**Tugas SDI berbasis Datamining**

Membuat model SDI dengan mengacu pada model di paper “*Increasing Accuracy and Completeness of Intrusion Detection Model Using Fusion of Normalization, Feature Selection Method and Support Vector Machine*”

Model pada Paper Referensi:  
-Dataset: **NSL-KDD**

-Metode Normalisasi: **Log**

-Metode Seleksi Fitur: **original-RIGFS** dan **modified-RIGFS**

-Metode Classifier: **SVM** dari LibSVM C-SVC kernel RBF

Model untuk Tugas Kelompok:

-Dataset: **NSL-KDD**

-Metode Normalisasi: **Log** dan **Z-score**

-Metode Seleksi Fitur: Metode Search "**Ranker**",

dengan pembagian jenis **attribute selection** untuk kelompok adalah sebagai berikut:

Kelompok 1. **InfoGain**AttributeEval

Kelompok 2. **GainRatio**AttributeEval

Kelompok 3. **Correlation**AttributeEval

Kelompok 4. **ChiSquared**AttributeEval

Kelompok 5. **SVM**AttributeEval

Kelompok 6. **ReliefF**AttributeEval

Kelompok 7. **SymetricalUncert**AttributeEval

Kelompok 8. **OneRAttribute**Eval

-Metode Classifier: **SVM** dari LibSVM C-SVC kernel RBF

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TAHAPAN MENGGUNAKAN WEKA DATA MINING UNTUK MENGUJI MODEL SISTEM DETEKSI INTRUSI

Dataset: NSLKDD

**1]. Menghilangkan Atribut yang tidak berguna (Useless)**

menggunakan perintah: weka.filters.**unsupervised**.attribute.RemoveUseless

[HASIL] Atribut yang dihapus:

@attribute **num\_outbound**\_cmds numeric

@attribute **is\_hot\_login** numeric

**2]. Merubah nilai Atribut Nominal ke Numerik**

menggunakan perintah: weka.filters.unsupervised.attribute.**OrdinalToNumeric**

Pada Dataset NSLKDD ada 4 atribut Nominal, yaitu: **protocol\_type, service, flag, dan class**. TETAPI untuk atribut class TIDAK diproses ke Numerik.

@attribute **protocol\_type** {tcp,udp,icmp}

Nilai diurutkan berdasarkan abjad:

* Icmp
* Tcp
* Udp

Selanjutnya baru diberi nilai konversi mulai dari 0

* Icmp 🡪 0
* Tcp 🡪 1
* Udp 🡪 2

@attribute **service** {ftp\_data,other,private,http,remote\_job,name,netbios\_ns, eco\_i,mtp,telnet,finger,domain\_u,supdup,uucp\_path,Z39\_50,smtp,csnet\_ns,uucp,netbios\_dgm,urp\_i,auth,domain,ftp,bgp,ldap,ecr\_i,gopher,vmnet,systat,http\_443,efs,whois,imap4,iso\_tsap,echo,klogin,link,sunrpc,login,kshell,sql\_net,time,hostnames,exec,ntp\_u,discard,nntp,courier,ctf,ssh,daytime,shell,netstat,pop\_3,nnsp,IRC,pop\_2,printer,tim\_i,pm\_dump,red\_i,netbios\_ssn,rje,X11,urh\_i,http\_8001}

@attribute **flag** {SF,S0,REJ,RSTR,SH,RSTO,S1,RSTOS0,S3,S2,OTH}

@attribute **class** {normal,dos,r2l,probe,u2r}

**[3] Melakukan normalisasi nilai numerik (penyamaan skala atau rentang nilai).**

Metode Normalisasi yang umum digunakan pada sistem deteksi intrusi adalah:

a) MinMax,

b) Zscore,

c) Log.

Berikut contoh implementasi di WEKA menggunakan "**MathExpression**":

[3A]. weka.filters.unsupervised.attribute.MathExpression-E(A-MIN)/(MAX-MIN)-Rlast

expression formula: **(A-MIN)/(MAX-MIN)**

[3B]. -weka.filters.unsupervised.attribute.MathExpression-Elog(1+A)-Rlast

expression formula: **log(1+A)**

[3C]. -weka.filters.unsupervised.attribute.MathExpression-E(A-MEAN)/SD

expression formula: **(A-MEAN)/SD**

Berikut contoh implementasi di WEKA menggunakan "**Normalize**":

[3D]. -weka.filters.unsupervised.attribute.Normalize

ignoreClass: False (setting default)

\*\*\*Catatan:

Normalize, By default, the resulting values are in [0,1] for the data used to compute the normalization intervals.

But with the scale and translation parameters one can change that, e.g., with scale = 2.0 and translation = -1.0 you get values in the range [-1,+1].

ignoreRange -- Specify range of attributes to ignore. This is a comma separated list of attribute indices, with "first" and "last" valid values. Specify an inclusive range with "-". E.g: "first-3,5,6-10,last".

**[4]. Melakukan Seleksi Fitur yang dianggap paling berguna (Attribute Selection)**

Pada ujicoba kali ini menggunakan Metode Search "**Ranker**",

dengan pilihan attribute selection sebagai berikut:

A. **InfoGain**AttributeEval

B. **GainRatio**AttributeEval

C. **Correlation**AttributeEval

D. **ChiSquared**AttributeEval

E. **SVM**AttributeEval

F. **ReliefF**AttributeEval

G. **SymetricalUncert**AttributeEval

H. **OneRAttribute**Eval

-------------------------------------------------

**[4A]. Attribute Selection - InfoGainAttributeEval**

Attribute Evaluator: InfoGainAttributeEval

Search Method: Ranker

Attribute Selection Mode: Use full training set atau Cross-Validation

setting: (Nom) class

**file: "KDDTrain20P\_05A\_RemUseless\_OrdToNum\_Log.arff"**

Hasil:

=== Run information ===

Evaluator: weka.attributeSelection.InfoGainAttributeEval

Search: weka.attributeSelection.Ranker -T -1.7976931348623157E308 -N -1

Relation: KDDTrain20P\_05A.arff-weka.filters.unsupervised.attribute.Remove-R42-weka.filters.unsupervised.attribute.RemoveUseless-M99.0-weka.filters.unsupervised.attribute.OrdinalToNumeric-R2,3,4-weka.filters.unsupervised.attribute.MathExpression-Elog(1+A)-Rlast

Instances: 25192

Attributes: 40

duration

protocol\_type

service

flag

src\_bytes

dst\_bytes

land

wrong\_fragment

urgent

hot

num\_failed\_logins

logged\_in

num\_compromised

root\_shell

su\_attempted

num\_root

num\_file\_creations

num\_shells

num\_access\_files

is\_guest\_login

count

srv\_count

serror\_rate

srv\_serror\_rate

rerror\_rate

srv\_rerror\_rate

same\_srv\_rate

diff\_srv\_rate

srv\_diff\_host\_rate

dst\_host\_count

dst\_host\_srv\_count

dst\_host\_same\_srv\_rate

dst\_host\_diff\_srv\_rate

dst\_host\_same\_src\_port\_rate

dst\_host\_srv\_diff\_host\_rate

dst\_host\_serror\_rate

dst\_host\_srv\_serror\_rate

dst\_host\_rerror\_rate

dst\_host\_srv\_rerror\_rate

class

Evaluation mode: evaluate on all training data

=== Attribute Selection on all input data ===

Search Method:

Attribute ranking.

Attribute Evaluator (supervised, Class (nominal): 40 class):

Information Gain Ranking Filter

Ranked attributes:

1.031066 5 src\_bytes

0.859716 3 service

0.725548 28 diff\_srv\_rate

0.705719 4 flag

0.661823 6 dst\_bytes

0.657095 27 same\_srv\_rate

0.653126 33 dst\_host\_diff\_srv\_rate

0.604614 21 count

0.592836 31 dst\_host\_srv\_count

0.576413 32 dst\_host\_same\_srv\_rate

0.565873 36 dst\_host\_serror\_rate

0.548323 23 serror\_rate

0.538136 37 dst\_host\_srv\_serror\_rate

0.514508 24 srv\_serror\_rate

0.43935 12 logged\_in

0.377375 35 dst\_host\_srv\_diff\_host\_rate

0.343376 34 dst\_host\_same\_src\_port\_rate

0.300444 30 dst\_host\_count

0.235109 22 srv\_count

0.213594 29 srv\_diff\_host\_rate

0.135349 38 dst\_host\_rerror\_rate

0.120556 2 protocol\_type

0.119999 39 dst\_host\_srv\_rerror\_rate

0.109055 25 rerror\_rate

0.07831 1 duration

0.076359 26 srv\_rerror\_rate

0.033372 10 hot

0.015315 20 is\_guest\_login

0.012974 8 wrong\_fragment

0.010869 13 num\_compromised

0.004729 16 num\_root

0.003145 14 root\_shell

0.002998 17 num\_file\_creations

0.002894 19 num\_access\_files

0.002458 11 num\_failed\_logins

0.000755 15 su\_attempted

0.000446 9 urgent

0.000382 18 num\_shells

0 7 land

Selected attributes: **5,3,28,4,6,27,33,21,31,32,36,23,37,24,12,35,34,30,22,29,38,2,39,25,1,26,10,20,8,13,16,14,17,19,11,15,9,18,7 : 39**

-------------------------------------------------

**[4B] Attribute Selection: GainRatioAttributeEval**

Attribute Evaluator: GainRatioAttributeEval

Search Method: Ranker

Attribute Selection Mode: Use full training set atau Cross-Validation

setting: (Nom) class

**file: "KDDTrain20P\_05A\_RemUseless\_OrdToNum\_Log.arff"**

=== Run information ===

Evaluator: weka.attributeSelection.GainRatioAttributeEval

Search: weka.attributeSelection.Ranker -T -1.7976931348623157E308 -N -1

Relation: KDDTrain20P\_05A.arff-weka.filters.unsupervised.attribute.Remove-R42-weka.filters.unsupervised.attribute.RemoveUseless-M99.0-weka.filters.unsupervised.attribute.OrdinalToNumeric-R2,3,4-weka.filters.unsupervised.attribute.MathExpression-Elog(1+A)-Rlast

Instances: 25192

Attributes: 40

Evaluation mode: evaluate on all training data

=== Attribute Selection on all input data ===

Search Method:

Attribute ranking.

Attribute Evaluator (supervised, Class (nominal): 40 class):

Gain Ratio feature evaluator

Ranked attributes:

0.699 9 urgent

0.5106 24 srv\_serror\_rate

0.474 23 serror\_rate

0.4626 4 flag

0.454 12 logged\_in

0.4413 37 dst\_host\_srv\_serror\_rate

0.4372 28 diff\_srv\_rate

0.3868 36 dst\_host\_serror\_rate

0.3282 6 dst\_bytes

0.3226 27 same\_srv\_rate

0.3073 5 src\_bytes

0.2441 3 service

0.2371 35 dst\_host\_srv\_diff\_host\_rate

0.2283 11 num\_failed\_logins

0.2043 20 is\_guest\_login

0.202 33 dst\_host\_diff\_srv\_rate

0.1903 32 dst\_host\_same\_srv\_rate

0.1885 14 root\_shell

0.1803 31 dst\_host\_srv\_count

0.1786 21 count

0.1769 8 wrong\_fragment

0.1752 10 hot

0.1715 29 srv\_diff\_host\_rate

0.1565 25 rerror\_rate

0.147 26 srv\_rerror\_rate

0.1466 30 dst\_host\_count

0.1406 1 duration

0.1398 34 dst\_host\_same\_src\_port\_rate

0.1394 2 protocol\_type

0.1381 39 dst\_host\_srv\_rerror\_rate

0.1245 38 dst\_host\_rerror\_rate

0.1142 17 num\_file\_creations

0.114 13 num\_compromised

0.0989 16 num\_root

0.0946 19 num\_access\_files

0.083 18 num\_shells

0.0776 15 su\_attempted

0.0686 22 srv\_count

0 7 land

**Selected attributes: 9,24,23,4,12,37,28,36,6,27,5,3,35,11,20,33,32,14,31,21,8,10,29,25,26,30,1,34,2,39,38,17,13,16,19,18,15,22,7 : 39**

--------------------------------------------------

**[4C] Attribute Selection: CorrelationAttributeEval**

Attribute Evaluator: CorrelationAttributeEval

Search Method: Ranker

Attribute Selection Mode: Use full training set atau Cross-Validation

setting: (Nom) class

**file: "KDDTrain20P\_05A\_RemUseless\_OrdToNum\_Log.arff"**

=== Run information ===

Evaluator: weka.attributeSelection.CorrelationAttributeEval

Search: weka.attributeSelection.Ranker -T -1.7976931348623157E308 -N -1

Relation: KDDTrain20P\_05A.arff-weka.filters.unsupervised.attribute.Remove-R42-weka.filters.unsupervised.attribute.RemoveUseless-M99.0-weka.filters.unsupervised.attribute.OrdinalToNumeric-R2,3,4-weka.filters.unsupervised.attribute.MathExpression-Elog(1+A)-Rlast

Instances: 25192

Attributes: 40

Evaluation mode: evaluate on all training data

=== Attribute Selection on all input data ===

Search Method:

Attribute ranking.

Attribute Evaluator (supervised, Class (nominal): 40 class):

Correlation Ranking Filter

Ranked attributes:

0.69958 27 same\_srv\_rate

0.6542 37 dst\_host\_srv\_serror\_rate

0.65374 6 dst\_bytes

0.65135 36 dst\_host\_serror\_rate

0.64946 23 serror\_rate

0.64882 24 srv\_serror\_rate

0.64521 5 src\_bytes

0.63123 32 dst\_host\_same\_srv\_rate

0.60512 21 count

0.60399 12 logged\_in

0.58076 31 dst\_host\_srv\_count

0.56493 4 flag

0.28698 30 dst\_host\_count

0.25902 3 service

0.2024 29 srv\_diff\_host\_rate

0.20128 33 dst\_host\_diff\_srv\_rate

0.19872 38 dst\_host\_rerror\_rate

0.19572 25 rerror\_rate

0.19424 26 srv\_rerror\_rate

0.19203 39 dst\_host\_srv\_rerror\_rate

0.18298 34 dst\_host\_same\_src\_port\_rate

0.17765 28 diff\_srv\_rate

0.15063 35 dst\_host\_srv\_diff\_host\_rate

0.11362 1 duration

0.10375 22 srv\_count

0.10049 8 wrong\_fragment

0.09787 2 protocol\_type

0.05225 20 is\_guest\_login

0.04389 16 num\_root

0.03995 19 num\_access\_files

0.0271 17 num\_file\_creations

0.02282 15 su\_attempted

0.0224 14 root\_shell

0.02021 10 hot

0.01317 18 num\_shells

0.00909 11 num\_failed\_logins

0.00626 13 num\_compromised

0.00567 9 urgent

0.00149 7 land

**Selected attributes: 27,37,6,36,23,24,5,32,21,12,31,4,30,3,29,33,38,25,26,39,34,28,35,1,22,8,2,20,16,19,17,15,14,10,18,11,13,9,7 : 39**

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**[4D] Attribute Selection: ChiSquaredAttributeEval**

Attribute Evaluator: ChiSquaredAttributeEval

Search Method: Ranker

Attribute Selection Mode: Use full training set atau Cross-Validation

setting: (Nom) class

**file: "KDDTrain20P\_05A\_RemUseless\_OrdToNum\_Log.arff"**

=== Run information ===

Evaluator: weka.attributeSelection.ChiSquaredAttributeEval

Search: weka.attributeSelection.Ranker -T -1.7976931348623157E308 -N -1

Relation: KDDTrain20P\_05A.arff-weka.filters.unsupervised.attribute.Remove-R42-weka.filters.unsupervised.attribute.RemoveUseless-M99.0-weka.filters.unsupervised.attribute.OrdinalToNumeric-R2,3,4-weka.filters.unsupervised.attribute.MathExpression-Elog(1+A)-Rlast

Instances: 25192

Attributes: 40

Evaluation mode: evaluate on all training data

=== Attribute Selection on all input data ===

Search Method:

Attribute ranking.

Attribute Evaluator (supervised, Class (nominal): 40 class):

Chi-squared Ranking Filter

Ranked attributes:

50177.22488 5 src\_bytes

31304.31928 3 service

25060.90233 6 dst\_bytes

24856.87952 33 dst\_host\_diff\_srv\_rate

24215.00684 4 flag

23567.04307 28 diff\_srv\_rate

20709.88937 31 dst\_host\_srv\_count

20645.17255 27 same\_srv\_rate

19283.60884 32 dst\_host\_same\_srv\_rate

19088.67248 21 count

18511.0319 23 serror\_rate

18410.4987 36 dst\_host\_serror\_rate

16556.26269 37 dst\_host\_srv\_serror\_rate

16437.63659 35 dst\_host\_srv\_diff\_host\_rate

16239.3464 24 srv\_serror\_rate

15042.59289 34 dst\_host\_same\_src\_port\_rate

12623.9806 12 logged\_in

11603.02585 30 dst\_host\_count

10230.54672 10 hot

7708.21943 22 srv\_count

7302.43243 38 dst\_host\_rerror\_rate

6817.75966 29 srv\_diff\_host\_rate

5874.8288 25 rerror\_rate

5208.23011 2 protocol\_type

4610.61644 39 dst\_host\_srv\_rerror\_rate

4525.24427 1 duration

3276.79999 26 srv\_rerror\_rate

2289.27269 9 urgent

2149.38399 14 root\_shell

1906.70908 20 is\_guest\_login

1030.10093 13 num\_compromised

609.68375 17 num\_file\_creations

548.62573 11 num\_failed\_logins

390.58495 8 wrong\_fragment

172.50347 16 num\_root

79.03322 19 num\_access\_files

18.35146 15 su\_attempted

17.71939 18 num\_shells

0 7 land

**Selected attributes: 5,3,6,33,4,28,31,27,32,21,23,36,37,35,24,34,12,30,10,22,38,29,25,2,39,1,26,9,14,20,13,17,11,8,16,19,15,18,7 : 39**

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**[4E] Attribute Selection: SVMAttributeEval**

Attribute Evaluator: SVMAttributeEval

Search Method: Ranker

Attribute Selection Mode: Use full training set atau Cross-Validation

setting: (Nom) class

**file: "KDDTrain20P\_05A\_RemUseless\_OrdToNum\_Log.arff"**

=== Run information ===

Evaluator: weka.attributeSelection.SVMAttributeEval -X 1 -Y 0 -Z 0 -P 1.0E-25 -T 1.0E-10 -C 1.0 -N 0

Search: weka.attributeSelection.Ranker -T -1.7976931348623157E308 -N -1

Relation: KDDTrain20P\_05A.arff-weka.filters.unsupervised.attribute.Remove-R42-weka.filters.unsupervised.attribute.RemoveUseless-M99.0-weka.filters.unsupervised.attribute.OrdinalToNumeric-R2,3,4-weka.filters.unsupervised.attribute.MathExpression-Elog(1+A)-Rlast

Instances: 25192

Attributes: 40

Evaluation mode: evaluate on all training data

=== Attribute Selection on all input data ===

Search Method:

Attribute ranking.

Attribute Evaluator (supervised, Class (nominal): 40 class):

SVM feature evaluator

Ranked attributes:

39 10 hot

38 13 num\_compromised

37 11 num\_failed\_logins

36 5 src\_bytes

35 9 urgent

34 20 is\_guest\_login

33 1 duration

32 21 count

31 2 protocol\_type

30 31 dst\_host\_srv\_count

29 6 dst\_bytes

28 8 wrong\_fragment

27 3 service

26 18 num\_shells

25 24 srv\_serror\_rate

24 33 dst\_host\_diff\_srv\_rate

23 15 su\_attempted

22 16 num\_root

21 35 dst\_host\_srv\_diff\_host\_rate

20 25 rerror\_rate

19 14 root\_shell

18 32 dst\_host\_same\_srv\_rate

17 38 dst\_host\_rerror\_rate

16 26 srv\_rerror\_rate

15 17 num\_file\_creations

14 34 dst\_host\_same\_src\_port\_rate

13 19 num\_access\_files

12 12 logged\_in

11 7 land

10 36 dst\_host\_serror\_rate

9 22 srv\_count

8 23 serror\_rate

7 30 dst\_host\_count

6 4 flag

5 27 same\_srv\_rate

4 28 diff\_srv\_rate

3 37 dst\_host\_srv\_serror\_rate

2 39 dst\_host\_srv\_rerror\_rate

1 29 srv\_diff\_host\_rate

**Selected attributes: 10,13,11,5,9,20,1,21,2,31,6,8,3,18,24,33,15,16,35,25,14,32,38,26,17,34,19,12,7,36,22,23,30,4,27,28,37,39,29 : 39**

--------------------------------------------------

**[4F] Attribute Selection: ReliefFAttributeEval**

Attribute Evaluator: ReliefFAttributeEval

Search Method: Ranker

Attribute Selection Mode: Use full training set atau Cross-Validation

setting: (Nom) class

**file: "KDDTrain20P\_05A\_RemUseless\_OrdToNum\_Log.arff"**

=== Run information ===

Evaluator: weka.attributeSelection.ReliefFAttributeEval -M -1 -D 1 -K 10

Search: weka.attributeSelection.Ranker -T -1.7976931348623157E308 -N -1

Relation: KDDTrain20P\_05A.arff-weka.filters.unsupervised.attribute.Remove-R42-weka.filters.unsupervised.attribute.RemoveUseless-M99.0-weka.filters.unsupervised.attribute.OrdinalToNumeric-R2,3,4-weka.filters.unsupervised.attribute.MathExpression-Elog(1+A)-Rlast

Instances: 25192

Attributes: 40

Evaluation mode: evaluate on all training data

=== Attribute Selection on all input data ===

Search Method:

Attribute ranking.

Attribute Evaluator (supervised, Class (nominal): 40 class):

ReliefF Ranking Filter

Instances sampled: all

Number of nearest neighbours (k): 10

Equal influence nearest neighbours

Ranked attributes:

0.21929867 21 count

0.20233953 27 same\_srv\_rate

0.19611811 34 dst\_host\_same\_src\_port\_rate

0.18572241 3 service

0.18203333 36 dst\_host\_serror\_rate

0.15009965 22 srv\_count

0.13983123 12 logged\_in

0.13677162 31 dst\_host\_srv\_count

0.12818723 5 src\_bytes

0.12614573 32 dst\_host\_same\_srv\_rate

0.122485 37 dst\_host\_srv\_serror\_rate

0.10633939 30 dst\_host\_count

0.09943857 6 dst\_bytes

0.0965423 2 protocol\_type

0.0933454 24 srv\_serror\_rate

0.08675894 4 flag

0.08430504 10 hot

0.07758978 33 dst\_host\_diff\_srv\_rate

0.07240247 28 diff\_srv\_rate

0.07070872 38 dst\_host\_rerror\_rate

0.0568053 29 srv\_diff\_host\_rate

0.04192273 8 wrong\_fragment

0.03254505 25 rerror\_rate

0.03095399 13 num\_compromised

0.02725659 1 duration

0.02276852 23 serror\_rate

0.02096629 35 dst\_host\_srv\_diff\_host\_rate

0.01838283 26 srv\_rerror\_rate

0.0176215 39 dst\_host\_srv\_rerror\_rate

0.00867361 20 is\_guest\_login

0.00154474 14 root\_shell

0.0009382 11 num\_failed\_logins

0.00061977 16 num\_root

0.00054888 19 num\_access\_files

0.00041517 15 su\_attempted

0.00013753 17 num\_file\_creations

0.00011989 18 num\_shells

0.00002621 7 land

0.00000105 9 urgent

**Selected attributes: 21,27,34,3,36,22,12,31,5,32,37,30,6,2,24,4,10,33,28,38,29,8,25,13,1,23,35,26,39,20,14,11,16,19,15,17,18,7,9 : 39**

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**[5]. Memilih dan menyimpan hasil seleksi atribut.**

Menggunakan perintah "**Remove**" berdasarkan urutan (rank) atribut hasil seleksi.

Berikut contoh untuk memilih 10 atribut urutan tertinggi:

**[5A]. Memilih attribute dari Attribute Selection - InfoGainAttributeEval**

Selected attributes: 5,3,28,4,6,27,33,21,31,32,36,23,37,24,12,35,34,30,22,29,38,2,39,25,1,26,10,20,8,13,16,14,17,19,11,15,9,18,7 : 39

[Proses Remove]

weka.filters.unsupervised.attribute.Remove-V-R5,3,28,4,6,27,33,21,31,32,last'

Misal memilih 10 attribute rangking teratas.

attributeIndices: 5,3,28,4,6,27,33,21,31,32,last

invertSelection: True

[HASIL] [SIMPAN di File Baru]

@relation 'KDDTrain20P\_05A.arff-weka.filters.unsupervised.attribute.Remove-R42-weka.filters.unsupervised.attribute.RemoveUseless-M99.0-weka.filters.unsupervised.attribute.OrdinalToNumeric-R2,3,4-weka.filters.unsupervised.attribute.MathExpression-Elog(1+A)-Rlast-weka.filters.unsupervised.attribute.Remove-V-R5,3,28,4,6,27,33,21,31,32,last'

@attribute src\_bytes numeric

@attribute service numeric

@attribute diff\_srv\_rate numeric

@attribute flag numeric

@attribute dst\_bytes numeric

@attribute same\_srv\_rate numeric

@attribute dst\_host\_diff\_srv\_rate numeric

@attribute count numeric

@attribute dst\_host\_srv\_count numeric

@attribute dst\_host\_same\_srv\_rate numeric

@attribute class {normal,dos,r2l,probe,u2r}

======================================================================

**[5B]. Memilih attribute dari Attribute Selection - GainRatioAttributeEval**

Selected attributes: 9,24,23,4,12,37,28,36,6,27,5,3,35,11,20,33,32,14,31,21,8,10,29,25,26,30,1,34,2,39,38,17,13,16,19,18,15,22,7 : 39

[Proses Remove]

**weka.filters.unsupervised.attribute.Remove-V-R9,24,23,4,12,37,28,36,6,27,last'**

Misal memilih 10 attribute rangking teratas.

attributeIndices: 9,24,23,4,12,37,28,36,6,27,last

invertSelection: True

[HASIL] [SIMPAN di File Baru]

?????

======================================================================

**[5C]. Memilih attribute dari Attribute Selection - CorrelationAttributeEval**

Selected attributes: 27,37,6,36,23,24,5,32,21,12,31,4,30,3,29,33,38,25,26,39,34,28,35,1,22,8,2,20,16,19,17,15,14,10,18,11,13,9,7 : 39

[Proses Remove]

**weka.filters.unsupervised.attribute.Remove-V-R27,37,6,36,23,24,5,32,21,12,last'**

Misal memilih 10 attribute rangking teratas.

attributeIndices: 27,37,6,36,23,24,5,32,21,12,last

invertSelection: True

[HASIL] [SIMPAN di File Baru]

?????

======================================================================

**[5D]. Memilih attribute dari Attribute Selection - ChiSquaredAttributeEval**

Selected attributes: 5,3,6,33,4,28,31,27,32,21,23,36,37,35,24,34,12,30,10,22,38,29,25,2,39,1,26,9,14,20,13,17,11,8,16,19,15,18,7 : 39

[Proses Remove]

**weka.filters.unsupervised.attribute.Remove-V-R5,3,6,33,4,28,31,27,32,21,last'**

Misal memilih 10 attribute rangking teratas.

attributeIndices: 5,3,6,33,4,28,31,27,32,21,last

invertSelection: True

[HASIL] [SIMPAN di File Baru]

?????

======================================================================

**[5E]. Memilih attribute dari Attribute Selection - SVMAttributeEval**

Selected attributes: 10,13,11,5,9,20,1,21,2,31,6,8,3,18,24,33,15,16,35,25,14,32,38,26,17,34,19,12,7,36,22,23,30,4,27,28,37,39,29 : 39

[Proses Remove]

**weka.filters.unsupervised.attribute.Remove-V-R10,13,11,5,9,20,1,21,2,31,last'**

Misal memilih 10 attribute rangking teratas.

attributeIndices: 10,13,11,5,9,20,1,21,2,31,last

invertSelection: True

[HASIL] [SIMPAN di File Baru]

?????

======================================================================

**[5F]. Memilih attribute dari Attribute Selection - ReliefFAttributeEval**

Selected attributes: 21,27,34,3,36,22,12,31,5,32,37,30,6,2,24,4,10,33,28,38,29,8,25,13,1,23,35,26,39,20,14,11,16,19,15,17,18,7,9 : 39

[Proses Remove]

**weka.filters.unsupervised.attribute.Remove-V-R21,27,34,3,36,22,12,31,5,32,last'**

Misal memilih 10 attribute rangking teratas.

attributeIndices: 21,27,34,3,36,22,12,31,5,32,last

invertSelection: True

[HASIL] [SIMPAN di File Baru]

?????

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