes classifier outperforms than these three. Classification techniques are applied by Thammasiri [5] for imbalanced dataset high prediction accuracy can be achieved for the majority of the class while minority of the class having poor performance. In this paper different data balancing techniques are compared to improve the prediction accuracy of minority class. Over sampling, under sampling and synthetic minority over sampling along with logistic regression, decision trees, neuron networks and support vector machines.

III. PROPOSED METHODOLOGY

This work focus on classification and prediction of placement possibilities in the under graduate students data set using data collected from the NGM College, Pollachi with the help of J48 ML classifier. The framework of proposed work is shown in figure 1.

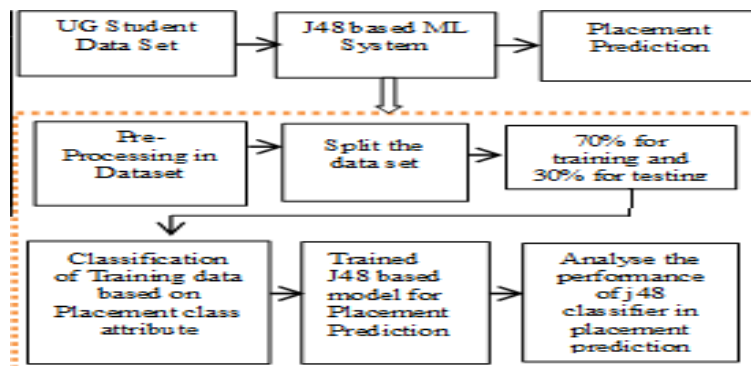


Figure1: Proposed Framework

Data Set:

The data set consists 124 instances with 8 attributes (SI.No, Register No, Student name, course, gender, percentage of SSLC, HSC and UG marks and placement status. The data collected from the passed out students from UG IT, CT, CS and B.Com CA departments in the Nallamuthu Gounder Mahalingam College, Pollachi.

Variables	Detail	Possible Values
SI_No	Serial Number	Numerical Sequence
RegisterNo	Register Number	Alphanumeric Sequence
StName	Student Name	Name of the Student
Course	Course Name	UG Course Name
Gender	Gender	{Male, Female}
SSLCMark	Percentage of Marks in SSLC	{35% to 100%}
HSCMark	Percentage of Marks in HSC	{35% to 100%}
UGMarks	Percentage of UG	{35% to 100%}
Placed	Placed in Campus Interview	{Placed,Not Placed}

Table 1. Attributes used in the data set

Pre-processing:

From the loaded placement data Remove Percentage filter is used to select the 70% instance for training and same filter with invert selection option is used to select remaining 30% instance for test. From the total 124 instances, 87 instances are selected for training and remaining 37 instances for testing.

Classification and Train using J48:

ML classifier J48 construct the tree for placement training set in built tree and pruning phases. Category based attributes like course name, percentage of marks and gender are used to build the tree. Information Gain (IG) calculated for the attributes like course, gender, SSLC percentage, H.Sc. percentage, UG Percentage and placement status and assign highest IG value attribute as root note (SSLC Percentage in this work) and form the tree based on splitting the attributes using IG values and checks all out comes fall under the same class or not. If all training instances are placed under the same class, node is represented with single class else determine the splitting attributes to classify and build tree. After tree formation, post / online pruning will be performed in the constructed tree to generate the best tree and solve the outlier and over fitting issues.

Testing and performance measures:

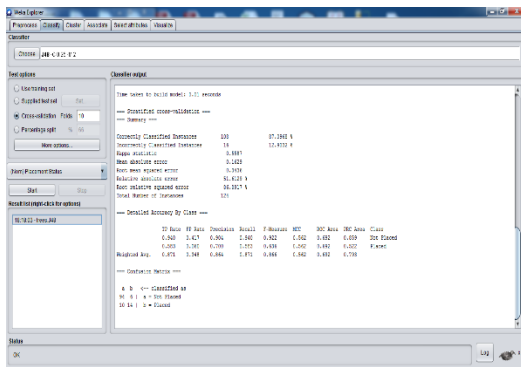
After completion of training phase using 48 for selected 87 instances, test data set (partitioned 37 instance data set) is passed to predict the placement possibilities and compare with previous and actual results. Classification accuracy, True positive and false positive rates, Precision and F1 score with Confusion matrix are used to analyse the performance measures of the trained and predicted model.

III IMPLEMENTATION AND RESULTS

The following process are performed in the implementation phase using J48 classifier in Weka;

- Passed out students data classification based on class attribute place (Placed , Not placed),
- Split the passed out students data set into training(70% of instance) and test data set(30% of instances),
- Train the model and test the placement prediction using training and test data sets.

Initially collected 124 passed out students instances are passed to j48 classifier with 10 x folds validation and obtain the classification results and generated tree.



Classification results

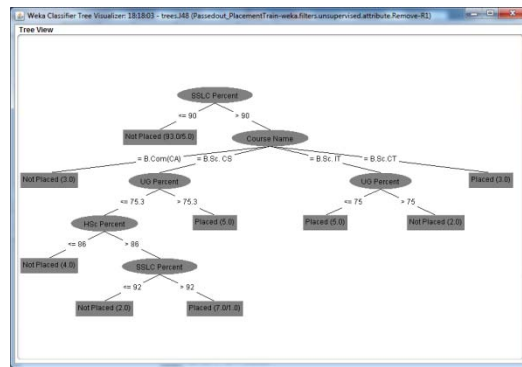


Fig.3 Tree generated by j48

Based on the results (fig.2), from the 124 instances, 108 instances are correctly classified with 87.09% of accuracy. 16 instances are not correctly classified (6 not placed instances are treated as placed and 10 placed instances are treated as not placed). The classifier shows good results in TP rate (0.871), FP Rate(0.348), precision (0.864) and F-measure (0.866).The size of the generated tree is 15 with 9 leaves. The generated tree is used to classify the placed and not placed students in the created model using training data set. The model takes 0.01 seconds to build.Fig.4. describes margin curve plot, the prediction margin with difference between the probability for the actual class and predicted class. Most of the instances are placed in margin 1, it shows the correct class is predicted by the classifier.

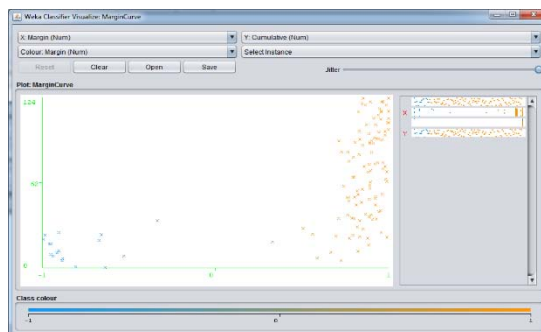


Fig.4 Margin curve plot for complete data set

From the total 124 instances, 87 instances are selected for training and remaining 37 instances for testing using split percentage and invert selection method. The selected 87 instance data set is used to train the model. The following fig.5 shows split placement data set into train and test random percentage and invert selection.

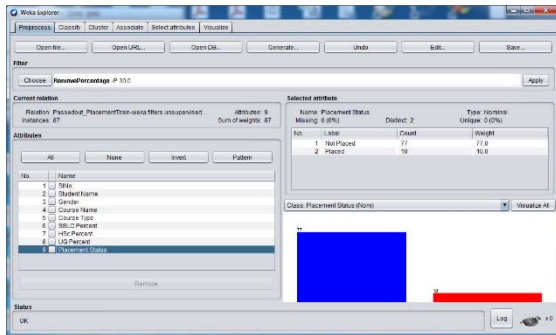


Fig.5. Data Set split

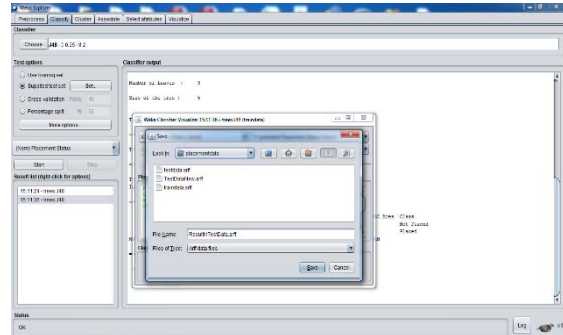


Fig.6. Save Predicted result

The above fig.6 depicts store the test data with predicted results

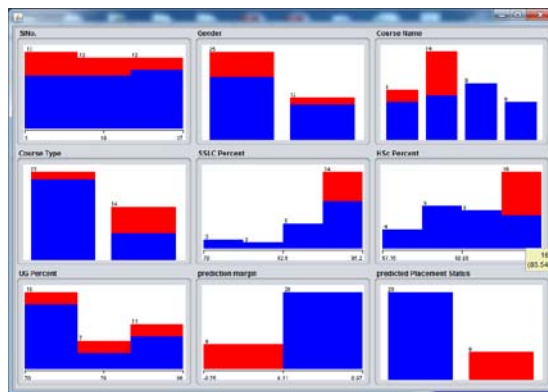


Fig.7. Visualized representation of predicted result data set

IV DISCUSSION

Out of 124 students data, the system predicted 108 instances correctly in the classification process carried out by j48 classifier based on placement status (placed, not placed). J48 classifier produced 87.09% accuracy with 0.5587 as Kappa statistic value, 0.1629 as Mean absolute error and 0.3436 as root mean square error. The j48 classifier builds the placement prediction model in 0.01 seconds only. It shows good accuracy with least running time.

After splitting the test data set from original placement data set, the test data set consists of 13 placed students and 24 non placed students. This model predicts 28 students are not placed and 9 students are placed. It reveals that some variations found in the placement prediction process, remaining nearly 13% of prediction accuracy should be removed from the prediction system and make it as 100% prediction accuracy.

CONCLUSION AND FUTURE SCOPE

This prediction model closely met the objective of this prediction model with 87% of placement prediction accuracy in the passed out student's placement training and test data set. This system yields good accuracy rate and it helps to the placement cell and also staffs to improve the students skill set to make them as placement offer received students. . To enhance the accuracy of j48 classifier, entropy value is modified using Rank correlation algorithm and attributes are selected using CFS Subset algorithm.

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