Detection of lead conversions using Predictive AI and Impact of digital marketing in conversions of leads in education sector with reference to Hyderabad, India.

Madduri Narsimlu[1], Dr.M. Senthil Kumaran[2]

[1]Research Scholar, Department of Computer Science and Engineering, Sri Chandrasekharendra Saraswathi Viswa Mahavidyalaya University, Enathur, Kancheepuram, Tamil Nadu, India (Association: KMIT, CSE, Hyderabad, T.S, India).

[2]Associate Professor and Head of CSE,SCSVMV.

Abstract- Digital marketing strategies are increasing every year especially in education sectors its play's major key role and have become an important part of any marketing and business strategy. Digital marketing is the key for the success of the organization to reach to the target audience. In the current era of digital world had a great transformation in the education field. The traditional marketing strategies are overtaken. Digital marketing is endorsing the good and services in the marketplace. As per the global statistical survey almost 4.66 billion people were active internet users as of October 2020, encompassing 69 percent of the global population. By 2023 there will be 820.99 million number of internets uses in India are forecasted. Mobile has now become so user-friendly for internet access worldwide as mobile internet users account for 90.8 percent of total internet users. Young students and working professionals are spending maximum time on internet in their learning process in all situation also the users are increasing day by day. Research paper aims to determine the role of digital marketing in lead conversions and detecting leads, it's influencing the among education industry as a target group in rural area. Education group has taken as a sample for the research work.

*Keywords: Digital marketing, customer, marketing strategies, management, education industry, lead conversions.*

I   INTRODUCTION

The volatile market, unexpected pandemic situation and changing day to day demand is having a great impact on buying and selling of goods and services. Traditional marketing is now replaced by digital marketing. In the globalized world to remain in the completions and to stand apart all the worldwide sectors are moving towards the digital world. So, its positive sign to move to digital world, everybody is now living into the digital world, where there are no geographical boundaries and limitations of reach too. Especially most of the people are using smartphones their life also got changed, earlier their family life

was different, these days everyone is choosing digital media is one of main stream medium for learning and selection of college/institute, suppose to detect leads in corporate institute/college are difficult task in that situation they can choose alternate channel which is digital channel. As per the statistical equations of 2024, 462.0 million social media users, equating to 32.2 percent of the total population. A total of 1.12 billion cellular mobile connections were active in India, its equivalent to 78.0 percent of the total population. Average time spent on smartphones in a day has been on the rise with average usage growing up 25 per cent to 6.9 hours in Jan 2022 (post-COVID) from about 6.9 hours on average in 2024. The people spending more time in digital platform learn various courses and technologies. In most of the schools, colleges and institutions are moving towards digital media platform. Every sector is taking efforts to engage the customer so the marketing teams are working and bringing innovative advertisements, optimized precise content, creative videos, voice commands for a search etc. most of customers are not ready to read the instructions instead they are focus on visual effects, pop up adds, sounds, videos and creative e materials. Organisations are giving their best to increase the customer attention span & coming up with many solutions for keeping a customer engaged and to stick on to the particular marketing activity. Day to day most of the customers upgrading to digital in the form of newspaper, magazines, advertisements etc. were published in digital form during the vacation and also in other times to get a consumer driven concept which has a direct impact on the targeted audience.

In a nutshell, digital marketing refers to marketing through an electronic device or the internet. It's another word for internet marketing. Today, hundreds of thousands of businesses engage in digital marketing, as they find it easier and more cost-effective to reach a large number of people this way.

There are many digital marketing as shown below:
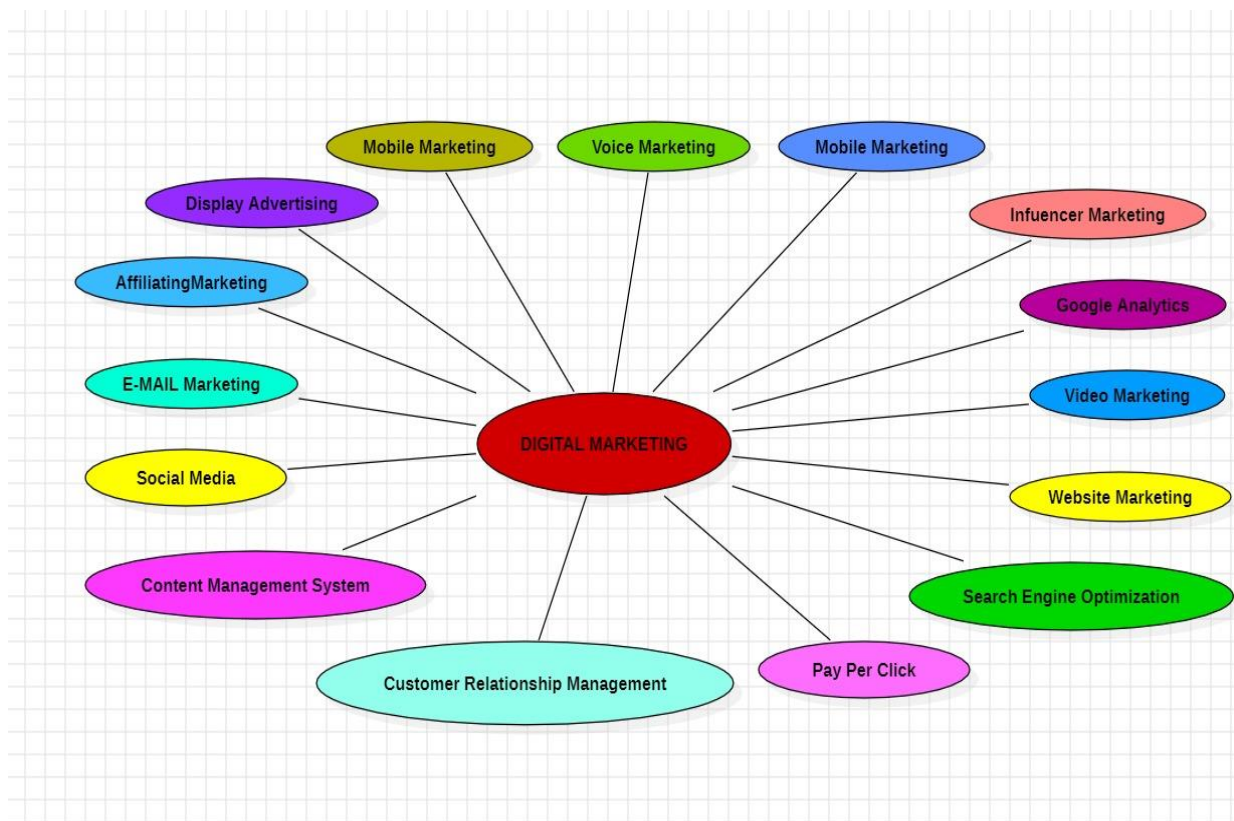
Nowedays, businesses reached their target audience using channels like television, radio, magazines, events, and direct mail. Now, as people spend more time online, businesses are trying to reach potential buyers through digital channels.

Digital Marketing provides following major benefits:

Increased Customer Loyalty with Frequent Communications - It cost more to attract and convert new customers than it does to retain existing customers. Customer loyalty can be difficult to establish. A customer retained can make another purchase or recommend your brand to others, which helps increase sales.

Cost effectiveness - One of the biggest benefits of online marketing is that it is cost-effective. Digital marketing helps business save money and obtain more leads. Big businesses have the money to allocate for TV ads, radio spots, and more. This makes it hard for small businesses to compete with these larger companies. Digital marketing, however, puts businesses on the same playing field.

Digital Marketing is measurable - When money is invested into a marketing campaign, tracking the results of the campaign is important. It is imperative to know whether a strategy is driving results that help business grow. With digital marketing methods, the results of campaign can be tracked with precision.

Digital marketing improves your conversion rate - one of the most notable benefits of digital marketing is the improvement of conversion rate. When money is invested in online marketing strategies, like conversion rate optimization (CRO), conversion rate can be increased.

Helps target ideal customers - To have an effective marketing campaign, you must reach the right people. Organisations need to reach people who are interested in doing business with them. Out of all the perks, the most significant advantage of online marketing is the ability to target people specifically.

Targeting people with traditional marketing methods is difficult. Generally,

Digital Marketing and Education Sector

Digital marketing has allowed direct interaction with higher level of engagement through the various social media platforms and channels target customers are quickly connected. Digital marketing is measureable, Target audience reach conversion is very fast the feedback is received on time and improvement is implemented immediately which less expensive and more effective on the other hand traditional marketing allows very slowly. Feedbacks cannot be received on time also it becomes more expensive & less effective. Digital media extends a successful future to the education institutes as long as the technology is improving, as per the customer needs digital marketing will be more innovative, creative to serve to the customers. Digital marketing empowers the educational sector/institutions to make the benefit of the power of social media. While sharing the information with the global target audience various social media platforms are being used. The shared content with great creativity of videos etc.

As digital marketing has become very important marketing tool to compete Digital marketing Importance & benefits in Education Sectors:

Brand awareness reach :

Instant Feedback System

It's measurable

Easy to Access

Impactful

Research Objectives

1. To detect conversions of leads and an impact of digital marketing on Education sector in Hyderabad City

2. To understand the strategies adopted by Training institutes, educational institutes and its impact on students

II LITERATURE REVIEW

A. Related Work

Lead Conversion of Digital Marketing Data Using Predictive Analytics ,May 2020

In view of the digital revolution and market dynamics, organizations started focusing more on developing strategies to find new customer segments through digital marketing mediums [1]. Acquiring new customers is difficult in any competitive industry. Also, the dynamic nature of growing digital marketing it even more challenging for organization to know right insights of data. In this context, it is essential for an organization to have knowledge about customers, attract more profitable customers and increase the bottom line. Information Technology (IT)-driven data analytics now has the capability to discover knowledge hidden inside very large amount of data to help in making business decisions which are customized to any organization needs. This paper is an attempt to create a machine learning model for customers training lead data which will help in identifying and predicting customer conversion and important attributes influencing lead conversion [2]. For the development analytical model CRISP methodology followed and explained each step in details. The Machine learning algorithm Logistic Regression technique applied to find to find the prospective leads. Used R for data Pre-processing, model development and prediction.

TriptiDhote*, Yatin Jog, NutanGavade and GesuShrivastava(Indian Journal of Science and Technology, Vol 8(S4), 200-205, February 201)advocated thatDigital marketing uses the internet and information technology to extend and improve traditional marketing functions". It has a wide spread application across sectors, however in the current context with proliferation digital and social media have gained enormous popularity and are integral parts of the decision making of young students seeking higher education.

P. Sathya(International Journal of Science and Research (IJSR) ISSN (Online): 2319-7064 argued that Digital Marketing has turn out to be crucial part of approach of many companies. At the present time, still for tiny business proprietor at hand have an extremely inexpensive and competent method by using digital marketing to market their products or services in the society. It has no restrictions. Company can utilize any devices such as tablets, smart phones, TV, laptops, media, social media, e-mail and lot other to support company and its products and services. Digital marketing may achieve something more if it considers consumer desires as a peak priority.

IJCSNS International Journal of Computer Science and Network Security, VOL22 No.4, April 2022,

Digitalization has a positive impact marketing on how business interact with customers. Examine the adoption of digital marketing, digital media channels and strategies in educational institutions particularly in the context of higher education. To achieve this purpose, previous studies conducted over a period of 6 years i.e., 2016 to 2021 have selected from the EBSCO, Web of Sciences, Wiley online and Google scholar databases. A total of 28 articles focusing only on digital marketing particularly in the context of higher education sector have selected for the review. This study is the first to explicitly consider digital marketing for enhancing digital customer particularly students with a comprehensive analysis of student's attributes in the context of education sector.

III METHODOLOGY

A. STATISTICS ON DATA

To detect lead conversions and the impact of Digital Marketing Strategies on Education Sector, a questionnaire was designed and the primary data was collected. The secondary data was collected through various sources like internet, Journals, Research Papers, books etc. The sampling method used was convenience sampling as there was a huge turnover of non-respondents and those were replaced by active respondents. The sample size was calculated using the Cochran's formula. The population was unknown hence the standard deviation was also unknown.

The sample size needed is calculated using formula as given under.

Sample Size = (Z-score * StdDev/ margin of error)2

$n = (Zs/e)2$

The confidence level is taken as 96% and z score corresponding to 96% confidence level is 1.96. Standard deviation was unknown and under such circumstances it is generally taken as 0.61. This is the most forgiving number and ensures that the sample will be large enough. Margin of Error is taken as 4%. Putting the values in the formula we get,

$n = (1.96 * 0.4/0.04)2$

$= 384.16$

≈ 384

The research conclusion to determine the impact of digital marketing and detections of leads conversions in education sector which becomes conclusive research design. The conclusive research encapsulates both analytical and recommended system. The impact determined based on leads which has been choosen by the audience. The target population was candidates who are looking job in IT Industry after their graduation. And the sample size was taken as 10011. The research is limited to Hyderabad City to detect leads and how digital marketing is influencing in education sector.

The research hypothesis was proposed as under.

The above research hypothesis was formulated as statistical hypothesis as under:

H0: There is no significant difference in the number of admissions before and after adopting the digital marketing strategies.

H1: There is a significant difference in the number of admissions before and after adopting the digital marketing strategies.

The above hypothesis was tested using paired t test at 5% significance level.

The another research hypothesis was proposed as Majority of the students have taken admission to college by referring to information available on the internet

which is digital marketing strategy adopted by the colleges.

The above hypothesis was formulated as statistical hypothesis as under:

Around 70% of the students are admitted to colleges using digital marketing strategies.

H0: p = 0.7

H1: p ≠0.7

$\alpha = 0.05$

The test of proportions was used to test the hypothesis. Both the hypothesis were tested using the software BlueSky Statistics.

Statistical Analysis

Hypothesis 1:

The below table describes about statistics of references and percentage of conversions vs Non conversion

Reference	Total Count	Not converted Count(%)	Converted Count(%)
Blogs	24	70.8	29.2
Board	39	35.9	64.1
Edu. guidance websites	2271	23.2	76.8
Email Marketing	82	12.2	87.8

| Face Book	5	0.0	100.0
Google	4024	28.0	72.0
Info@Tds	169	55.6	44.4
Inst.Website	139	18.0	82.0
Just Dail	1363	13.3	86.7
Online Review	18	83.3	16.7
Seo	45	0.0	100.0
Physical Counseling	21	85.7	14.3
Social Media	1473	22.7	77.3
Suleka	300	16.7	83.3
Telecalling	20	80.0	20.0
Videos	18	50.0	50.0

B. DATA DESCRIPTION

Dataset contains 10011 observations and 8 columns, target label is conversion

Column Name	Description
Place	Station or location of the leads from where they are contacting
Distance	It is distance from their place to the point of contact
Reference	Digital marketing e-channels through which the leads are coming with their reference
Branch	The Branches of the institutions to which the leads are contacting
Working status	Whether the leads are working, not working or student
Course	The type of course that the leads are opting
Qualification	The educational qualification of the leads
Conversion	Lead is going to be converted or not

Created different visualization charts for the variables to understand the data and we can draw some insights out of the data.

The below diagram describes that influence of each parameter on lead conversion.
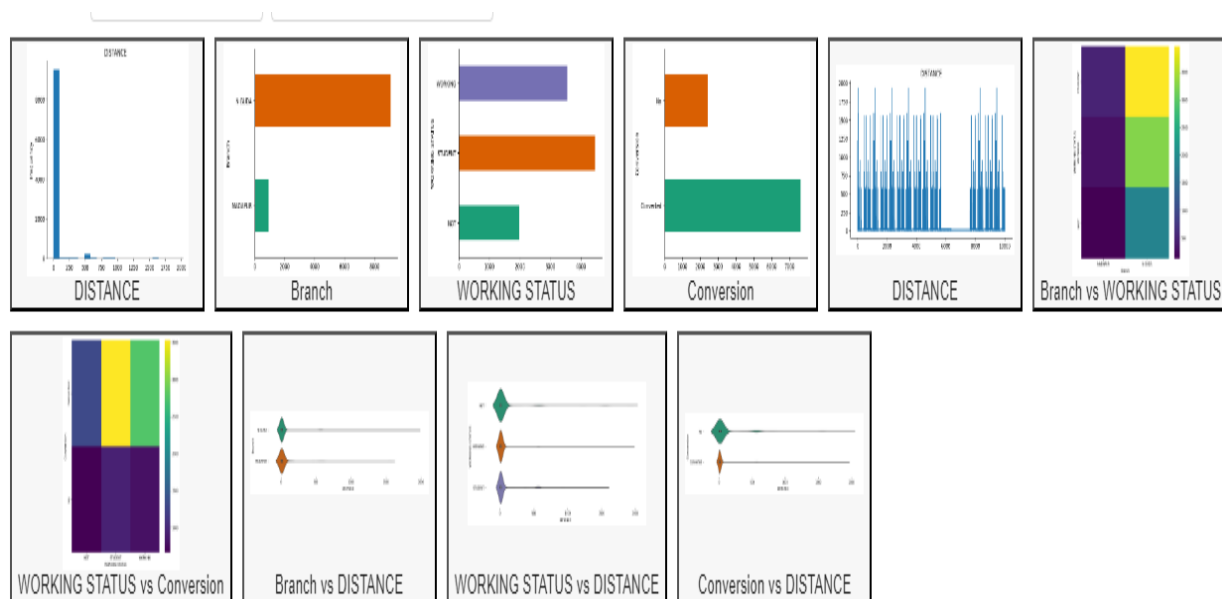
The Fig(1) shows that influence of each parameter category wise.

C. DATA TREATMENT AND TRANSFORMATION

The missing values in records are eliminated or replaced using data imputation. After data imputation, the variable count is 8 variables. For example,
In original variables, some of the variables are of static value and some other were having insignificant information which are dropped from the model. The variables which are not considered are (SNO, PLACE) Out of 8 variables, 2 have been dropped so after the analysis the variable count is 7. For the Final development of the model, 7 variables considered which are DISTANCE, REFERENCE, BRANCH, WORKING STATUS,
COURSE, QUALIFICATION and CONVERSION. The variable
CONVERSION is the target variable. The variables which are object type such as REFERENCE, BRANCH, WORKING STATUS, COURSE, QUALIFICATION and CONVERSION variables are object type which are converting into category type and then after converting into numeric by using one hot encoding technique of pandas tool.

D. MODEL SELECTION

Random Forests are an ensemble learning technique that combines multiple decision trees to improve prediction accuracy and optimizing overfitting in this recommendation systems. The model construction follows recommendation systems.
To build the model will do the following:
Feature attribute selection
The algorithm uses the training data to learn the relationship between the features and the target. The test data is used to evaluate the performance of the model. In

this DISTANCE, REFERENCE, BRANCH, WORKING STATUS, COURSE, QUALIFICATION are input features and Conversion is a target feature.

Model Construction:

From the given sample of different types of features have to select the conversion according to their features. Whether that lead has been converting or not the feature which selected, In the first decision tree set of input features such as Branch and Qualification based on this lead can be converted or not.

The model will create an instance of the Random Forest model, with the default parameters. We then fit this to our training data. We pass both the features and the target variable, so the model can learn. The classifier is RandomForestClassifier() with two parameters max_depth=2, random_state=0. Will train with tain_x and train_y data.

Model Evaluation:

A trained Random Forest model,will find out whether it is making accurate predictions or not. y_prediction=clf.predict(test_x).

The model generated 76% occuracy. This score is pretty good, we need to optimize the model to get more better results by optimizing hyperparameters.
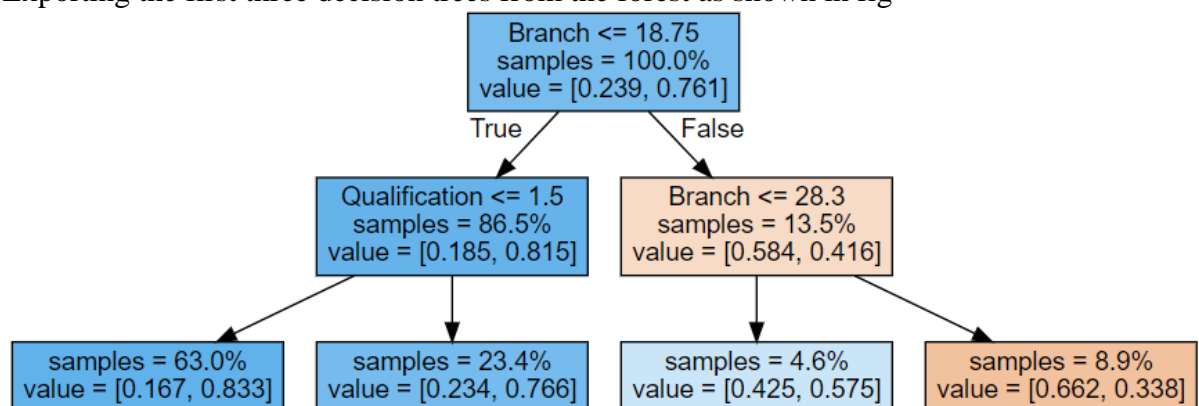
Performance and accuracy of the model:

The performance and accuracy which will generated by the constructed model. The results are shown in table

```
performance
[[  16  714]
 [   3 2271]]
accuracy score
0.761318242343542
```
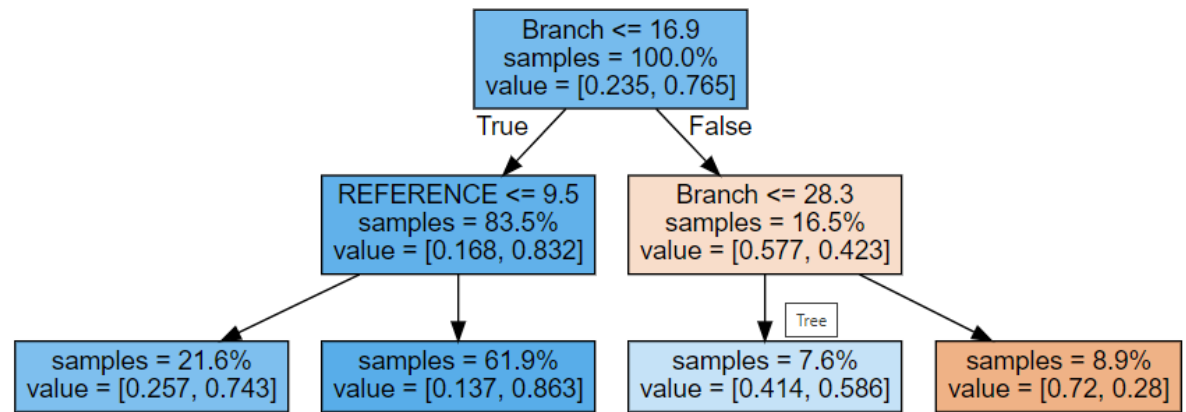
Fig1. Randomforest classifier model performance

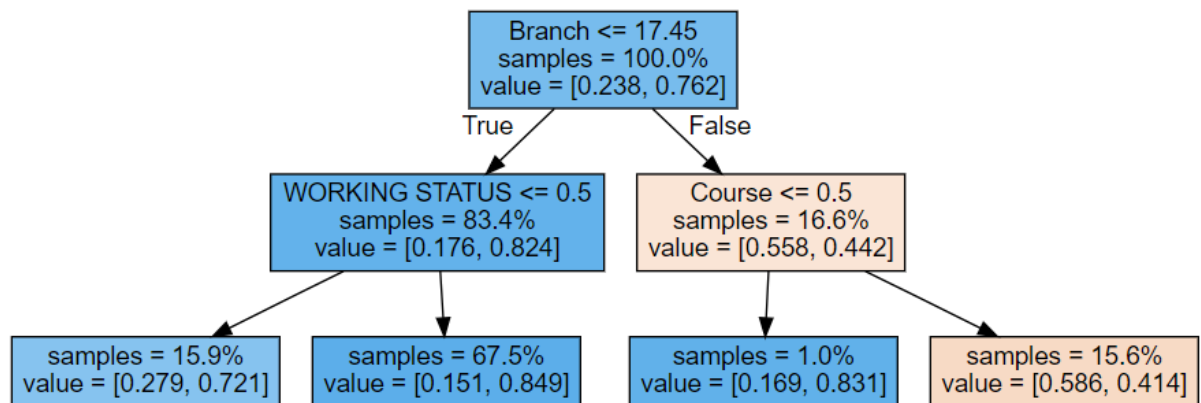**Exploration of results in Tree:**

Exporting the first three decision trees from the forest as shown in fig

Fig2. The Tree represents Branch and Qualification to classify target label

Fig3. The Tree represents Branch and Reference to classify target label

Fig4. The Tree represents Branch and Working status to classify target label

These trees can get very large and difficult to visualize. The colours represent the majority class of each node (box, with red indicating majority 0 (no subscription) and blue indicating majority 1 (subscription). The colours get darker the closer the node gets to being fully 0 or 1.

Each node also contains the following information:
The variable name and value used for splitting
The % of total samples in each split
The % split between classes in each split

Hyperparameter tuning

Randomly search parameters within a range per hyperparameter. Will define the hyperparameters to use and their ranges in the param_dist dictionary. In our case, we are using:

n_estimators: the number of decision trees in the forest. Increasing this hyperparameter generally improves the performance of the model but also increases the computational cost of training and predicting.

max_depth: the maximum depth of each decision tree in the forest. Setting a higher value for max_depth can lead to overfitting while setting it too low can lead to underfitting.

Assess model performance

After Hyperparameter tuning the model will be optimizing the model and increases its accuracy. Visualize the model predicted against what the correct prediction was. We can use this to understand the tradeoff between false positives (top right) and false negatives(bottom left).
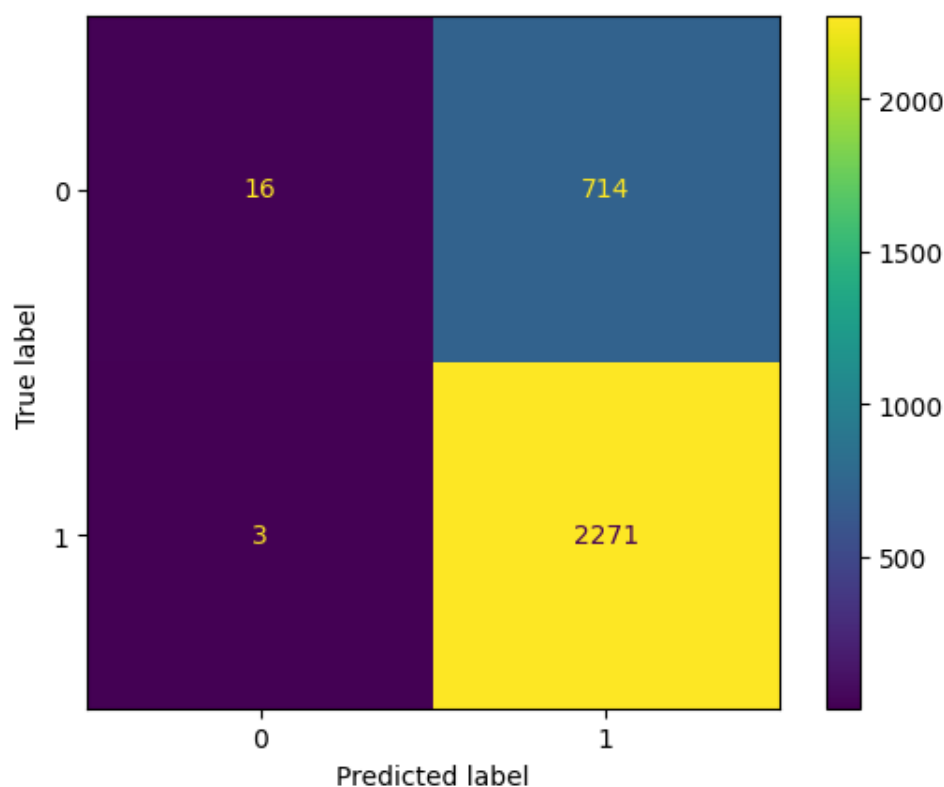
Fig5: Describes about Expected Vs predicted observations

IV . RESULTS

Data is collected from the various training institutes from Hyderabad city. Research is analyzed based on institutes and students feedback how the digital marketing strategies have impacted on their decision making, also are they effective enough for the educational training institutes. Also the research predicted has shown how digital marketing strategies are changing the views of learners prospects and their impact on admissions. Majority of the students were in the age group of 22-30 years. The sample comprised of more of students as compared to working candidates. It was found during the course of research that working candidates are more aware than the students regarding digital platform.

It was concluded that there is a significant difference in the number of conversions before and after adopting the digital marketing strategies. Following chart shows the admission scenario before and after adopting the Digital Marketing Strategies. The x axis shows the institutes. The names of institutes are hidden and allotted numbers for sake of anonymity. The data is collected from the institutes which runs the emerging courses. It was found that in case of graduation candidates are instrumental in deciding the institute to enhance their skills to acquire more knowledge to get good opportunity. And most of them looking for good placement in reputed organization.

As per the data most of the students are selecting digital media to learn the new technology and most of them are students preferring digital platform.
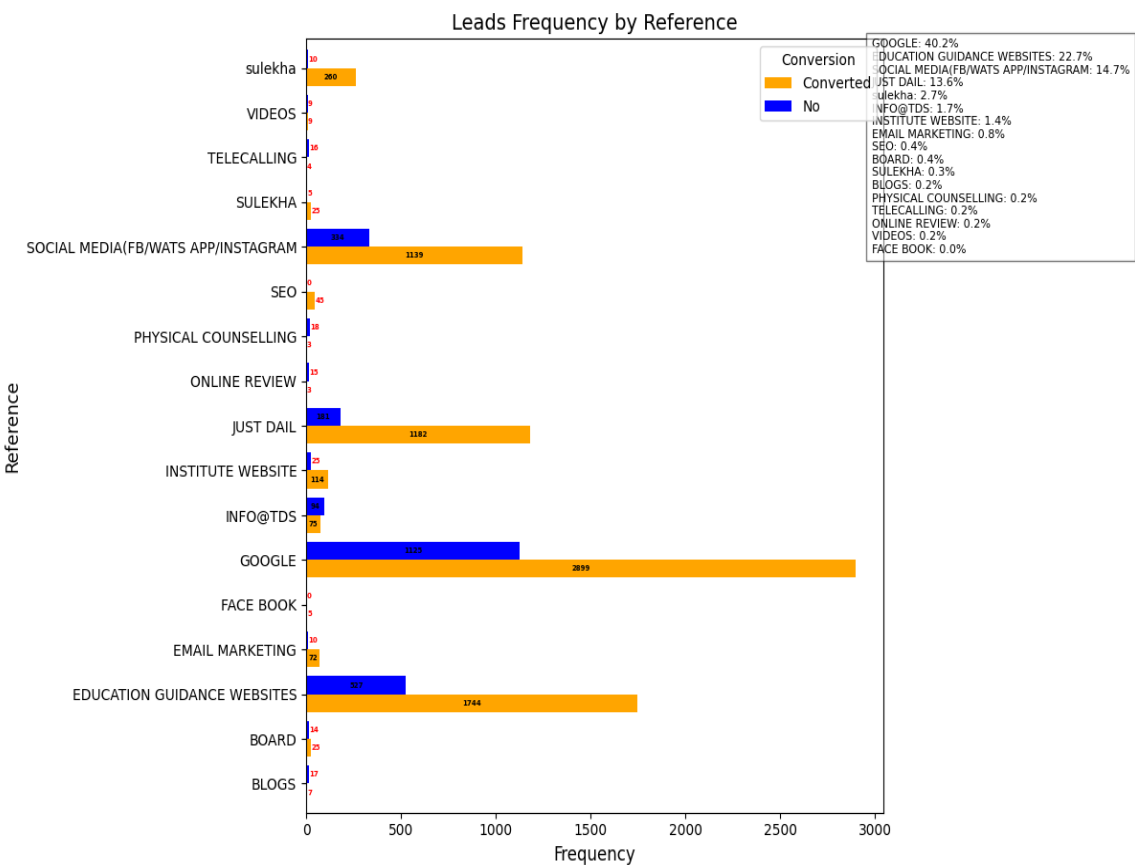
Total count: 10011
Total "No" count: 2400
Total "Converted" count: 7611
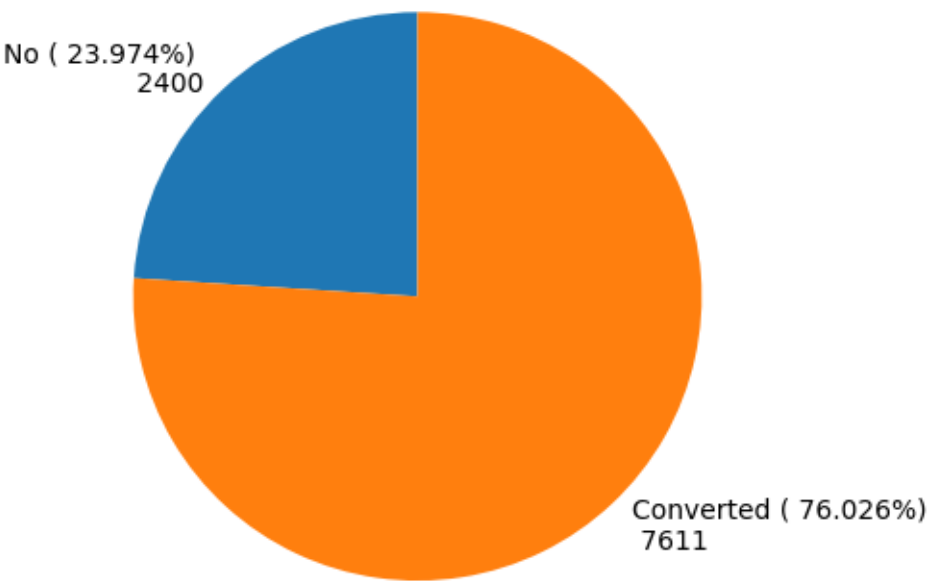
Fig6. Percentage of lead conversion based on digital marketing data.

Fig7 :shows that frequency of leads in each category of References

V DISCUSSION

The increased use of the internet and digital media has been a major influence in the field of education. The education sector is a revolutionized sector because the majority percentage of students is the users of the internet. This has a direct implication on the way that educational institutions and colleges need to utilize the web and cell phones to connect with more students. And digital marketing is the best strategy that can be embraced by the educational institutions to reach out to prospective students. Digital marketing is the best means to reach the majority of the student population today because of several reasons. Some of these reasons include:

☐ Prospective student's population is already searching online for educational and training courses.

☐ Students spend more of their time on the internet rather in front of other media such as television.

☐ Advertisements on the internet are highly effective compared to offline advertising

☐ Display advertisements outperform traditional advertising.

☐ Most parents and guardians today judge a school or college based on its website and its online presence, reviews and ratings.

☐ Most students have started judging a school or college through its online presence.

☐ The internet is the most favored and simple channel for applying and making leads queries.

☐ Expatriates and outstation students depend more on the web for college admissions.

☐ Parents and students consider the web as a convenient means for carrying out the admission

processes and other required processes.

The following are some reasons to consider the utilization of digital marketing for educational institutes:

Boost Brand Awareness: Social media platforms & online visibility is the best approach to generate brand awareness effectively and to reach the right target group as they consist of a large group of audience. They can help you enhance your followers followed by increased conversion rate. Numerous educational industries executed social media marketing techniques successfully to enhance leads, audience and brand awareness as well.

Virtuous Response: Online is the best medium to communicate and interact with your targeted audience in no or less time. Online Marketing channels provide the reply to audience feedback and individuals read queries instantly through social media channels.

Cost Effective: Digital Marketing channels are reasonable compared with traditional promoting

Strategies. Online marketing strategies such as email marketing, social media marketing require small execution cost or investment. Through Digital Marketing, educational industries can focus on a bigger audience at a low venture and achieve considerable benefits.

High Conversion Rates: E-mail and SMS are an important part of Digital Marketing that can help the educational institutions in getting high response rates because of the way that they are close to people. With Digital Marketing services for schools & colleges, educational industries can easily reach their targeted group in an effective way.

VI CONSLUSION

Digital Marketing tracking tools assist you to track and measure the adequacy of your online marketing campaign for institutes, schools and colleges. Get important information or insights for your Digital Marketing technique and improve your education industry marketing objectives. The education industry has been growing as a leader in today's developing digital marketing trends. Digital marketing for education sector assists institutes, universities, schools and college institutions in building their brand and also to simplify the student's recruitment process and it optimizing the time to select institute for learning any emerging technology.

VII SCOPE FOR FURTHER RESEARCH

The application of advanced analytics for customer behaviour proved essential in Digital Marketing. As discussed in the previous sections, Digital Marketing in the Education sector is relatively newer concept as compared to other sectors. Very few research analysis have been conducted to assess the pros and cons of Digital Marketing in the education sector. The researchers have taken one aspect for study which is 9998| Shankar M A study and detection of lead conversion on Impact of Digital Marketing Strategies on Education Sector with reference to Hyderabad, India limited to Hyderabad city. There are other aspects open for research to assess the impact of digital marketing on the educational sector. The education sector has many paradigms. Institutes to higher higher to universities education to conventional teaching to modern digital based education and what not. These paradigms need to be assessed on the parameter of digital marketing. Hence the further scope of research into this area is wide and calls for in-depth understanding of each and every nuance.

REFERENCES

[1] A study on Impact of Digital Marketing Strategies on Education Sector with reference to Nagpur, India,Dr. Vijaya Gondane, ManpreetKaur Pawar, year 2021,Vol 20(issue 1),pp.2503-2511.

[2] Lead Conversion of Digital Marketing Data Using Predictive Analytics, Conference paper First Online: 19 May 2020, pp 510–519,Pedda Vukkalam Vedanth Karthik, Pejawara Guru Prasad Rao & Madduri Narsimlu

[3] J. Yeo, S. Hwang, s. kim, E. Koh and N. Lipka, "Conversion Prediction from Clickstream: Modeling Market Prediction and Customer Predictability," IEEE Transactions on Knowledge and Data Engineering, vol. 32, no. 2, pp. 246-259, 1 Feb. 2020.

[4] M. Papoutsoglou, A. Ampatzoglou, N. Mittas and L. Angelis, "Extracting Knowledge From On-Line Sources for Software Engineering Labor Market: A Mapping Study," IEEE Access, vol. 7, pp. 157595-157613, 2019.

[4] L. Zhang, R. Cushing, L. Gommans, C. De Laat and P. Grosso, "Modeling of Collaboration Archetypes in Digital Market Places," IEEE Access, vol. 7, pp. 102689-102700, 2019.

[5]. F. Fernández-Navarro, M. Carbonero-Ruz, D. Becerra Alonso and M. Torres-Jiménez, "Global Sensitivity Estimates for Neural Network Classifiers," IEEE Transactions on Neural Networks and Learning Systems, vol. 28, no. 11, pp. 2592-2604, Nov. 2017.

[6]. M.E.H.Pedersen, and A.J.Chipperfield, "Simplifying Particle Swarm Optimization", Applied Soft Computing, vol.10, no.2, pp.618-628, March 2010.