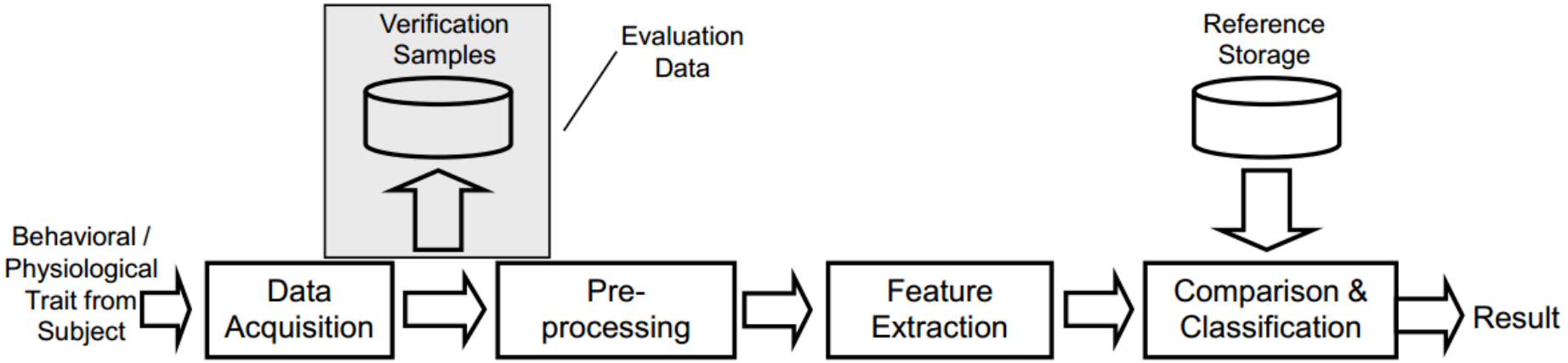
FAKULTÄT FÜR
INFORMATIK

Speaker Recognition

Speaker Recognition

- Identify person by the speech
- Our task was:
- close set speaker recognition
- Projection of the Speaker to the Characters of „Doddingtons Zoo“



Database

- 48 male
- 35 female
- mostly 5 recordings
- 415 recordings with a length between 5 and 35 seconds
- 100mb Size
- was recorded with normal telephones

- Source: hyke…

Preprocessing

- Created 3 different sets
  - Female
  - Male
  - Mixed

Train Set

- 4 Samples each Speaker

Test Set

- 1 Samples of 10 seconds each Speaker

Feature Extraction

- Used the AMSL Audio Feature Extractor
  - Divide recordings in small samples
  - Delivers 593 Features each sample

Result:

- All 415 recordings delivered XXX instances

Postprocessing

- Using Weka
  - Deleted unhelpful Features
    - e.g. same value by all instances
  - Deleted Instances without speech
    - Under usage of Aplitude
    - Approximatily 50% of the Database

Classification

- Using Weka
  - Used all relevant classifier
  - Used train set for training of the classifier
  - Used test for evaluation of the classifier

Best classifier:

	IBK	RandomForest
Male		
Female		
mixed		

Speaker is correct classified, if the majority of samples of **one** recording is correct classified

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Covarianzmatrix

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	aa	ab	ac	ad	ae	af	ag	ah	ai	<-- classified as
19	0	0	0	0	1	1	0	0	0	0	0	0	0	2	0	5	3	0	1	0	1	0	1	0	2	0	0	0	0	1	1	0	2	0	a = female_01
1	26	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	1	2	1	1	0	3	0	0	0	3	0	0	0	0	0	b = female_02
0	0	20	0	0	0	2	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	5	1	0	0	0	0	0	0	0	1	0	0	1	c = female_03
0	0	0	8	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	d = female_04
1	3	1	0	12	2	0	0	5	0	0	1	1	0	0	0	0	1	0	4	2	0	0	0	0	1	0	0	0	2	2	0	0	1	1	e = female_05
0	0	0	0	0	36	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	f = female_06
0	1	0	0	2	0	13	0	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	3	0	g = female_07
2	0	0	0	0	0	3	26	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	h = female_08
0	0	0	0	1	0	2	0	11	0	0	0	1	0	3	0	0	1	0	3	0	1	0	2	0	0	0	0	0	2	3	3	0	0	0	i = female_09
0	0	1	0	0	0	0	0	0	22	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	j = female_10
0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	1	0	0	1	0	1	0	1	1	0	2	0	1	0	0	0	0	0	0	1	k = female_11
0	0	0	0	1	0	0	3	0	0	1	17	0	0	0	0	0	0	0	2	0	0	0	1	0	3	0	1	0	0	0	0	0	2	0	l = female_12
0	1	0	0	2	0	0	1	1	0	2	0	16	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	m = female_13
1	0	0	4	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	n = female_14
1	1	0	0	6	0	2	0	0	0	0	1	0	0	11	0	0	2	0	0	2	1	1	0	0	4	1	4	0	1	0	1	0	5	0	o = female_15
0	0	0	0	0	0	0	1	0	2	0	0	0	2	0	18	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	p = female_16
3	1	0	0	3	0	1	0	1	0	0	0	0	0	2	0	14	5	0	0	0	2	0	3	0	0	0	0	0	1	0	2	1	8	0	q = female_17
3	0	0	0	2	0	0	0	0	0	1	0	1	0	1	0	0	23	0	1	2	0	0	0	0	1	0	0	1	0	0	0	0	2	0	r = female_18
0	0	4	0	0	0	0	0	0	2	4	0	0	1	0	0	0	0	12	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	1	s = female_19
1	3	0	0	1	0	1	1	0	0	1	1	0	0	0	0	1	0	0	15	1	1	0	3	0	0	0	0	0	2	0	3	0	2	0	t = female_20
1	0	0	0	2	1	1	0	0	0	1	1	0	0	1	0	1	1	2	1	8	2	2	0	0	0	0	0	0	0	0	0	0	2	1	u = female_21
0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	6	8	1	1	0	1	0	0	1	0	3	2	0	1	1	v = female_22
0	0	0	0	0	0	0	0	0	2	1	1	0	0	1	1	0	0	1	0	1	0	32	1	0	0	0	0	0	0	0	0	0	0	1	w = female_23
1	1	1	0	2	0	0	0	2	0	0	1	0	0	0	0	1	2	1	3	0	0	1	12	0	2	0	1	0	0	0	2	0	2	0	x = female_24
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	17	0	0	0	0	0	0	1	0	0	y = female_25
4	5	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	0	1	0	0	0	2	0	21	0	0	0	2	1	0	0	1	0	z = female_26
0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2	16	0	0	0	0	0	0	0	0	aa = female_27
1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	0	0	0	0	0	2	0	ab = female_28
0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	1	1	0	0	0	0	0	0	14	1	0	0	0	0	0	ac = female_29
1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	5	0	0	1	0	0	2	0	1	0	29	1	0	0	0	0	ad = female_30
0	1	0	0	0	0	0	0	1	0	1	0	4	0	1	1	0	0	0	6	0	0	0	2	0	0	0	1	0	0	18	1	0	2	0	ae = female_31
0	1	0	0	1	0	1	0	4	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	5	0	0	1	af = female_32
0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	1	1	0	2	0	0	1	1	0	0	0	13	0	0	ag = female_33
0	0	0	0	3	0	0	0	0	0	1	1	0	0	2	0	1	1	0	1	3	2	0	0	0	0	0	1	0	0	0	1	0	16	2	ah = female_34
0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	13	ai = female_35

Doddington Zoo

- Sheeps: easily accepted by the system
- Goats: exceptionally unsuccessful at being accepted
- Lambs: exceptionally vulnerable to impersonation
- Wolves: exceptionally successful at impersonation

character	percentage
Sheep	90%
Goat	5%
Lamp	2,5%
Wolfs	2,5%

Conclusion

- Database very important
- 97,5% authentication rate

Vielen Dank für Ihre Aufmerksamkeit!

www.ovgu.de

Sources