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Review of imbalanced data classification and approaches relating to real-time applications

Authors: Anjali S. More, Dip Rane

Published in: 2021

Book: Data Processing, Data Learning and Core Process Knowledge for Resolving Data Imbalance

Pages: 1-10

Language: English

Description: In today's world, numerous real-time applications deal with handling of imbalances of handling imbalanced data classification and its impact on performance metrics. There is the need of robust and effective solution in a real-time data of imbalanced data classification, which is proposed by attention of researchers. This detection in finance, disease diagnosis in medical applications, of fault detection, of the big data mining, security detection and intrusion detection in security and other real-time applications are imbalanced data classification. Detection of effective detection of imbalanced data and capture the imbalanced. This is an open challenge, proposed researchers to making its in real-time applications and related machine learning approaches. The focus of this research work is to review a new study of imbalanced data applications of imbalanced data classification in real-time applications.

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Review of Imbalanced Data Classification and Approaches Relating to Real-Time Applications

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Abstract

In today's era, real-time data mining applications deal with leading challenges of handling imbalanced data distribution and its impact on performance metrics. This is the presence of some's data distribution in an entire range of real-time applications which engender the detection of malicious fraud, detection in finance, disease diagnosis in medical diagnosis, oil spill detection, phishing detection, anomaly detection and intrusion detection in security, and other real-time applications, contribute uneven data distribution. Data imbalance's effects classification performance reduction, system's failure rate. These leading challenges prompt researchers to investigate imbalanced data applications and real-time's learning approaches. The present effort's research work is to review a wide variety of real-time data applications of skewed data distribution as binary class data unbalanced and imbalanced data distribution; the problem encounters; the variety of approaches to resolve the data imbalance; and provide open research areas.

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Review of Imbalanced Data Classification and Approaches Relating to Real-Time Applications

Authors Anjali S More, Dipti P Rana

Publication date 2021

Book Data Preprocessing, Active Learning, and Cost Perceptive Approaches for Resolving Data Imbalance

Pages 1-22

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Description In today's era, multifarious data mining applications deal with leading challenges of handling imbalanced data classification and its impact on performance metrics. There is the presence of skewed data distribution in an ample range of existent time applications which engrossed the attention of researchers. Fraud detection in finance, disease diagnosis in medical applications, oil spill detection, pilfering in electricity, anomaly detection and intrusion detection in security, and other real-time applications constitute uneven data distribution. Data imbalance affects classification performance metrics and upturns the error rate. These leading challenges prompted researchers to investigate imbalanced data applications and related machine learning approaches. The intent of this research work is to review a wide variety of imbalanced data applications of skewed data distribution as binary class data unevenness and ...

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Chapter 1

Review of Imbalanced Data Classification and Approaches Relating to Real-Time Applications

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ABSTRACT

In today's era, multifarious data mining applications deal with leading challenges of handling imbalanced data classification and its impact on performance metrics. There is the presence of skewed data distribution in an ample range of existent time applications which engrossed the attention of researchers. Fraud detection in finance, disease diagnosis in medical applications, oil spill detection, pilfering in electricity, anomaly detection and intrusion detection in security, and other real-time applications constitute uneven data distribution. Data imbalance affects classification performance metrics and upturns the error rate. These leading challenges prompted researchers to investigate imbalanced data applications and related machine learning approaches. The intent of this research work is to review a wide variety of imbalanced data applications of skewed data distribution as binary class data unevenness and multiclass data disproportion, the problem encounters, the variety of approaches to resolve the data imbalance, and possible open research areas.

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INTRODUCTION

Data cataloging into specific classes is one of the foremost techniques in the domain of machine learning and mining with the heuristics of balanced dataset i.e. the data is equally distributed among the classes. This heuristic is not true in the existent world applications and the majority of the related applications are having imbalanced dataset where data is skewed towards one class or more than one classes. The imbalanced nature of data is having their own importance, one cannot neglect them. Thus, many researchers are motivated to deal with imbalanced classification for real-life applications. There is an incessant growth of instances of data availability in many application eras such as finance, health care, computer network system, security, internet of things, etc. where it is very much essential to advance the primary perceptives of knowledge discovery and data analysis to take the critical decision.

Nowadays, though there is existence of data discovery techniques, imbalanced data applications relating to real-life scenarios have shown the great attraction to the researchers to focus on imbalanced applications and review the problems occurred due to data unevenness. The individuals working in industry as well as academia gets attracted towards diverted data applications as review in the survey section by Alberto Fernández et al. (2009).

Several realistic application areas deal with the handling of uneven data representation, the minority instance class gets ignored due to the majority instance class. Unequal data distribution leans performance metrics towards the majority class. The review study in this research focuses on the most important application categories of imbalanced data distribution as binary class imbalance and multiclass data imbalance. To deal with the promising issues arising from class imbalance this study presents a review of imbalanced data applications, imbalanced data categories, problems encountered due to this characteristic, and the methodologies to deal with distorted data relating to real-life applications.

BACKGROUND

Classification is the most popular technique to correctly classify an instance with unknown class. Many real-world data sets show evidence of unequal class distributions in which maximum data samples are belonging to one of the larger class and far fewer data instances are falling into minority class. In case of medical diagnosis example, which consist of the cases that relates to diagnosis for a rare disease. For the referred example, only 2% of the patients are positive diagnosis and 98% diagnosis as negative. Dealing with such imbalanced datasets and related classification generates the need of machine learning algorithms. In current time the data diverted applications are relating to binary as well as multiclass data imbalance. In both category of imbalanced class either of one class having maximum instance and which diverts the performance towards majority class, i.e. performance is leaned towards majority class. The traditional classifiers reveal accurate forecast for the majority instance class and diversify the performance in case of minority data sample class. The cost of misclassification an imbalanced class can be harmful for the real world application like disease diagnostics. Thus, in today's era, Stefan Lessmann (2014) and Rebeen A. H., Masashi K. & Jens L (2020) show imbalanced data applications have received considerable attention from the research community to further boost their performance by numerous machine learning algorithms. Lars W. Jochumsen et al. (2016), Nahit Emanet et al. (2014), explained in the study that there are diverse approaches to tackle the trouble of extremely imbalanced data applications. In particular, the study deals with the description of preprocessing, cost-sensitive learning, Support Vector

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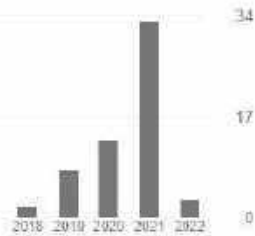


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Note: Paper Absentia is also accepted.

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Thanks & Regards..

Organizing Team

Dr. S. S. Agrawal

ICRSCT 2021

9421837340



Madhyanchal Professional University Bhopal, Madhyapradesh (India)



Virtual International Conference on
Emerging Trends in Engineering, Science, Management & Commerce (21-22 May, 2021)

Organized by
Madhyanchal Professional University, Bhopal
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Certificate

This is to certify that Prof./Dr./Mr./Ms. **BHAVESH SHAH** of **MADHYANCHAL PROFESSIONAL UNIVERSITY, BHOPAL** has attended the Two day Virtual International Conference on Emerging Trends in Engineering, Science, Management & Commerce held on 21/05/2021 to 22/05/2021 at Department of Electronics & Communication Engineering, Madhyanchal Professional University Bhopal, Madhyapradesh (India). He/She has presented the paper titled **Review of Classification Techniques to Resolve Big data Imbalance**.

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Dr. Sandeep Gangrade
Pro-Vice Chancellor

in association with **Advance Research Educational Society**

Guidelines for creation of Question Bank SPPU

While designing questions for Online assessments or Evaluation various attributes of a question are to be associated in the question repository or Bank for each and every question. Based on these attributes, one may be able to generate specific learning objective for every student appearing for the exam.

Attributes of a question:

1. Subject
2. Unit - Chapter
3. Difficulty level
4. Type of a question (In this Case Multi choice question only)
5. Teacher ID (Author)

Following are the basic guidelines to create a question bank for Online examination.

Qualitative Guidelines:

1. Create Multiple Choice Single Correct questions having 4 options

Input Language Marathi		Item Bank IT for Teacher					
Difficulty Level (Low-1,Medium-2,High-3)	No. of Options(2-6)	Question Text	Option Text 1	Option Text 2	Option Text 3	Option Text 4	Correct Option
2	4	गूगल कॅलेंडरचा उपयोग कशासाठी केला जातो ?	फॉर्ममधून डेटा गोळा करणे	इतरांना संदेश पाठवणे	इतरांबरोबर वेळापत्रक शेअर करणे	इतरांबरोबर डॉक्युमेंट शेअर करणे	3
2	4	कोणत्या डिव्हाइसवर तुमचे Google कॅलेंडर पाहता येते?	स्मार्टफोन	लॅपटॉप	टॅबलेट	दिलेल्या सर्व	4
2	4	तुम्ही 10 स्लाइडचे एक प्रेझेंटेशन तयार केले आहे. तुम्हाला सर्व स्लाइड्सवर ऑडिओ प्ले करायचा असल्यास कोणत्या ऑडिओ पर्यायावर तुम्ही क्लिक करावे?	Hide During Show	Loop Until Stopped	Rewind After Playing	None of the Above	4

Figure 1. Question with 4 Options

2. Avoid options stating “None of the Above” and “All of the Above”

Input Language Marathi		Item Bank IT for Teacher					
Difficulty Level (Low-1,Medium-2,High-3)	No. of Options(2-6)	Question Text	Option Text 1	Option Text 2	Option Text 3	Option Text 4	Correct Option
2	4	गूगल कॅलेंडरचा उपयोग कशासाठी केला जातो ?	फॉर्ममधून डेटा गोळा करणे	इतरांना संदेश पाठवणे	इतरांबरोबर वेळापत्रक शेअर करणे	इतरांबरोबर डॉक्युमेंट शेअर करणे	3
2	4	कोणत्या डिव्हाइसवर तुमचे Google कॅलेंडर पाहता येते?	स्मार्टफोन	लॅपटॉप	टॅबलेट	दिलेल्या सर्व	4
2	4	तुम्ही 10 स्लाइडचे एक प्रेझेंटेशन तयार केले आहे. तुम्हाला सर्व स्लाइड्सवर ऑडिओ प्ले करायचा असल्यास कोणत्या ऑडिओ पर्यायावर तुम्ही क्लिक करावे?	Hide During Show	Loop Until Stopped	Rewind After Playing	None of the Above	4

Figure 2. Avoid these Option

Guidelines for creation of Question Bank SPPU

- The questions should follow principle of "Conceptual Distraction". It means all four options must look correct unless the concept is absolutely clear.

Consider the following equation

$$\square \times 4 = \square \times 8 \div 2$$

Which value of \square makes the equation true?

- Only 1
- Only 10
- Either 1 or 10
- Any number

Figure 3. Example for Conceptual Distractor Options in Question

- A proper weightage to the topics and content of the syllabus on whom questions are to be made is to be created first. This will be reference for generation of question bank for the said subject or course generally it goes like, Subject-Unit-Chapter-Topic.

Following are the details present in the import template.

- Difficulty Level
- Author – Teachers are requested to put BCUD Id here
- No. of Options in the Questions – we will have only 4 options (A B C D)
- Question text (without any special character, image, formula, subscript or superscript as they are to be created in image form as per guidelines given below)
- Option wise Text
- Correct Option No.

Difficulty Level (Low-1,Medium-2,High-3)	No. of Options(2-6)	Question Text	Option Text 1	Option Text 2	Option Text 3	Option Text 4	Correct Option
2	4	गूगल कॅलेंडरचा उपयोग कशासाठी केला जातो ?	फॉर्ममधून डेटा गोळा करणे	इतरांना संदेश पाठवणे	इतरांबरोबर वेळापत्रक शेअर करणे	इतरांबरोबर डॉक्युमेंट शेअर करणे	3
2	4	कोणत्या डिव्हाइसवर तुमचे Google कॅलेंडर पाहता येते?	स्मार्टफोन	लॅपटॉप	टॅबलेट	दिलेल्या सर्व	4
2	4	तुम्ही 10 स्लाइडचे एक प्रेझेंटेशन तयार केले आहे. तुम्हाला सर्व स्लाइड्सवर ऑडिओ प्ले करायचा असल्यास कोणत्या ऑडिओ पर्यायावर तुम्ही क्लिक करावा?	Hide During Show	Loop Until Stopped	Rewind After Playing	None of the Above	4

Figure 5. Bulk Question Import Template

Guidelines for creation of Question Bank SPPU

Technical Guidelines:

The question sample attached is of the question type Multiple Choice (4 options) Single Correct answer, wherein the questions can be in the form of Images or text. The samples as well as the templates provided will guide you in creating the question bank. Also some of the basic instructions are given below; please follow them while creating the question bank.

Some basic

Instructions- For

textual type questions:

1. Type the questions in the excel file directly. Copy paste from other file is also possible, but utmost care should be taken to ensure the format of the text as numbers and date formatting does not change after copy paste.
2. Use separate excel (.xlsx) files for different topics.

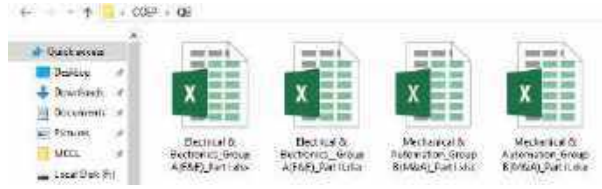


Figure 6. Topic wise Question Bank excels files (.xlsx)

3. Do not create multiple sheets in a single Excel file.

Item Bank ID	Item Bank	IT for Teacher	Difficulty Level (Low-1, Medium-2, High-3)	No. of Options (2-6)	Question Text	Option Text 1	Option Text 2	Option Text 3	Option Text 4	Correct Option
2	4				गूगल कॅलेंडरचा उपयोग कशासाठी केला जातो ?	फॉर्मिभूषण डेटा गोळा करणे	इतरांना संदेश पाठवणे	इतरांबरोबर वेळापत्रक शेअर करणे	इतरांबरोबर डॉक्युमेंट शेअर करणे	3
2	4				कोणत्या डिव्हाइसवर तुमचे Google कॅलेंडर पाहता येते?	स्मार्टफोन	लॅपटॉप	टॅबलेट	दिलेल्या सर्व	4
2	4				तुम्ही 10 स्लाइडचे एक प्रेझेंटेशन तयार केले आहे. तुम्हाला सर्व स्लाइड्सवर ऑडिओ प्ले करायचा असल्यास कोणत्या ऑडिओ पर्यायावर तुम्ही क्लिक करावा?	Hide During Show	Loop Until Stopped	Rewind After Playing	None of the Above	4
2	3				जेव्हा तुम्ही Camtasia मध्ये ऑडिओ रेकॉर्ड करता तेव्हा तो तुम्हाला कुठे पाहता येतो?	Clip Bin	Library	Clip Bin and on track		3
2	3				तुम्हाला YouTube वर कॉपीराइट नसलेला व्हिडिओ शोधायचा आहे. त्यासाठी तुम्ही कोणता पर्याय 'फिल्टर' मध्ये निवडावा?	Live	Purchased	Creative Commons		3
2	3				तुम्ही ऑनलाइन चाचणी तयार केल्यावर तुमच्या विद्यार्थ्यांना काय पाठवावा?	विद्यार्थ्यां	टेस्टची लिंक	टेस्टचे डॉक्युमेंट		2
2	3				शिक्षक शिकवताना प्रश्न विचारतात. हा कोणाच्या दृष्ट्याचा सामान्य संवाद?	शिक्षक व विद्यार्थ्यां	पालक व शिक्षक	शिक्षक व पालक		1

Figure 7. Avoid Multiple Sheets in 1 Excel

Guidelines for creation of Question Bank SPPU

- Do not add special characters, images, symbols, formula, subscript or superscript in the Question text or Option text.

Avoid

Superscript: $x^2 + y^2 = z^2$	Subscript: $C_6H_{12}O_6$	Formula: $x^3 - 5$ $(7x - 4)^3 - 5$
-----------------------------------	------------------------------	---

Figure 8. Avoid in Question/Option Text

- If you come across such type of questions / options then, please add those in Picture Type questions text or option text header.
- Questions where underlined or **bold** or *italics* text is present should be included in Picture Type questions only.

Avoid

Find the meaning of the underlined word(s).

When he was challenged, the salesman stood up for his product.

Find the meaning of the Highlighted word(s).

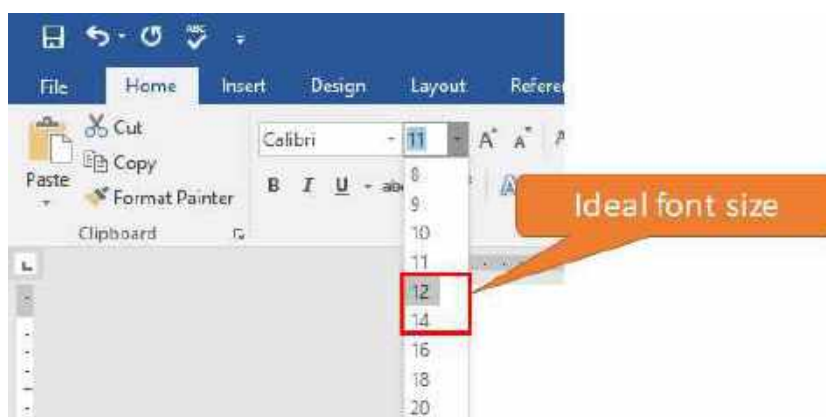
This book is about a man who **deserted** his family and went to live in the Himalayas.

Figure 9. Avoid Bold/Underline words in Question Text

- As we provide multilingual support for following languages: English, Hindi, Marathi the questions should be provided only in **Unicode** font only. (If bilingual questions bank is to be created, please contact SPPU for further assistance)

For Image type questions:

- Create the complete question bank in MS-Word only for the questions which have figures, diagrams, chemical equations, special symbols or characters, subscript or superscript as a part of the question or Option. Font size should be minimum 12 and



maximum 14.

Figure 10. Font Size for Question & Option Text

- Create images of the word file by Print Screen option, crop them with the help

Guidelines for creation of Question Bank SPPU

of any image editor utility and save the files in .jpg format as per the samples attached. E.g. **q1.jpg**, **q1o1.jpg**, **q1o2.jpg**, **q1o3.jpg**, **q1o4.jpg**.

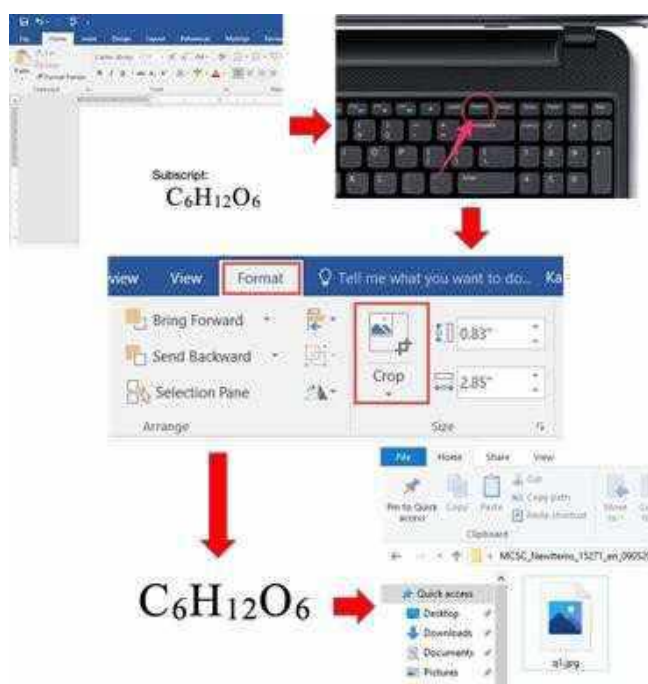


Figure 11. Use Print Screen to create Image based question

Guidelines for creation of Question Bank SPPU

- Please ensure the image resolutions should be not more than:
horizontal – 700 pixels: vertical – 300 pixels

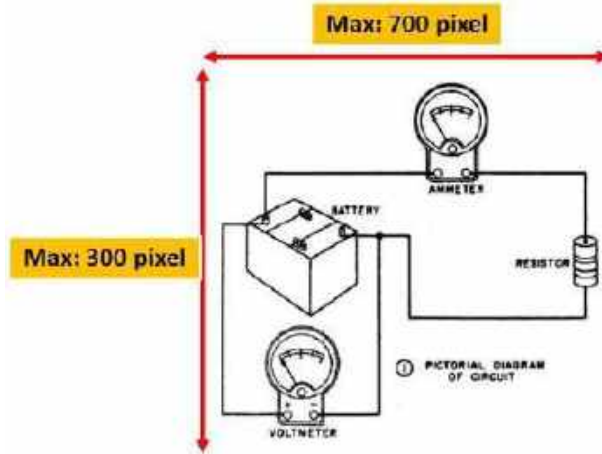


Figure 12. Image Dimensions for Question/Option

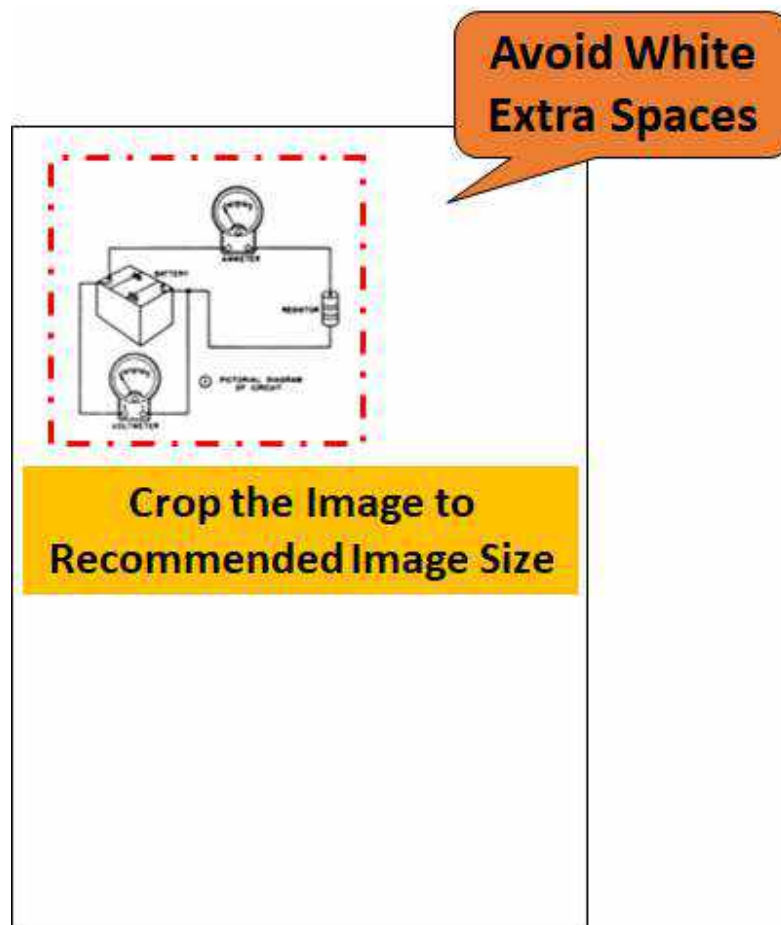


Figure 13. Tips for Cropping Image

Guidelines for creation of Question Bank SPPU

4. You can then write the name of the image in excel in the image column (the image names should be in small case and avoid any kind of special characters and spaces in the image names)

Item Bank ID	Item Bank	Item Bank ID for Teacher	Question Text	Item Image	Option Text 1	Option Text 2	Option Text 3	Option Text 4	Correct Option
0	4		मुद्राण के लेखक उपरोक्त कक्षाकारी केस जारी ?	01.jpg	सर्वप्रथम मुद्रा लेखक कर्ण	इसका नाम बर्दाद मसूदागी	प्रसंगिक लेखक का नाम शीर कर्ण	इसका लेखक का नाम शीर कर्ण	3
1	3		अंगणवाड़ी शिक्षक द्वारा तुलसी का गूदा का उपयोग करना सही है।		सही है	सही है	सही है	सही है	4
2	3		बनने से पहले ही इस कैंडल को खोल कर ले लें। तुरन्त ही इसे खोलें।		मिडल कैंडल शेड	लूप अंडर शेड	नॉट अंडर शेड	नोथिंग अंडर शेड	3

Figure 14. Image name in Item Image Column

5. Create separate folders for each topic or subject.
6. To reduce the size of the images you can use any of the freely available image compression software. E.g. IrfanView

OES Template Validator:

Once the excel file is ready in the prescribed OES format. The file can be validated using OES

- MCSC Checker -v 1.2. Following is the step to

follow: Step 1: Open the file **“OES - MCSC Checker**

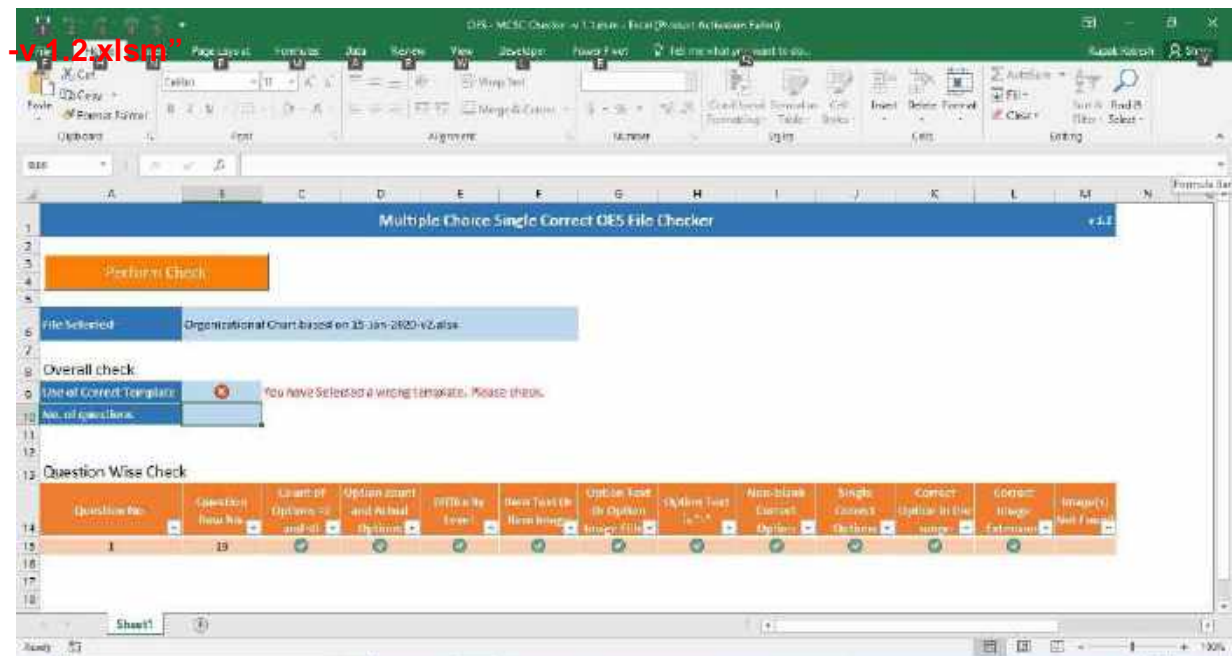


Figure 15. OES Excel File Validator

Guidelines for creation of Question Bank SPPU

Step 2: Click on **“Perform Check”** button.

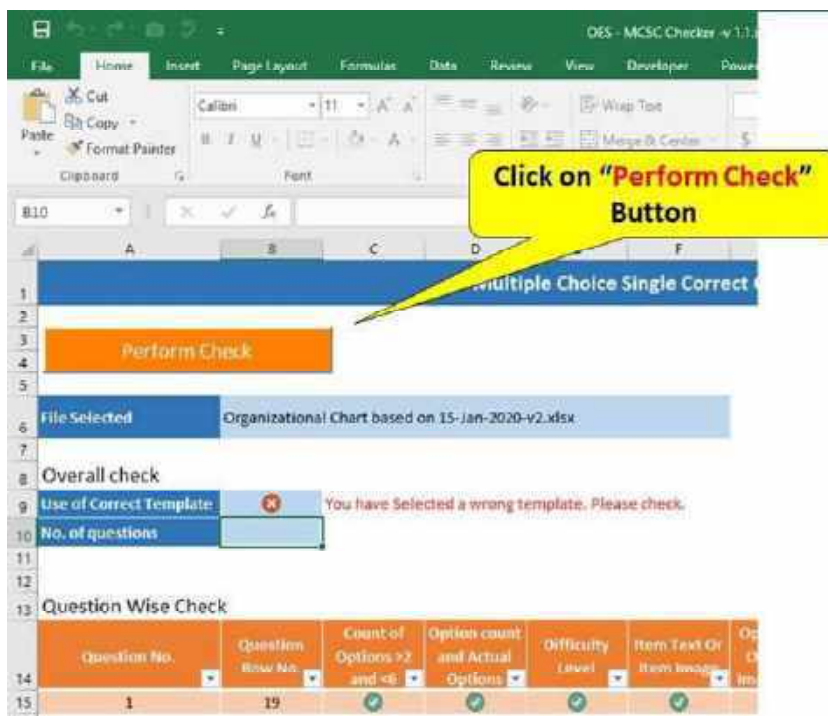


Figure 16. Step 2 - Template Validator

Step 3: Browse & Select the Question excel file prepared by you.

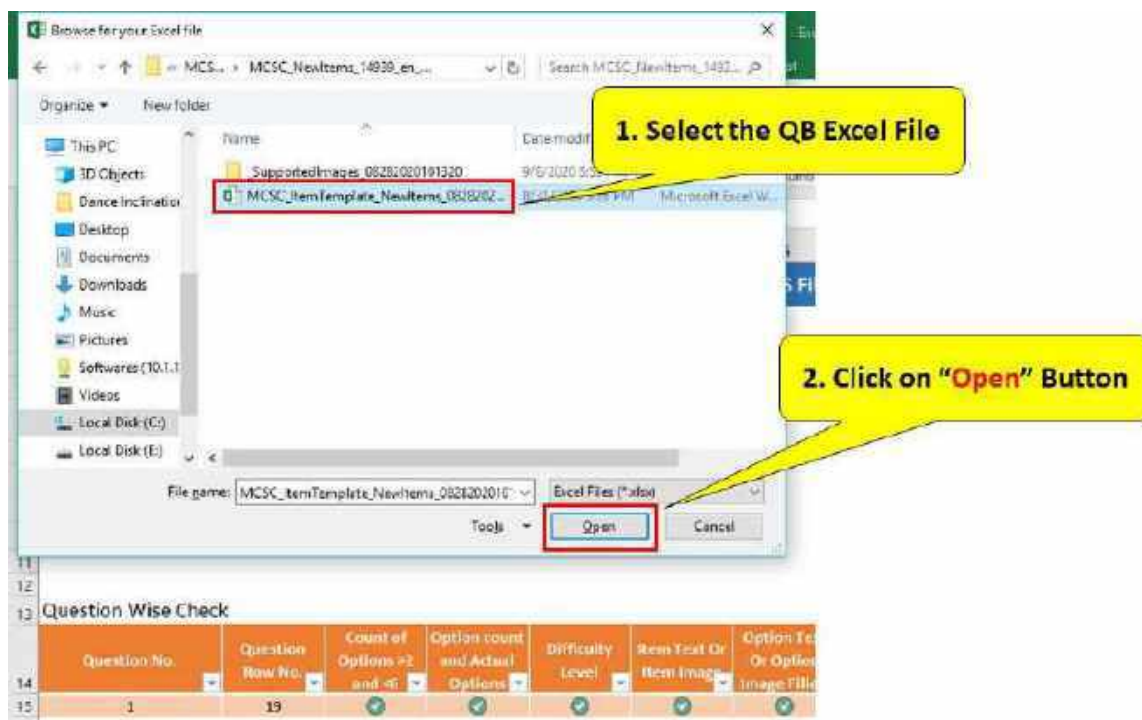


Figure 17. Step 3 - Browse & Select the QB Excel

Guidelines for creation of Question Bank SPPU

Step 4: Read the Feedback. "x" indicates, the issue in the question number.

Figure 18. Step 4 - Check the Issues

Question No.	Question Row No.	Count of Options >2 and <6	Option count and Actual Options	Difficulty Level	Item Text Or Item Image	Option Text Or Option Image File	Option Text Length	Non-Blank Correct Option	Single Correct Option	Correct Option in the range	Correct Image Extension	Image(s) Not Found
1	19	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2	20	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Item Option2
3	21	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

This indicates that the question is not having correct extension or the image file name is missing in the image column in question or option

Figure 19. Step 4 - Feedback 1

Question No.	Question Row No.	Count of Options >2 and <6	Option count and Actual Options	Difficulty Level	Item Text Or Item Image	Option Text Or Option Image File	Option Text Length	Non-Blank Correct Option	Single Correct Option	Correct Option in the range	Correct Image Extension	Image(s) Not Found
1	19	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2	20	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Item Option2
3	21	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
4	22	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
5	23	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	
6	24	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

This indicates:
 1. "No. of Option" cell is blank or
 2. "No. of Option" cell is having value <2 or >6

Figure 20. Step 4 - Feedback 2

So make the necessary changes in Original excel file as per the feedback provided by the OES Template Validator. Once all the questions are validated the excel file is ready to be uploaded in OES.

Guidelines for creation of Question Bank SPPU

Question type wise Sample question screens.

Multiple Choice Single Correct

The screenshot shows a question bank interface with the following details:

- Header:** MKCL OES, AllMixPaper2
- User:** devedrach
- Time Remaining:** 09:25
- Question No. 1:** which of the following is the last step in aerobic respiration in which water is formed and energy is released?
- Options:**
 - Glycolysis
 - Annylation
 - Krebs cycle
 - Electron transfer
- Navigation:** Save & Next, Mark for Review, Skip, Reset
- Right Panel:** Number of questions: 1, buttons for Answered, Not Answered, Not Visited, View QP, Profile, Marked Items, End Test

Multiple Choice Single Correct with image in question

The screenshot shows a question bank interface with the following details:

- Header:** MKCL OES, General Science Practice Test
- Total questions in exam:** 25 | Answered: 0
- User:** msubdev16
- Time Remaining:** 58:24
- Question No. 11:** What does the given images show?
- Diagram:** A detailed diagram of a DC generator. It shows a rectangular armature coil (ABCD) between the North (N) and South (S) poles of a field magnet. The coil is on a shaft that rotates clockwise. A commutator is mounted on the shaft, with carbon brushes (B1, B2) in contact with it. The brushes are connected to a load. Labels include: Field magnet, Armature coil, Motion (up and down), Rotation of coil clockwise, Field, Commuter, Carbon brush, Shaft, and Load.
- Options:**
 - DC Generator
 - AC Generator
 - Alternator
 - None of the option
- Navigation:** Save & Next
- Right Panel:** Number of main questions: 21, Number of questions: 25, buttons for Answered, Not Answered, Not Visited, Profile, Instructions, End Test

PEL_SRT_AI_02 oct, 2020_25



CERTIFICATE OF PARTICIPATION

THIS IS TO CERTIFY THAT

Prof.ANJALI S MORE
9921897835

HAS ACTIVELY PARTICIPATED IN THE WEBINAR ON "**ARTIFICIAL INTELLIGENCE WITH DEEP LEARNING**" ORGANIZED BY DEPARTMENT OF **COMPUTER ENGINEERING, SUMAN RAMESH TULSIANI TECHNICAL CAMPUS, FACULTY OF ENGINEERING, KHAMSHET, PUNE** IN ASSOCIATION WITH **PANTECH E LEARNING** ON **02-10-2020**

SRINIVASAN N
DIRECTOR
PANTECH E LEARNING

DR.J. B. SANKPAL
PRINCIPAL

PROF.ANJALIM.DALVI
HOD

PROF.SONALIS. PATIL
CO-ORDINATOR



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This is to certify that Mr./Mrs./Ms. **Prof. Anjali S. More** has participated in online faculty development program on “**Google Meet**” and successfully completed the online quiz.

This event is organized by Suman Ramesh Tulsiani Technical Campus-Faculty of Engineering, Khamshet
on **24/09/2020**.

Prof. D. V. Kudande & Prof. B. B. Shah
Faculty Coordinator

Prof. (Dr.) J. B. Sankpal
Principal
SRTTC-FoE, Khamshet



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on

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SWAMI KESHVANAND INSTITUTE OF TECHNOLOGY, MANAGEMENT & GRAMOTHAN

Certificate

This is to certify that _____ Prof. Anjali Sanjivanrao More _____

of _____ Suman Ramesh Tulsiani Technical Campus FOE _____ *has participated in*

“Web-Hack & HR Conclave: Recruitment and Technology 4.0” held on 28th-29th September, 2020.

Prof. Dheerendra Mathur
TEQIP Coordinator
RTU, Kota

Dr. R.K. Pachar
Principal
SKIT, Jaipur

PEL_AITS_PS_Sep 29, 2020_292



CERTIFICATE OF PARTICIPATION

THIS IS TO CERTIFY THAT

Prof.ANJALI MORE
SUMAN RAMESH TULSIANI TECHNICAL CAMPUS FOE

HAS ACTIVELY PARTICIPATED IN THE WEBINAR ON "**POWER SYSTEM STABILITY**" ORGANIZED BY DEPARTMENT OF **EEE, ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, HYDERABAD** IN ASSOCIATION WITH **PANTECH E LEARNING** ON **29-09-2020**

SRINIVASAN N
DIRECTOR
PANTECH E LEARNING

U.NARENDER
HOD-AITS

M.CHANDRA SHEKHAR
ASSISTANT PROFESSOR
AITS

J.SHANKAR
ASSISTANT PROFESSOR
AITS

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None of your completed reviews have been ranked by an editor yet.

Reviews (Cumulative) ⓘ

Assigned/Completed/Completed On-Time

3/0/0

Reviews (Year-to-Date) ⓘ

Assigned/Completed/Completed On-Time

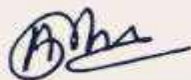
3/0/0

CERTIFICATE OF PARTICIPATION

THIS CERTIFICATE IS PRESENTED TO

Prof. Anjali S. More

FOR ATTENDING AN E-WORKSHOP ON
“HOW TO CATCH CLONED/FAKE/PREDATORY JOURNALS IN ACADEMICS”
ORGANIZED PCCOE IET ON CAMPUS, PUNE
HELD ON 22nd FEBRUARY 2021.



Dr. A. D. Thakare
Secretary,
IET Pune Local Network



Dr. K. Rajeswari
HOD,
Computer Department

Savitribai Phule Pune University

Formerly University Of Pune

Phone : 020-25621445
Fax : 020-25601206
Web : <http://www.unipune.ac.in>



CO-ORDINATION SECTION
Ganeshkhind, Pune - 411 007
Maharashtra (INDIA)

Second half of the year,2020



21/02/2021 07:00

21021601140

More Anjali Sanjivanrao

Suman Ramesh Tulsyani Charitable Trust Suman Ramesh Tulsiani Technical Campus Faculty of Engineering
Addr: Survey No 81,82,91,92,94,97,99,101,102,106,At Post Mauje Khamshet,Taluka Maval, District Pune
410405 Ta: Mawal Dist: Pune

Mobile No. : 9921897835

Email : anjalimore1980@rediff.com

Sir/ Madam,

1. The University Authorities have been pleased to appoint you for the Paper Setter and Examiner, in the subject of :-

Post Name	Examination	Paper / Subject	Chairman	Important Dates
Paper Setter & Examiner Appt NO. 20221162	BE 2012 (Endsem) (Theory) BOS:Computer Engineering 	Paper-Computer Network Design and Modeling (410444B) , (sem-I)	Mehetre Deepak Chandrakant K.J. Educational Institute K J College of Engineering & Management Research Addr: K J Educational Institute K J College of Engineering & Management Research Addr: Serve No 25 & 27 Kondhawa - Saswad Road Pune 411048(excluding Corporation Area) Dist: Pune Ta: Haweli(excluding Corporation Area) Dist: Pune 9404348720	E-Mode Manuscript Submission: 22th Feb. 2021

- The appointment is based on certain assumptions and subject to the respective provisions of the Maharashtra Public Universities Act 2016 and Statues/Ordinances, Rules and Regulations framed thereunder.
- It shall be obligatory on every faculty member of affiliated colleges to render necessary assistance and service in respect of examinations of the University.
- As per the decision taken by the statutory bodies, there will be 50 multiple choice questions of one mark each on for candidates appearing for the online examination
 - These question banks shall be prepared on 100 percent syllabus for second year to final year programs.
 - These question banks shall be prepared on 70 percent syllabus for the first year program (starting from the first topic serially).
- Question bank for the final year (UG/PG) program shall consist of 2 parts A and B
 - 'A' consists of 50 multiple choice questions and (ii) 'B' consists 4 descriptive type questions.
 - Paper setters are requested to discuss with the concerned Chairman of the paper setting panel about the division of work for the preparation of the question bank
- Method of uploading question papers:**
 - Each multiple choice question bank (200 questions minimum) and descriptive type questions bank (50 questions) shall be uploaded through to the designated web-portal through the BCUD Login of the Chairman of the paper setting panel on pgg.unipune.ac.in It is mandatory to prepare question bank in prescribed format made available to paper setters through the faculty BCUD login.
 - For the subjects under the BOS-Mathematics, each multiple choice question will carry two marks. Each descriptive type question will carry five marks.
 - Model answers for descriptive questions (restricted up to 30 words for each question) shall be provided by the panel of paper setters appointed for the final year program in template provided. Saperate remuneration as prevailing rules and regulations shall be paid to paper setters for providing model answers for the descriptive type questions included in question paper bank.

I seek your co-operation.
Thanking You

Yours,
For Director,Board of Examination and Evaluation

To,
The Principal/Directors,

You are requested to relieve the teachers for paper setting. Also requested to communicate names of the teacher/s who remain absent for the work of paper setting, the said information is required for submission to the University Authorities for necessary action under the provisions of section 48(4) of the Maharashtra Public Universityes Act,2016.

For early payment of examination remuneration work through ECS, you are requested to update your BCUD online teacher profile with Bank Account details. For details contact 020-25601388

Paper setter payment will done through automated NEFT/RTGS service for which please update your pancard ,bank account details and bank IFSC code in your teacher profile.`

Course Code	Course Name	Subject Code	Subject Name
24813	M.E. (2013 PAT.)	604102	WIRELESS & MOBILE TECHNOLOGIES
25013	M. COM. (2013)	215	BANKING LAW & PRACTICES
70115	F.E. (2015 COURSE) EXAMINATION	102006	ENGINEERING GRAPHICS I



SRTCT'S



Suman Ramesh Tulsiani Technical Campus, Faculty of Engineering, Khamshet

An ISO 9001:2015 certified Institute and Accredited by NAAC with 'B+' Grade



Prof. Anjali Sanjivanrao More

For Attending e Workshop on "Machine Learning in Healthcare "
organized by

Department of Computer Engineering , Computer Society of India Student Chapter
on 12/03/2021.

Prof. Sonali Patil
CSI-Coordinator

Prof. Anjali Dalvi
HoD, Computer Department

Prof. (Dr.) J. B. Sankpal
Principal



SRTCT'S

Suman Ramesh Tulsiani Technical Campus FOE, Kamshet, Pune

An ISO 9001:2015 certified Institute and Accredited by NAAC with 'B+' Grade

Department of Computer Engineering

CERTIFICATE OF PARTICIPATION

*This is to Certify that Mr./Ms./Mrs. **Prof. Anjali S. More** has participated in
“**Webinar on Research Methodology**” organized by Department of Computer Engineering,
Suman Ramesh Tulsiani Technical Campus-Faculty of Engineering on 2/17/2021.*

Certificate Id : QLKGZS-CE000039

Prof. Vidya Shitole
Event Coordinator

Prof. Anjali Dalvi
HoD, Computer Engg.

Prof. (Dr.) J. B. Sankpal
Principal



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School of Advanced Sciences

CERTIFICATE OF PARTICIPATION


This is to certify that

Mr./Ms. _____ **Prof. Anjali Sanjivanrao More** _____, has

successfully participated in the **5-day National Workshop on “Data Science and Advanced Computing”**

during 13th -14th March 2021 (Level-I) and 19th -21st March 2021 (Level-II)

organized by the School of Advanced Sciences (SAS), VIT-AP University.


Dr. Santanu Mandal
Dean, SAS
VIT-AP University


Dr. S. V. Kota Reddy
Vice Chancellor
VIT-AP University

<http://vitap.ac.in/school-of-advanced-sciences/>



Savitribai Phule Pune University, Pune
TE Computer Engineering 2019 Course Syllabus Revision
Course Coordinators Presentation Schedule

Date: 27/05/2021

Sr. No.	Name of Course	Team Coordinators	Presentation schedule	
			Date	Time
1	Database Management Systems	Dr. Anuradha Thakare	3/6/2021	10:30 am to 10:40am
2	Theory of Computation	Dr. Sunil Dhore		10:40 am to 10:50am
3	Systems Programming and Operating Systems	Dr. Manisha Bhende		10:50 am to 11:00am
4	Computer Networks and Security	Dr. P. B. Kumbharkar		11:00 am to 11:10am
5	Elective I: Internet of Things and Embedded Systems	Dr. A. B. Pawar		11:10 am to 11:20am
6	Elective I: Human Computer Interface	Dr. S. D. Babar		11:20 am to 11:30am
7	Elective I: Distributed System	Dr. Amar Buchade		11:30 am to 11:40am
8	Elective I: Software Project Management	Dr. Sachin Sakhare		11:40 am to 11:50am
9	Database Management System Laboratory	Prof. Rahul Patil		11:50 am to 12:00pm
10	Computer Networks and Security Laboratory	Dr. Vinod V. Kimbahune		12:00 pm to 12:10pm
11	Laboratory	Dr. Amol Potgantwar		12:10 pm to 12:20pm
12	Practice I			12:20 pm to 12:30pm
13	Seminar	Dr. Swati A. Bhavsar		12:30 pm to 12:40pm
14	Audit Course 5	Dr. Kishor Wagh		12:40 pm to 12:50pm
15	Data Science and Big Data Analytics	Dr. Sheetal Sonawane	4/6/2021	10:30 am to 10:40am
16	Web Technology	Prof. Abhijit D. Jadhav		10:40 am to 10:50am
17	Artificial Intelligence	Dr. J. R. Prasad		10:50 am to 11:00am
18	Elective II: Information Security	Dr. Swati Nikam		11:00 am to 11:10am
19	Elective II: Augmented and Virtual Reality	Dr. Shaikh Nuzhat Faiz		11:10 am to 11:20am
20	Elective II: Cloud Computing	Dr. S. K. Sonkar		11:20 am to 11:30am
21	Elective II: Software Modeling and Architectures	Dr M A Pradhan		11:30 am to 11:40am
22	Internship	Dr. Gitanjali V. Kale		11:40 am to 11:50am
23	Data Science and Big Data Analytics Laboratory	Dr. H. K. Khanuja		11:50 am to 12:00pm
24	Web Technology Laboratory	Prof. Abhijit D. Jadhav		12:00 pm to 12:10pm
25	Laboratory Practice II	Dr. Snehal Mohan Kamalapur		12:10 pm to 12:20pm
26	Audit Course 6	Dr. Sangve Sunil M.		12:20 pm to 12:30pm



HOD Computer <hodcomp@srttc.ac.in>

Meeting Link for TE Computer Engineering 2019 course syllabus revision Course Coordinators presentations on 4th June 2021

1 message

Dr Pramod Patil <pdpatiljune@gmail.com>

Thu, Jun 3, 2021 at 10:12 PM

To: "Santosh V. Chobe" <santosh.chobe@dypvp.edu.in>, HOD Computer <hod_comp@pgmcoepune.com>, archana.chaugule@pccoer.in, Hodcomp <hodcomp@pict.edu>, mvm_comp@pvgcoet.ac.in, mapotey@gmail.com, Rahul Paikrao <rahul.paikrao@avcoe.org>, sharad.rokade@pravara.in, Dhananjay Kshirsagar <dbk4444@gmail.com>, svpmcoecompspeaks <hodcomputer.svpm@gmail.com>, Dwarkoba Gaikwad <dpgaikwad@aissmscoe.com>, Mahesh Wankhade <mpwankhade.scoe@sinhgad.edu>, sarika_k_99@yahoo.com, kishor.shedge@pravara.in, hod@comp.maepune.ac.in, hod.comp@kbtcoe.org, Ratnaraj Kumar <ratnaraj.jambi@gmail.com>, Rajeswari Kannan <raji.pccoer@gmail.com>, hod.comp@vpkbiet.org, S B Chaudhari <sbchaudharitrinity@gmail.com>, Sanghavi Sir <sanghavi.mahesh@gmail.com>, "Prof. Sachin D. Babar" <hodce.sit@sinhgad.edu>, BALASAHEB GITE <bbgite.sae@sinhgad.edu>, Gupbrij@rediffmail.com, sandeepchaware@mmcoe.edu.in, poonam gupta <poonam.gupta@raisoni.net>, "M.U. Kharat" <mukharat@rediffmail.com>, Imran Shaikh <imran.shaikh22@gmail.com>, dpgadekar_compicoer@jspm.edu.in, hodcomp <hodcomp@indiraicem.ac.in>, rachana.sable@raisoni.net, Shyam Ingle <shyamingle@gmail.com>, GSN <hodcomp_sits@sinhgad.edu>, subhash.rathod@mmit.edu.in, Ameet Zore <amit.zore@gmail.com>, "HOD, COMPUTER DEPT., BVCOERI [062]" <hod.comp@engg.brahmavalley.com>, aaemfcoe comp <comp0063@gmail.com>, Shital Aher <shitalaher5445@gmail.com>, pavan kulkarni <pavanscs012@gmail.com>, vidya.jagtap@raisoni.net, Mininath Nighot <imaheshnighot@gmail.com>, comp.spcoe@gmail.com, headcomp@ges-coengg.org, hodcomp.acem@gmail.com, mukund.wagh.81@gmail.com, Gayatri Bhandari <gayatri.bhandari1980@gmail.com>, maheshdhande@rediffmail.com, Nilesh Wankhade <nileshr_2000@yahoo.com>, Prashant Suryavanshi <sprashant1234@gmail.com>, Sachin Hiranwale <hiranwalesachin@gmail.com>, Shashi Ghumbre <shashi.ghumbre@gmail.com>, pramod sinare <pramod.sinare100@gmail.com>, sandeep kadam <sandiipkadam@gmail.com>, pallavi.jha@isbm.ac.in, comp.ucoer@gmail.com, kamini nalavade <kamini.nalavade@siem.org.in>, Dnyaneshwar Wavhal <dnyaneshwar.wavhal@gmail.com>, amolrajpure9@gmail.com, hod_comp@pvgcoenashik.org, hod_comp@dypic.in, Santosh Darade <darade.santosh@gmail.com>, Mangesh Manake <mangesh.manake@dyptc.edu.in>, hod.sgoicoe@gmail.com, HOD Computer <hodcomp@srttc.ac.in>, HoD – Computer <hodce@isquareit.edu.in>, Deepti Varshney <varshney.deepti11@gmail.com>, Nitin Bhandari <nitinbhandari.engg@gmail.com>, Mangesh Salunke <salunkemangesh019@gmail.com>, Bhushan Borhade <borhadebhushan@gmail.com>, head_compntc@jspm.edu.in, Jyoti Lagad <jyotilagad@gmail.com>, "RMD SSOE, Warje, Pune COMP. ENGG. Dept." <comphod.rmdssoe@sinhgad.edu>, Hodcomp Soet <hodcompsoet@dypic.in>, HODCOMP SKNSITS <hodcomp.sknsits@sinhgad.edu>, HOD COMPUTER <hodcomp.nbnssoe@sinhgad.edu>, Yogesh Jorwekar <jorwekaryogesh@gmail.com>, Vinod Bharat <vinod.bharat@dyptc.edu.in>, Rama Gaikwad <hodcomp@abmspcoerpune.org>, Uday Patkar <Patkarudayc@gmail.com>, Ashwini Gaykar <ash77gaykar@gmail.com>, Geetanjali Mohole <gpmohole@gmail.com>, Santosh Darawade <santosh.darawade@gmail.com>, hodcomp.scenashik@shreemahavir.org, "Vilas G. Mankar" <vilasmankar@gmail.com>, Prajakta Deshmukh <prajaktad2905@gmail.com>, khataisunils88@gmail.com, tanajidhaigude@gmail.com

Dear Sir/Madam,

Herewith please find the meeting link for presentations by Course Coordinators of TE Computer Engineering 2019 course syllabus revision, on 4th June 2021.

BoS Computer Engineering SPPU is inviting you to a scheduled Zoom meeting.

Topic: Presentation TE Computer Syllabus Draft

Time: Jun 4, 2021 10:30 AM India

Join Zoom Meeting

<https://dpu-edu-in.zoom.us/j/97204922745?pwd=S1FTcVFpTjJGODVtV3B6dHFod1JBdz09>

Meeting ID: 972 0492 2745

Passcode: 373726

Also find attached the schedule for your reference.

Thanks and Regards,

--

Prof.Dr.Pramod Patil

Post Doctoral Researcher. Center for Communication Media and Information Technology, Aalborg University, Copenhagen, Denmark

ME(CE), Ph.D (CE), College of Engineering (**COEP**), Pune

BE(CSE),S.G.G.S.College of Engineering and Technology, Nanded

LMISTE, Membership of ACM, CSI

I/C Principal and Professor

Department of Computer Engineering

Dr D.Y.Patil Institute of Technology, Pimpri, Pune-411018

Member, Board of Studies (Computer Engineering), Savitribai Phule Pune University

Member, Faculty of Science and Technology, Savitribai Phule Pune University

Institute Vision : " **Empowerment Through Knowledge** "

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Office Email : hodcomp.engg@dypvp.edu.in

Office Phone : 02027421095/96/97 ext. 7318

Mobile : 9011456035



TE_Comp_Engg_2019_course_coordinators_ppt_schedules.pdf

197K

Savitribai Phule Pune University

Formerly University Of Pune

Phone : 020-25621445
Fax : 020-25601206
Web : <http://www.unipune.ac.in>



CO-ORDINATION SECTION
Ganeshkhind, Pune - 411 007
Maharashtra (INDIA)

Second half of the year,2020



17/03/2021 07:00

21031700019

More Anjali Sanjivanrao

Suman Ramesh Tulsiani Charitable Trust Suman Ramesh Tulsiani Technical Campus Faculty of Engineering
Addr: Survey No 81829192949799101102106At Post Mauje Khamshet Ta: Mawal Dist: Pune

Mobile No. : 9921897835

Email : anjalimore1980@rediff.com

Sir/ Madam,

1. The University Authorities have been pleased to appoint you for the Paper Setter and Examiner, in the subject of :-

Post Name	Examination	Paper / Subject	Chairman	Important Dates
Paper Setter & Examiner Appt NO. 20239232	B.E. (Theory) BOS:Computer Engineering 	Paper-Advanced Databases (410445) , B.E.2008 Course Sem- II (Ele- III)	Tambe Kailas Popat Zeal Education Society Zeal College of Engineering and Research Addr: Sr No 39Katraj-Dhayari Road Narhe Pune Ta: Haweli(excluding Corporation Area) Dist: Pune 9552539195	E-Mode question bank submission last date - 13 June 2021

- The appointment is based on certain assumptions and subject to the respective provisions of the Maharashtra Public Universities Act 2016 and Statues/Ordinances, Rules and Regulations framed thereunder.
- It shall be obligatory on every faculty member of affiliated colleges to render necessary assistance and service in respect of examinations of the University.
- As per the decision taken by the statutory bodies, the mode of examinations will be online consist of 60 multiple choice questions of one mark each for examinees. Out of these 50 correctly solved questions will be considered for the evaluation purpose. As per the decision taken during the meeting of Board of Examinations & Evaluation for under-graduate and post-graduate programs in Statistics and Mathematics and FY BCA 2019 pattern- mathematics, there will be 30 multiple choice questions of two marks each. Out of these 25 correctly solved questions will be considered for the evaluation purpose.
- On the recommendation of concern BOS the Board of Examinations & Evaluation has approved the proposal of syllabus for the **final year Science under-graduate programs only**, question papers will on 70 percent syllabus. The contents of these syllabi are uploaded on the University web-portal unipune.ac.in under the General Circulars (Examinations).
- For all other programs question papers shall be set on 100 percent syllabus.
- Method of uploading question bank:**
 - For the examinations which are getting conducted for the first time at the University level for those subjects taught first time as per the revised syllabus each multiple choice question bank shall have 200 questions. These shall be uploaded through the designated web-portal using BCUD Login of the Chairman of the paper setting panel through the web-portal qpg.unipune.ac.in specially developed for this purpose. It is mandatory to prepare question banks in prescribed format which is made available to the paper setters on the qpg.unipune.ac.in
 - There are some question banks of the first year first term programs prepared on the 70 percent syllabus. Concerned paper setting panel is required to add the multiple choice questions on the remaining 30 percent syllabus for incorporating 100 percent syllabus.
 - For the final year Science programs, the question banks are available with 100 percent syllabus. The designated chairman is expected to go through the contents of these question banks and delete the questions which are not out of the 70 percent syllabus finalized by the Board of Studies and approval taken by Board of Examinations and Evaluation. The Designated chairman shall upload on qpg portal.

d] For the other cases where the examinations are already conducted using the question bank provided by the paper setting panel, the question bank will available in excel format . These papers setting panel is required to include additional new 50 questions in the question bank. Precautions shall be taken not to include questions, which already exist in previous question bank.

I seek your co-operation.
Thanking You

Yours,
For Director,Board of Examination and Evaluation

To,
The Principal/Directors,

You are requested to relieve the teachers for paper setting. Also requested to communicate names of the teacher/s who remain absent for the work of paper setting, the said information is required for submission to the University Authorities for necessary action under the provisions of section 48(4) of the Maharashtra Public Universityes Act,2016.

For early payment of examination remuneration work through ECS, you are requested to update your BCUD online teacher profile with Bank Account details. For details contact 020-25601388

Paper setter payment will done through automated NEFT/RTGS service for which please update your pancard ,bank account details and bank IFSC code in your teacher profile.`

Course Code	Course Name	Subject Code	Subject Name
24813	M.E. (2013 PAT.)	604102	WIRELESS & MOBILE TECHNOLOGIES
25013	M. COM. (2013)	215	BANKING LAW & PRACTICES
70115	F.E. (2015 COURSE) EXAMINATION	102006	ENGINEERING GRAPHICS I



HOD Computer <hodcomp@srttc.ac.in>

Thank you for attending the Web seminar: National Webinar on 12th June_11.30 am to 1.30 pm-Keynote Speaker: Dr. Anil Sahsrabudhe-AICTE Chairman

1 message

messenger@webex.com <messenger@webex.com>

Sat, Jun 12, 2021 at 2:31 PM

Reply-To: sanjmeht@in.ibm.com

To: hodcomp@srttc.ac.in

Hello Anjali Manojkumar Dalvi ,

Thank you for attending the National Webinar on 12th June_11.30 am to 1.30 pm-Keynote Speaker: Dr. Anil Sahsrabudhe-AICTE Chairman Web seminar on Saturday, June 12, 2021 using Webex.

If you have comments or questions, please contact your host, Sanjiv Mehta, at:

Topic: National Webinar on 12th June_11.30 am to 1.30 pm-Keynote Speaker: Dr. Anil Sahsrabudhe-AICTE Chairman

Saturday, June 12, 2021

Host: Sanjiv Mehta (sanjmeht@in.ibm.com)

sanjmeht@in.ibm.com

<https://www.webex.com>



HOD Computer <hodcomp@srttc.ac.in>

Registration approved for Web seminar: National Webinar on 12th June_11.30 am to 1.30 pm-Keynote Speaker: Dr. Anil Sahsrabudhe-AICTE Chairman

1 message

messenger@webex.com <messenger@webex.com>

Thu, Jun 10, 2021 at 11:00 AM

Reply-To: sanjmeht@in.ibm.com

To: hodcomp@srttc.ac.in

Hello Anjali Manojkumar Dalvi,

Your registration was approved for the following Webex event.

Topic: National Webinar on 12th June_11.30 am to 1.30 pm-Keynote Speaker: Dr. Anil Sahsrabudhe-AICTE Chairman

Host: Sanjiv Mehta

Date and Time:

Saturday, June 12, 2021 11:30 am, India Time (Mumbai, GMT+05:30)

Saturday, June 12, 2021 2:00 am, Eastern Daylight Time (New York, GMT-04:00)

Event number: 145 053 2952

Registration ID: This event does not require a registration ID

Event password: AICTE_WEBINAR (24283093 from phones)

To join the online event
-----Go to <https://ibm.webex.com/ibm/onstage/g.php?MTID=ee77f3d9bb802b30e7b8606335feffc8>

To view in other time zones or languages, please click the link:

<https://ibm.webex.com/ibm/onstage/g.php?MTID=e88d1ce713edc9d13bc1abde9393cdc60>-----
Join the audio conference only

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United States Toll: 1-669-234-1178

Global call-in numbers: <https://ibm.webex.com/ibm/globalcallin.php?MTID=e2add6448461b47bea626d95340ee4daa>Toll-free dialing restrictions: https://ibm.webex.com/ibm/customer_tollfree_restrictions.pdf

Access code: 145 053 2952

For assistance

You can contact Sanjiv Mehta at:

sanjmeht@in.ibm.com

Can't join the event?

<https://collaborationhelp.cisco.com/article/kwmj5eb>

To join the event more quickly, you can set up Webex Events before the event starts. Go to:

<https://ibm.webex.com/ibm/ecsetup.php?frommail=1>The playback of UCF (Universal Communications Format) rich media files requires appropriate players. To view this type of rich media files in the meeting, please check whether you have the players installed on your computer by going to <https://ibm.webex.com/ibm/onstage/systemdiagnosis.php>

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IMPORTANT NOTICE: This Webex service includes a feature that allows audio and any documents and other materials exchanged or viewed during the session to be recorded. By joining this session, you automatically consent to such recordings. If you do not consent to the recording, discuss your concerns with the meeting host prior to the start of the recording or do not join the session. Please note that any such recordings may be subject to discovery in the event of litigation.

Chapter 1

Review of Imbalanced Data Classification and Approaches Relating to Real-Time Applications

Anjali S. More

Sardar Vallabhbhai National Institute of Technology, Surat, India

Dipti P. Rana

 <https://orcid.org/0000-0002-5058-1355>

Sardar Vallabhbhai National Institute of Technology, Surat, India

ABSTRACT

In today's era, multifarious data mining applications deal with leading challenges of handling imbalanced data classification and its impact on performance metrics. There is the presence of skewed data distribution in an ample range of existent time applications which engrossed the attention of researchers. Fraud detection in finance, disease diagnosis in medical applications, oil spill detection, pilfering in electricity, anomaly detection and intrusion detection in security, and other real-time applications constitute uneven data distribution. Data imbalance affects classification performance metrics and upturns the error rate. These leading challenges prompted researchers to investigate imbalanced data applications and related machine learning approaches. The intent of this research work is to review a wide variety of imbalanced data applications of skewed data distribution as binary class data unevenness and multiclass data disproportion, the problem encounters, the variety of approaches to resolve the data imbalance, and possible open research areas.

DOI: 10.4018/978-1-7998-7371-6.ch001

INTRODUCTION

Data cataloging into specific classes is one of the foremost techniques in the domain of machine learning and mining with the heuristics of balanced dataset i.e. the data is equally distributed among the classes. This heuristic is not true in the existent world applications and the majority of the related applications are having imbalanced dataset where data is skewed towards one class or more than one classes. The imbalanced nature of data is having their own importance, one cannot neglect them. Thus, many researchers are motivated to deal with imbalanced classification for real-life applications. There is an incessant growth of instances of data availability in many application eras such as finance, health care, computer network system, security, internet of things, etc. where it is very much essential to advance the primary perceptives of knowledge discovery and data analysis to take the critical decision.

Nowadays, though there is existence of data discovery techniques, imbalanced data applications relating to real-life scenarios have shown the great attraction to the researchers to focus on imbalanced applications and review the problems occurred due to data unevenness. The individuals working in industry as well as academia gets attracted towards diverted data applications as review in the survey section by Alberto Fernández et al. (2009).

Several realistic application areas deal with the handling of uneven data representation, the minority instance class gets ignored due to the majority instance class. Unequal data distribution leans performance metrics towards the majority class. The review study in this research focuses on the most important application categories of imbalanced data distribution as binary class imbalance and multiclass data imbalance. To deal with the promising issues arising from class imbalance this study presents a review of imbalanced data applications, imbalanced data categories, problems encountered due to this characteristic, and the methodologies to deal with distorted data relating to real-life applications.

BACKGROUND

Classification is the most popular technique to correctly classify an instance with unknown class. Many real-world data sets show evidence of unequal class distributions in which maximum data samples are belonging to one of the larger class and far fewer data instances are falling into minority class. In case of medical diagnosis example, which consist of the cases that relates to diagnosis for a rare disease. For the referred example, only 2% of the patients are positive diagnosis and 98% diagnosis as negative. Dealing with such imbalanced datasets and related classification generates the need of machine learning algorithms. In current time the data diverted applications are relating to binary as well as multiclass data imbalance. In both category of imbalanced class either of one class having maximum instance and which diverts the performance towards majority class, i.e. performance is leaned towards majority class. The traditional classifiers reveal accurate forecast for the majority instance class and diversify the performance in case of minority data sample class. The cost of misclassification an imbalanced class can be harmful for the real world application like disease diagnostics. Thus, in today's era, Stefan Lessmann (2014) and Rebeen A. H., Masashi K. & Jens L (2020) show imbalanced data applications have received considerable attention from the research community to further boost their performance by numerous machine learning algorithms. Lars W. Jochumsen et al. (2016), Nahit Emanet et al. (2014), explained in the study that there are diverse approaches to tackle the trouble of extremely imbalanced data applications. In particular, the study deals with the description of preprocessing, cost-sensitive learning, Support Vector

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Fri, Jun 12, 2020 at 2:52 PM

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Guidelines to all Engineering faculty members on how to effectively assess the academic performances of students for the academic year 2019-20.

Speakers:**Dr. Manohar G Chaskar,****Dean Faculty of Science and Technology, SPPU****Shri Mahesh Kakade****Director of Board of Examinations and Evaluation, SPPU**Webinar will be Live Streamed through "**Microsoft Teams**" Platform**Users can directly watch Live through Web Browser (Watch on the Web Instead - Option) or using Mobile App****Please Click below and Join as Guest :**

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Date: 13 June 2020**Time: 04:00 PM - 05:00 PM**

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Thank you once again for your participation and see you soon.

Stay Safe & Stay Home...!!

Thanks & Regards,

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About the Contributors

Agricultural technologies. She has published 2 research papers in IEEE and 3 in IOP science. she has also published over 6 Indian patents and 1 Australian patents.

Vaishali S. Tidake obtained her Bachelors Degree in Computer Engineering from KKWCOE, Nashik in 1999, M. E. (CSE-IT) from VIT, Pune in 2008 and Ph. D. (Computer Engineering) from MCERC, Nashik, SPPU in (2021). She is currently working as Associate Professor in Dept. of Computer Engineering, MVPS's KBT College of Engineering Nashik. She has published several research papers in national and international journals and conferences.

Bharat Tidke is currently working as an Assistant Professor at Vellore Institute of Technology and did his MTech and PhD from Sardar Vallabhbhai National Institute of Technology, Surat. His areas of interest include Data Analytics, Big data, and Social network analysis.

Shivani Vora is Assistant Professor in Department of Computer Engineering, Chhotubhai Gopalbhai Patel Institute of Technology (CGPIT), UTU, Bardoli and PhD Research Scholar at National Institute of Technology (SVNIT), Surat, India. She completed her M.Tech (Research) in Computer Engineering from Sardar Vallabhbhai National Institute of Technology, Surat. She has several years of experience in teaching and research, also published many papers in reputed international journals and conferences. Her area of research includes Data Mining, Machine Learning, Natural Language Processing, Artificial Intelligence, etc. She is guiding several UG and PG Students at CGPIT, UTU, Bardoli.

Chapter 1

Review of Imbalanced Data Classification and Approaches Relating to Real-Time Applications

Anjali S. More

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ABSTRACT

In today's era, multifarious data mining applications deal with leading challenges of handling imbalanced data classification and its impact on performance metrics. There is the presence of skewed data distribution in an ample range of existent time applications which engrossed the attention of researchers. Fraud detection in finance, disease diagnosis in medical applications, oil spill detection, pilfering in electricity, anomaly detection and intrusion detection in security, and other real-time applications constitute uneven data distribution. Data imbalance affects classification performance metrics and upturns the error rate. These leading challenges prompted researchers to investigate imbalanced data applications and related machine learning approaches. The intent of this research work is to review a wide variety of imbalanced data applications of skewed data distribution as binary class data unevenness and multiclass data disproportion, the problem encounters, the variety of approaches to resolve the data imbalance, and possible open research areas.

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INTRODUCTION

Data cataloging into specific classes is one of the foremost techniques in the domain of machine learning and mining with the heuristics of balanced dataset i.e. the data is equally distributed among the classes. This heuristic is not true in the existent world applications and the majority of the related applications are having imbalanced dataset where data is skewed towards one class or more than one classes. The imbalanced nature of data is having their own importance, one cannot neglect them. Thus, many researchers are motivated to deal with imbalanced classification for real-life applications. There is an incessant growth of instances of data availability in many application eras such as finance, health care, computer network system, security, internet of things, etc. where it is very much essential to advance the primary perceptives of knowledge discovery and data analysis to take the critical decision.

Nowadays, though there is existence of data discovery techniques, imbalanced data applications relating to real-life scenarios have shown the great attraction to the researchers to focus on imbalanced applications and review the problems occurred due to data unevenness. The individuals working in industry as well as academia gets attracted towards diverted data applications as review in the survey section by Alberto Fernández et al. (2009).

Several realistic application areas deal with the handling of uneven data representation, the minority instance class gets ignored due to the majority instance class. Unequal data distribution leans performance metrics towards the majority class. The review study in this research focuses on the most important application categories of imbalanced data distribution as binary class imbalance and multiclass data imbalance. To deal with the promising issues arising from class imbalance this study presents a review of imbalanced data applications, imbalanced data categories, problems encountered due to this characteristic, and the methodologies to deal with distorted data relating to real-life applications.

BACKGROUND

Classification is the most popular technique to correctly classify an instance with unknown class. Many real-world data sets show evidence of unequal class distributions in which maximum data samples are belonging to one of the larger class and far fewer data instances are falling into minority class. In case of medical diagnosis example, which consist of the cases that relates to diagnosis for a rare disease. For the referred example, only 2% of the patients are positive diagnosis and 98% diagnosis as negative. Dealing with such imbalanced datasets and related classification generates the need of machine learning algorithms. In current time the data diverted applications are relating to binary as well as multiclass data imbalance. In both category of imbalanced class either of one class having maximum instance and which diverts the performance towards majority class, i.e. performance is leaned towards majority class. The traditional classifiers reveal accurate forecast for the majority instance class and diversify the performance in case of minority data sample class. The cost of misclassification an imbalanced class can be harmful for the real world application like disease diagnostics. Thus, in today's era, Stefan Lessmann (2014) and Rebeen A. H., Masashi K. & Jens L (2020) show imbalanced data applications have received considerable attention from the research community to further boost their performance by numerous machine learning algorithms. Lars W. Jochumsen et al. (2016), Nahit Emanet et al. (2014), explained in the study that there are diverse approaches to tackle the trouble of extremely imbalanced data applications. In particular, the study deals with the description of preprocessing, cost-sensitive learning, Support Vector

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Performance enrichment through parameter tuning of random forest classification for imbalanced data applications

Authors Anjali S More, Dipti P Rana

Publication date 2021/12/29

Journal Materials Today: Proceedings

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Description One of the foremost application domains in today's real-life scenario is unequal data distribution within datasets, related classifiers, and its Performance Enrichment Techniques (PET). Random Forest Classification (RFC) is one of the most efficient techniques that can function speedily over binary or multiclass imbalanced characteristics datasets. With its built-in ensemble capacity, building a generalized model on any Binary Imbalanced Datasets (BID) and Multiclass Imbalanced Datasets (MID) gets much easier. Related work carried out here implies that the attention of researchers is inclined towards ID applications and related machine learning techniques. RFC gives improvised performance due to Ensemble Approach (EA). EA generates several classifiers and segregates the results as PET. The performance of the single classifier is lower than the performance of the set of multiple classifiers. The associated ...

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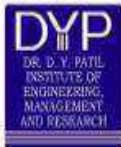
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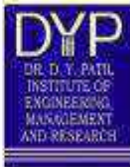
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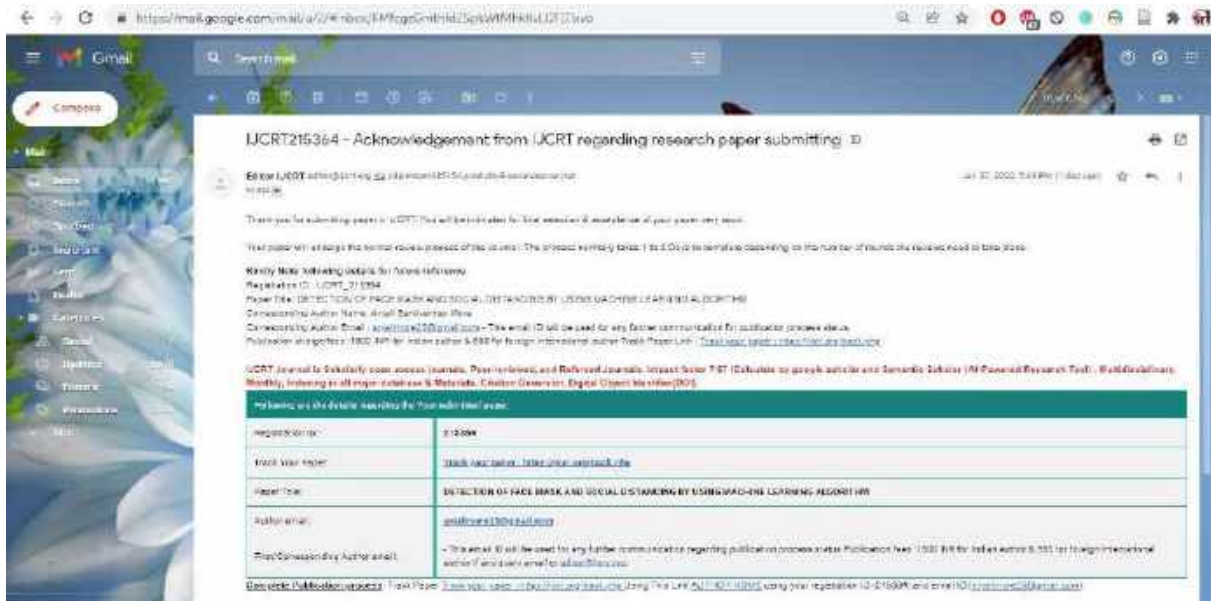
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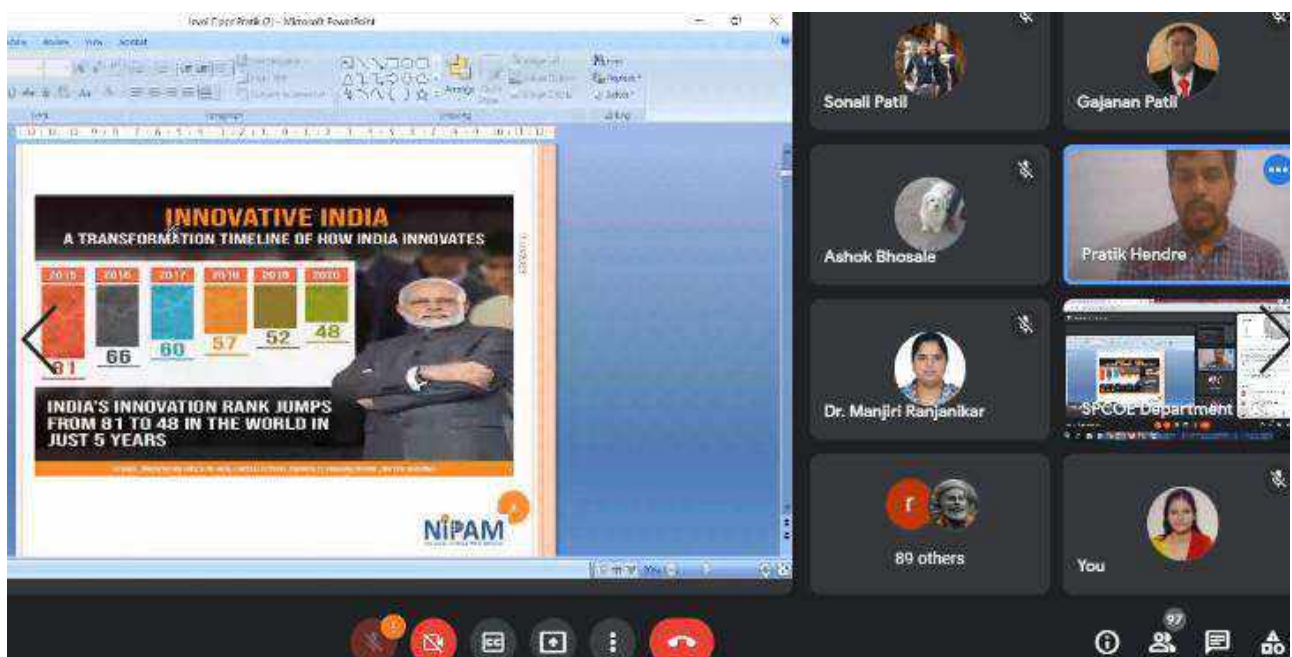




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Department of Information Technology

Certificate of Participation

This is to certify that
Jyotsna Vilas Barpute

has attended in One Day Online Faculty Orientation Programme (FOP) on “**Cloud Computing and Laboratory Practice - II**” of TE-IT (2019 course) organized by **Department of Information Technology, MVP's K.B.T.College of Engineering, Nashik - 13**, Maharashtra, India in association with **Board of Studies Information Technology, Savitribai Phule Pune University, Pune** on 02-02-2022.

 Dr. V.R.Sonawane Convener, HOD I.T	 Dr. Aditya Abhyankar Chairman, BoS-IT, SPPU, Pune	 Prof. N.B.Desale Vice-Principal	 Dr. S. R. Devane Principal
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Certificate of Participation

This is to certify that
Prof. Jyotsna Barpute
of Suman Ramesh Tulasiani faculty college of engineering

has participated in One-Day Faculty Development Program on “**Data Science & Big Data Analytics**” held on 08th February 2022 organized by the Department of Computer Engineering, I²IT in Association with BoS Computer Engineering, SPPU, Pune.

 Dr. Ajitkumar Shitole HoD, CE I ² IT	 Dr. Pramod Patil Member, BoS Computer Engg. (SPPU)	 Dr. Varsha Patil Chairman, BoS Computer Engg. (SPPU)	 Dr. Vaishali Patil Principal I ² IT
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