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## Learning from class-imbalanced data: Review of methods and applications

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923	Improving predictive performance on survival in dairy cattle using an ensemble learning approach. <b>2020</b> , 177, 105675	2
922	Arctic Vision: Using Neural Networks for Ice Object Classification, and Controlling How They Fail. <b>2020</b> , 8, 770	2
921	News Classification for Identifying Traffic Incident Points in a Spanish-Speaking Country: A Real-World Case Study of Class Imbalance Learning. <b>2020</b> , 10, 6253	2
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916	MSCS-DeepLN: Evaluating lung nodule malignancy using multi-scale cost-sensitive neural networks. <b>2020</b> , 65, 101772	25
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914	A systematic assessment of the use of opponent variables, data subsetting and hierarchical specification in two-party crash severity analysis. <b>2020</b> , 144, 105666	2
913	Dual Kriging assisted efficient global optimization of expensive problems with evaluation failures. <b>2020</b> , 105, 106006	6
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911	Semi-supervised Learning Algorithm Based on Linear Lie Group for Imbalanced Multi-class Classification. <b>2020</b> , 52, 869-889	1
910	A Novel Electricity Theft Detection Scheme Based on Text Convolutional Neural Networks. <b>2020</b> , 13, 5758	5
909	Data-driven rated power prediction of diesel engines using improved multi-class imbalanced learning method. <b>2020</b> , 51, 324-329	2
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870	Association between Crash Attributes and Drivers' Crash Involvement: A Study Based on Police-Reported Crash Data. <b>2020</b> , 17,	2
869	Handling Minority Class Problem in Threats Detection Based on Heterogeneous Ensemble Learning Approach. <b>2020</b> , 11, 13-37	1
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859	Deep learning-based BCI for gait decoding from EEG with LSTM recurrent neural network. <b>2020</b> , 17, 046011	24
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853	Counting and Classification of Malarial Parasite From Giemsa-Stained Thin Film Images. <b>2020</b> , 8, 78663-78682		3
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845	A hybrid sampling algorithm combining M-SMOTE and ENN based on Random Forest for medical imbalanced data. <b>2020</b> , 107, 103465		35
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840	A novel random forest approach for imbalance problem in crime linkage. <b>2020</b> , 195, 105738		13
839	Employing a Machine Learning Approach to Detect Combined Internet of Things Attacks against Two Objective Functions Using a Novel Dataset. <b>2020</b> , 2020, 1-17		7
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836	A Survey of Deep Facial Attribute Analysis. <b>2020</b> , 128, 2002-2034		11

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834	Critical Instances Removal based Under-Sampling (CIRUS): A solution for class imbalance problem1. <b>2020</b> , 16, 55-66		1
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829	A real-time crash prediction fusion framework: An imbalance-aware strategy for collision avoidance systems. <b>2020</b> , 118, 102708		11
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827	IMNRFixer: A hybrid approach to alleviate class-imbalance problem for predicting the fixability of Non-Reproducible bugs. <b>2020</b> , e2290		0
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825	Hashing-Based Undersampling Ensemble for Imbalanced Pattern Classification Problems. <b>2020</b> , PP,		8
824	Rescaled-LSTM for Predicting Aircraft Component Replacement Under Imbalanced Dataset Constraint. <b>2020</b> ,		2
823	A Multiple Classifiers System for Anomaly Detection in Credit Card Data With Unbalanced and Overlapped Classes. <b>2020</b> , 8, 28210-28221		16
822	Financial distress prediction: Regularized sparse-based Random Subspace with ER aggregation rule incorporating textual disclosures. <b>2020</b> , 90, 106152		9
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815	Dynamic imbalanced business credit evaluation based on Learn++ with sliding time window and weight sampling and FCM with multiple kernels. <b>2020</b> , 520, 305-323		10
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812	A multi-objective instance-based decision support system for investment recommendation in peer-to-peer lending. <i>Expert Systems With Applications</i> , <b>2020</b> , 150, 113278	7.8	15
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810	A gravitational density-based mass sharing method for imbalanced data classification. <b>2020</b> , 2, 1		0
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806	Ensemble learning by means of a multi-objective optimization design approach for dealing with imbalanced data sets. <i>Expert Systems With Applications</i> , <b>2020</b> , 147, 113232	7.8	22
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801	Addressing class imbalance in deep learning for small lesion detection on medical images. <b>2020</b> , 120, 103735		28
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788	Using Hybridized techniques for Prediction of Software Maintainability using Imbalanced data. <b>2020</b> ,	
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761	On the class overlap problem in imbalanced data classification. <b>2021</b> , 212, 106631		22
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753	Utilizing Deep Learning and Oversampling Methods to Identify Children's Emotional and Behavioral Risk. <b>2021</b> , 39, 227-241		0
752	Multi-Attribute Learning With Highly Imbalanced Data. <b>2021</b> ,		
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750	A Fraud Detection Approach Based on Combined Feature Weighting. <b>2021</b> , 74-82		
749	Time-Series Prediction of Iron and Silicon Content in Aluminium Electrolysis Based on Machine Learning. <b>2021</b> , 9, 10699-10710		
748	SMOTE-Text: A Modified SMOTE for Turkish Text Classification. <b>2021</b> , 82-92		
747	Estimation of a logistic regression model by a genetic algorithm to predict pipe failures in sewer networks. <b>2021</b> , 43, 759-776		6
746	A Novel Adaptive Minority Oversampling Technique for Improved Classification in Data Imbalanced Scenarios. <b>2021</b> ,		1

745	An Improving Majority Weighted Minority Oversampling Technique for Imbalanced Classification Problem. <b>2021</b> , 9, 5069-5082	7
744	Toward Road Safety Recommender Systems: Formal Concepts and Technical Basics. <b>2021</b> , 1-20	0
743	Multimodal Detection of Tonic-Clonic Seizures Based on 3D Acceleration and Heart Rate Data from an In-Ear Sensor. <b>2021</b> , 490-502	1
742	A Study on Forecasting the Default Risk of Bond Based on XGboost Algorithm and Over-Sampling Method. <b>2021</b> , 11, 258-267	3
741	Shyness Trait Recognition for Schoolchildren via Multi-View Features of Online Writing. <b>2021</b> , 1-1	
740	Dialogue Act Recognition using Branch Architecture with Attention Mechanism for Imbalanced Data. <b>2021</b> ,	
739	An Empirical Evaluation of Stacked Ensembles With Different Meta-Learners in Imbalanced Classification. <b>2021</b> , 9, 87434-87452	4
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736	Clustering and Weighted Scoring Algorithm Based on Estimating the Number of Clusters. <b>2021</b> , 40-49	1
735	Uncertainty-Aware Resampling Method for Imbalanced Classification Using Evidence Theory. <b>2021</b> , 342-353	1
734	Review of Imbalanced Data Classification and Approaches Relating to Real-Time Applications. <b>2021</b> , 1-22	
733	Unbalanced data classification based on oversampling and integrated learning. <b>2021</b> ,	
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729	COVIDScreen: explainable deep learning framework for differential diagnosis of COVID-19 using chest X-rays. <b>2021</b> , 33, 1-22	25
728	Linguistic-Coupled Age-to-Age Voice Translation to Improve Speech Recognition Performance in Real Environments. <b>2021</b> , 1-1	2



727	Addressing Extreme Imbalance for Detecting Medications Mentioned in Twitter User Timelines. <b>2021</b> , 93-102	0
726	Water monitoring by means of digital microscopy identification and classification of microalgae. <b>2021</b> , 23, 1443-1457	1
725	Classifying imbalanced data using SMOTE based class-specific kernelized ELM. <b>2021</b> , 12, 1255-1280	3
724	A Hybrid Framework for Class-Imbalanced Classification. <b>2021</b> , 301-313	
723	Minority Class Oriented Active Learning for Imbalanced Datasets. <b>2021</b> ,	1
722	Two-Class Fuzzy Clustering Ensemble Approach Based on a Constraint on Fuzzy Memberships. <b>2021</b> , 139-153	
721	Tackling the Imbalanced Data in Software Maintainability Prediction Using Ensembles for Class Imbalance Problem. <b>2021</b> , 391-399	
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