Soft Computing Technique Based on Missing Value Treatment

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Abstract: Missing value treatment is an actual yet challenging issue confronted in data mining. In existing work missing value treatment is a procedure that replaces the missing values in a dataset by some conceivable values. The conceivable values are generally generated from the dataset using a statistical evaluation.Thesetypesofresultdonotgiveaccurateoutcomes.In this paper, soft computing is used in the random forest approach using for missing value treatment that isdevised and implemented on the different types of social media. Using random forest approach results are improved form existingtechnique.

Index Terms: Missing value, Missing value treatment, Soft computing, Social media.

I. INTRODUCTION

The development of online networking throughout the mostrecentdecadehasreformedthemannerinwhichpeople collaborate and ventures direct business. People produce information at a remarkable rate by connecting, sharing, and devouring substance through web-based social networking. Comprehension and handling this new sort of information to gather noteworthy examples presents difficulties and open doors for interdisciplinary research and apparatus advancement [4]. Internet-based life Mining incorporates web-based life, informal organization examination, and information mining to give an advantageous and sound stage for understudies, specialists, analysts, and venture administrators to comprehend the nuts and bolts and possibilities of web-based life mining [9]. Missing valuesare a common problem in most clear research spaces, for example, Social Media Analysis, Satellite Data, GPS Data, Biology, Medicine or Climatic Science. They can ascend out of various sources, for example, abusing of tests, low standard to-change degree, estimation goof, non-reaction or killed intriguing esteem. Missing values make ittroublesome for investigators to perform information examination. Three kinds of issues are typically connected with missingworth: (1) Loss of efficiency. (2) Complications in handling and analyzing the data. (3) Bias resulting from differences between missing and complete data. Statistician categorized missing data into three categoriesas:

(a) Missing not at Random(MNAR).
(b) Missing at Random(MAR)
(c) Missing completely at Random(MCAR)

The following are commonmethods:

* **Hot deck:** A randomly picked a value from an individual who has comparable values on differentfactors.

***Cold deck:** An efficiently picked a value from an individual who has comparable values on a different factor.

* **Regression:**Theforecastedvalueobtainedbyregression the missing variable on differentfactors.

* **Stochastic regression:** The forecasted value from a regression plus an arbitrary residualvalue.

* **Interpolation and extrapolation:** An expected value from different perceptions from a similarindividual.

Fengfeng Fan, 2017 presents the work on internet missing worth attribution utilizing OL-MVI Model. In this methodology, all the records are broke down and outlined for missing value treatment from constant information. Davis *et al.* [14] 2016underline the assessment of different internet-based life with investigation designs. The online life incorporates Google+, LinkedIn, Facebook and Twitter with their relative ways to deal with brings the information and reconciliation of social profiles. What's more, the standard digging joining is introduced for various applications by the creators. Barve A. *et al.* [25] 2018 SVN, KNN, and Random Forest Approach worked on the dataset of social media. The anticipated outcomes are displayed to be efficacious and execution mindful on the particulardatasets.

II. PROBLEM DEFINITION ANDRELATEDWORK

Identification of the problem is that in the statistical approach and algorithms to deal with the missing value includetheaveragevalueandremovaloftherecordsfromthe real dataset. If such a strategy is used, the results cannot be evaluated. In existing research work of missing value treatment, the statistical evaluation using mean, linear regressionofexistingvaluesareusedwhichcanbeimproved using soft computingalgorithm.

Statistical Based Treatment is having an evident focus on the mean and prediction based on that curve is done on scenarios of regression and prediction based treatment.

III. MISSING VALUE TREATMENTUSING SOFT COMPUTING

This work is having the key focus on the randomly based imputation approach is having the fitness score based on the final outcome and overall acceptability score.

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values. These missing values are exclusively prepared utilizing the approach is discretionary choice trees utilizing random forest paradigm. The choice tree in each gathering is handled to have the area mean occurrences and hence the outcomes or result of expected mean values is assessed from each set. The ascribed an incentive from every choice tree is related with a particular acknowledgment score of positioning and this kind of scoring is utilized to at long last have the last credited esteem which is the best fit for attribution.

IV. ALGORITHMIMPUTATIONOFMISSINGVALUE IN THE FETCHEDDATASET

PHASE 1: Using Association Rule Mining forImputation.

1) Activation of Rule Mining and Extraction of LiveData.
2) Generate rules and distance based prediction from the training dataset.
3) From the list of association rules remove rules with consequent containing value “Missing orNull”.
4) Sort association rules by confidence in descendingorder and apply soft computing for Fitness of the Imputation and Best Fit Candidate for MissingValue.
5) If suitable association rule was found, fill the missing value in the data set for missing values imputation by value in the consequent of the associationrule.

PHASE 2: Clustering if there were no suitable association rule.

1) In the preparation informational index fill every single missing an incentive by the uncommon value. In further advances are these values called "Missing or Null". Apply Density-based Clustering from the datasets of filled values.
2) Produce association rules from the preparation informational dataset.
3) From the list of association rules evacuate rules with help lower than required.
4) From the list of association rules remove rules with consequent that is combination longer than a threshold value.
5) From the list of association rules expel rules with resulting containing the value "Missing orNull".
6) Sort association rules by trust in the divingrequest.
7) If suitable association rule was found, fill missing value in the data set for missing values imputation by value in consequent of the association rule. Else fill missing value in the data set for missing values treatment by the mostcommonattributevalue(exceptthevalue“Missing or Null”).

In the above mentioned algorithm, there are two phases. The first phase deals with the data extraction and pre-processing so that the further evaluation of missing valuesandimputationcanbedone.Thesecondphasesis having focus on the treatment of missing values using soft computing approach in integration with random forest algorithm. Random Forest algorithm is a prominent algorithm for the optimization andpopulation based processing ofdatasets.

Flow of Work Flow Diagram

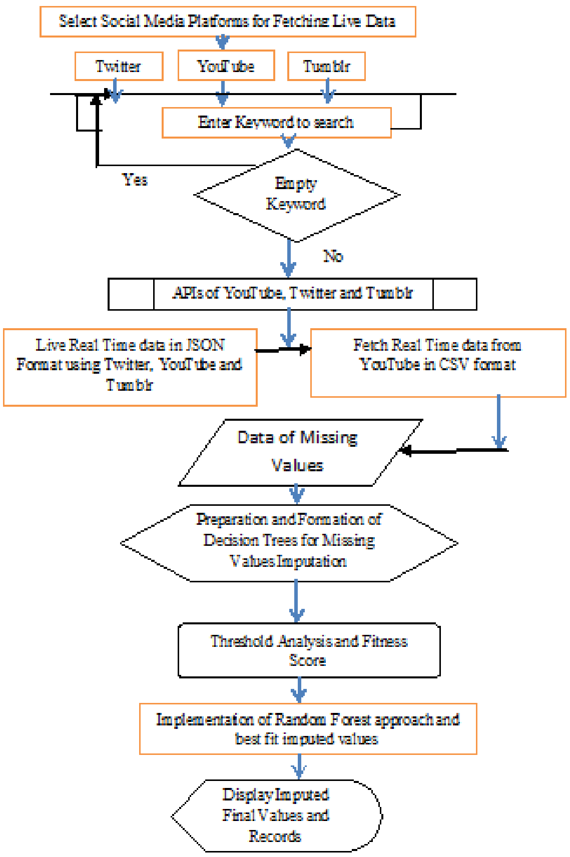

Select Social Media Platforms for Fetching Live Data
Twitter
YouTube
Tumblr
Enter Keyword to search
Yes
Empty Keyword
No
APIs of YouTube, Twitter and Tumblr
Live Real Time data in JSON Format using Twitter, YouTube and Tumblr
Fetch Real Time data from YouTube in CSV format
Data of Missing Values
Preparation and Formation of Decision Trees for Missing Values Imputation
Threshold Analysis and Fitness Score
Implementation of Random Forest approach and best fit imputed values
Display Imputed Final Values and Records

Fig. (1) Flow using Random Forest Approach for Missing Value Imputation

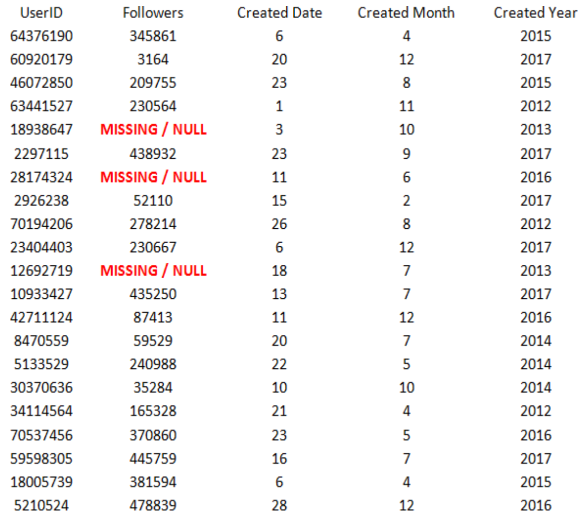
V. IMPLEMENTATION ANDEXPERIMENTAL RESULT

Python Programming is utilized for actualizing the irregular Random Forest Approach and information is brought from various web-based lives utilizing APIs. In this examination deal with missing value treatment, the circumstance of expelling specific substance is taken so the client conviction related to that word can be evaluated with missing value treatment. The substance or customer feelings in light of different classes are taken with the live extraction of data from different online interpersonal interaction. These classes are used so the all-out decision about the zone, guidance, and district can be penniless down with the extraction of data related to customer courses of occasions. In most of the tweets, the evaluation or customer feelings of electronic interpersonal interaction are related to the academicians and specialists who show their points of view or ends on this online life. The assessment of supporters is done in light of the fact that it is numeric esteem and distinguishing proof should be possible where there are unimportant or invalid adherents. In the event that we don't think about these values, the outcomes can be inefficient to the last end. In customary system, such characteristics based records are deleted anyway by this methodology a definitive outcome cannot be extraordinary. In the isolated tweets and messages, it is found that the investigation perspectives and standards set around different classes are generallydiscussedby the examiners, academicians and government official. With the execution of proposed approach, the missing values ascription is seen to be solid with the filling or attribution of the characteristics using an irregular woodland approach that is one the indisputable methodology settling on the use of huge decision trees and a short time later last situating of the best outcome with the scoring ofresults.

A. *RAW DATA AFTER PREPROCESSINGWITH MISSINGVALUE*

Following screenshot resent that the data is collected from the different social media and processed it. It shows data into CSV (comma-separated values) format.

Table I DATA WITH MISSING VALUE

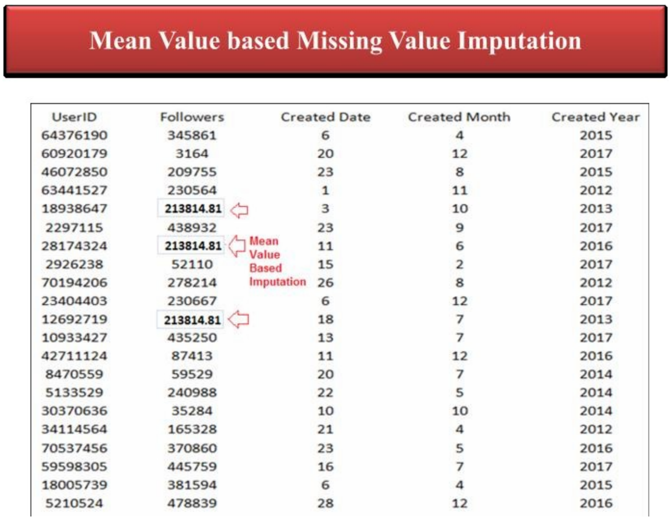


UserID	Followers	Created Date	Created Month	Created Year
64376190	345861	6	4	2015
60920179	3164	20	12	2017
46072850	209755	23	8	2015
63441527	230564	1	11	2012
18938647	MISSING / NULL	3	10	2013
2297115	438932	23	9	2017
28174324	MISSING / NULL	11	6	2016
2926238	52110	15	2	2017
70194206	278214	26	8	2012
23404403	230667	6	12	2017
12692719	MISSING / NULL	18	7	2013
10933427	435250	13	7	2017
42711124	87413	11	12	2016
8470559	59529	20	7	2014
5133529	240988	22	5	2014
30370636	35284	10	10	2014
34114564	165328	21	4	2012
70537456	370860	23	5	2016
59598305	445759	16	7	2017
18005739	381594	6	4	2015
5210524	478839	28	12	2016

B. *MISSING VALUE IMPUTATION USING STATISTICAL VALUED BASEDAPPROACH*

Following is the point of view of execution situation in programming language for missing value treatment.

Table II DATA WITH MISSING VALUE IMPUTATION USING STATISTICAL VALUED BASED APPROACH



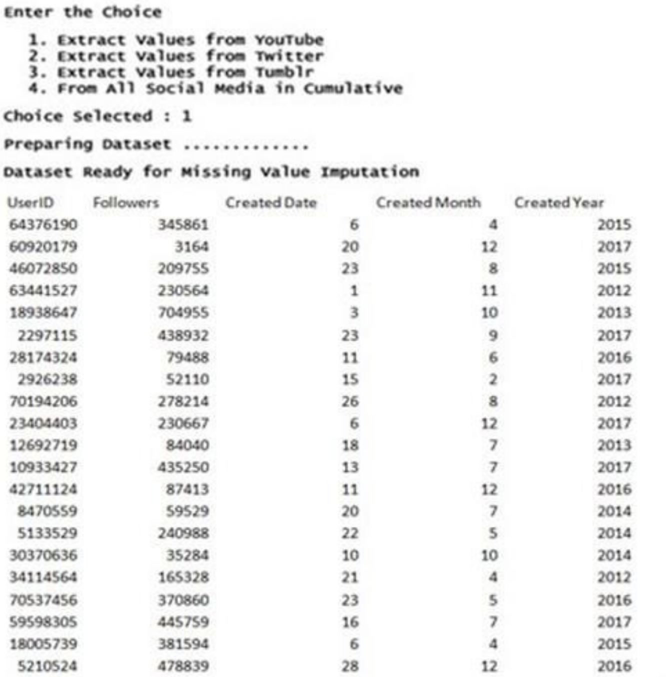
Mean Value based Missing Value Imputation

UserID	Followers	Created Date	Created Month	Created Year
64376190	345861	6	4	2015
60920179	3164	20	12	2017
46072850	209755	23	8	2015
63441527	230564	1	11	2012
18938647	213814.81	3	10	2013
2297115	438932	23	9	2017
28174324	213814.81	11	6	2016
2926238	52110	15	2	2017
70194206	278214	26	8	2012
23404403	230667	6	12	2017
12692719	213814.81	18	7	2013
10933427	435250	13	7	2017
42711124	87413	11	12	2016
8470559	59529	20	7	2014
5133529	240988	22	5	2014
30370636	35284	10	10	2014
34114564	165328	21	4	2012
70537456	370860	23	5	2016
59598305	445759	16	7	2017
18005739	381594	6	4	2015
5210524	478839	28	12	2016

C. *MISSING VALUE TREATMENT USINGRANDOM BASEDAPPROACH*

The screenshot is showing the treated values using the random forest-based approach of missing value treatment. These imputed values are different from the statistically based imputation.

Table III DATA WITH MISSING VALUE TREATMENT



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Enter the Choice

   1. Extract Values from YouTube
   2. Extract Values from Twitter
   3. Extract Values from Tumblr
   4. From All Social Media in Cumulative

Choice Selected : 1

Preparing Dataset .............

Dataset Ready for Missing Value Imputation
```

UserID	Followers	Created Date	Created Month	Created Year
64376190	345861	6	4	2015
60920179	3164	20	12	2017
46072850	209755	23	8	2015
63441527	230564	1	11	2012
18938647	704955	3	10	2013
2297115	438932	23	9	2017
28174324	79488	11	6	2016
2926238	52110	15	2	2017
70194206	278214	26	8	2012
23404403	230667	6	12	2017
12692719	84040	18	7	2013
10933427	435250	13	7	2017
42711124	87413	11	12	2016
8470559	59529	20	7	2014
5133529	240988	22	5	2014
30370636	35284	10	10	2014
34114564	165328	21	4	2012
70537456	370860	23	5	2016
59598305	445759	16	7	2017
18005739	381594	6	4	2015
5210524	478839	28	12	2016

Summary of the Records Identified with Missing Values Extracted from different social media

Following is the analytics of the general executions in exceptional social media in terms of lacking values extracted in unique timelines.

Following are the styles of data extracted from social media from distinct class and instance with the datasets used on assorted subjects.

TableIV DATASETS EVALUATION UNDER CLASSESAND INSTANCES

Datasets	Instances	Dataset Size (KB)	Classes
UGC	548	96	1
Delhi	680	37	2
Disaster	697	48	2
Election	536	60	3
University	673	60	1
Mumbai	905	46	2

Table v is the depiction of class definitions with the facts evaluation scenarios. Inside the subsequent effects, the accuracy degree is measured.

Table V CLASS DEFINITIONS AND RECORDS

Class	Id	Records Evaluated
Education	1	1219
Location	2	2211
Politics	3	487

Following table VI is the percentage of accuracy finished after implementation using specific processes of the existing

Table VI APPROACH BASED ACCURACY

Category	**Statistical Evaluation Based Outcome**	**Random Forest**
Education	50	70
Location	66.48	94
Politics	75.83	95

The accuracy is evaluated with the benchmark of traditional suggest. The evaluation of blunders aspect from the proposed method is evaluated and compared from statistical analysis. The deviation among the values obtained from the proposed and classical method is the bottom of the assessment of mistakes factor in absolute and relative terms.

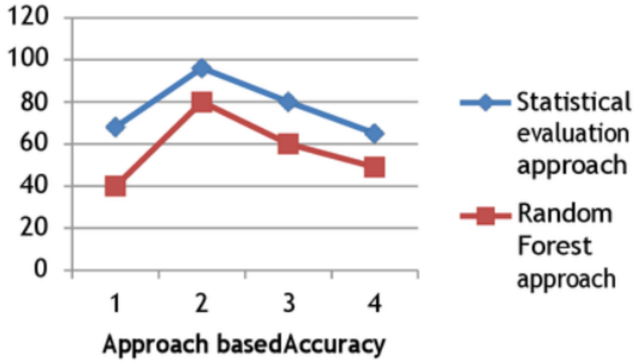

Fig. (2) Approach Based Accuracy

D. *EVALUATION AND COMPARISONOF INTEGRITY IN PROPOSED APPROACH AND EARLIER APPROACH*

Integrity signifies the consistency of the set of rules in terms of jogging in distinctive key phrases. From the effects, it's far obtrusive that the proposed random forest method is integrity and consistency aware of exclusive situations of execution with special keywords in comparison to the preceding processes of statistical evaluation. Following the effects show that the execution time is integrity aware and constant without any ambiguity.

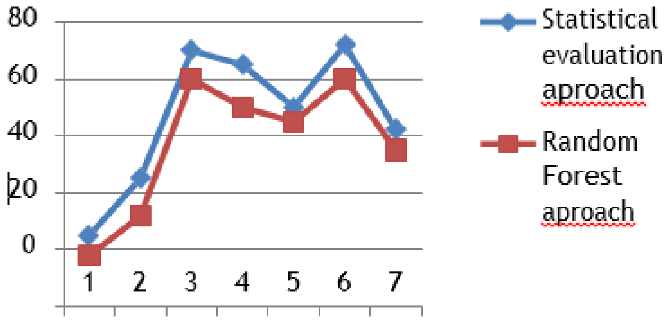

Fig. (3) EVALUATION OF INTEGRITY

VI CONCLUSION

Statistical Evaluation Based techniques are used from many years so in this research work soft computing based technique is used. Using soft computing and Random Forest based algorithms the overall result can be improved. This work extracts the live data from multiple social and extracts the missing values. On extracted missing values, the global fitness score for missing value treatment is done for higher accuracy using soft computing. There are nature inspired approaches which can be further analyzed.

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21. Fengfeng Fan, 2017 presents the work on online missing value imputation using OL-MVI Model. In this approach, all the tuples / records are analyzed and summarized for missing value treatment from real timedata.

AUTHOR PROFILE

Sukhman Kaur received M.C.A degree in computer science and application from Punjabi University, Patiala, India, in 2015. She received an MPhil degree in computer science and application from Punjabi University, Patiala, India, in 2018. She is currently pursuing a Ph.D. degree in Computer Scienceat Punjabi University, Patiala, India. Her research interests include Data mining and networking.

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