Database Specification

Overview

- Over 2200 form-pages of (937) Tunisian town/village names
- All data are digitized using a resolution of 300 dpi (b/w)
- Ground truth information available
  - e.g. sequence of Arabic character shapes
  - baseline/reference line position
  - topline position for set_a
- A wide variety of writing styles; 411 different writers
- About 26000 Arabic handwritten Tunisian town/village names
- Approximately 212 000 Arabic characters and ligatures
- Divided into 4 sets (a-d)
- Images and ground truth documentation included

Set specification

The whole database is divided into 4 disjoint sets for training and testing Arabic OCR systems. We recommend using the specified sets for comparability with results of other groups.

SET	Number of words	Number of writer (OK+bad)
a	6537	88+14=102
b	6710	89+13=102
c	6477	88+15=103
d	6735	90+14=104
SUM	**26459**	355+56=**411**

Data formats

Image format

The form-pages are stored in uncompressed TIFF-file format (file-extension .tif).
All cropped Tunisian town/village names coming as uncompressed TIFF-images and as BMP-images (file-extension .bmp). In the TIFF header section “Image description” label information is stored.

Ground Truth format

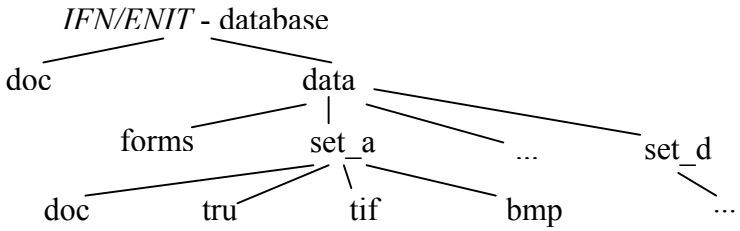
For each cropped Tunisian town/village name you find a truth file (file-extension .tru). The truth-file is an ASCII .txt file including all available ground truth information. One example is shown below.

```
01: COM: IFN/ENIT-database truth (label) file
02: COM: http://www.ifnenit.com
03: COM: IfN, TU-BS
04: COM: di45_019.tif coming from pb377_6.tif
05: X_Y: 498 87
06: BDR: begin data record
07: LBL: ZIP:3032;AW1:مركزدرويش;AW2:maB|raE|keB|zaE|daA|raA|waA|yaB|shE|;QUA:YB1;ADD:P6
08: CHA: 9
09: BLN: 56,42
10: TLN: 23,19
11: EDR: end of data record
```

lines 01-04: comments
line 05: image size in pixel (x,y)
line 06: begin data record
line 07: label
ZIP: Tunisian post code / ZIP code
AW1: Tunisian town/village name in Arabic windows encoding
AW2: Arabic character shape sequence of Tunisian town/village name in Latin code (refer Appendix for the lookup table).
QUA: baseline quality tag (B1=:OK;B2=:bad)
ADD: number of pieces of Arabic words (PAW's)
line 08: number of characters
line 09: baseline/reference line information Y1,Y2
line 10: topline information Y1,Y2 (in data set_a only!!!)
line 11: end of data record

Database Organisation

The *IFN/ENIT*-database has the following directory structure.



doc
In this directory documentation in pdf and/or txt format is available.

data
In this directory all available data are stored. Each of the four sets has it's own directory (set_?).

set_?
In these directories all data are available in tif and bmp file format. The ground truth information you will find in the directory tru. The subdirectory doc under data/set_? includes a pdf-file for each writer with all words and baselines.

File name convention

The following file name convention is used.
SWww_NNN.EXT

- S:=set (a,b,c,d)
- Www:=writerID; W=(e,f,i,j,m,q) ,w=(0..9)
- NNN:=word_number; N=(0..9)

Ordering Information

IFN/ENIT-database is made available for non-commercial use. The data is supplied with no guarantee of accuracy or usability. We can't guarantee to maintain the *IFN/ENIT*-database, but would be interested in hearing of any comments or results that you have.

Upon request we make the data available on the Internet for free download. If the database has to be shipped as a CD-Rom production and shipping costs will be charged. In both cases please contact us.

BUGS

When you are working with the *IFN/ENIT*-database perhaps you will discover bugs concerning the label or the extraction of the data. Please report the bugs you find back to us. So we can improve the quality of the data over the time.

Reporting results

We kindly invite you to publish reached results with the *IFN/ENIT*-database. To keep recognition results comparable, we suggest reporting results as shown in the following example:

Database version: ***IFN/ENIT*-database v1.0p2**			
Test	Training set(s)	Test set	Recognition result(*)
1	a,b,c	D	23.7%
2	c,b,d	A	25,4%
…			

(*) Percentage of correctly recognised words in the specified test set. We recommend to use the ground truth / label category "ZIP:" as reference for the recognition result. Please use for each test the whole number of 937 different Tunisian town/village names as lexicon, in the case a lexicon is needed.

Contact

Please feel free to contact contact@ifnenit.com.

References

Mario Pechwitz, Samia Snoussi Maddouri, Volker Märgner, Noureddine Ellouze, Hamid Amiri; ***IFN/ENIT*-database of handwritten Arabic words**, In Proceedings of CIFED'02, Hammamet, Tunisia, 21.-23.10.2002, p. 129-136

Appendix

Label legend / lookup table – *Arabic* label to *Latin* label & statistic of occurrence in the database

Arabic label	***Latin*** label	**Quantity**
0_A	0A	342
1_A	1A	279
2_A	2A	384
6_A	6A	311
7_A	7A	354
8_A	8A	284
9_A	9A	341
ء_A	hhA	520
آ_A	amA	544
أ_A	aeA	1660
إ_A	ahA	631
أ_EلB	aeElaB	360
إ_EلB	ahElaB	122
ئ_M	alM	355
ا_A	aaA	20251
ا_E	aaE	13308
ا_EلB	aaElaB	799
ا_EلM	aaElaM	1076
ب_A	baA	331
ب_B	baB	5636
ب_E	baE	344
ب_M	baM	3407
ة_A	teA	2182
ت_A	taA	356
ت_B	taB	2324
ة_E	teE	7259
ت_E	taE	357
ت_M	taM	1045

ث_A	thA	338
ث_B	thB	353
ث_M	thM	327
ج_A	jaA	504
ج_B	jaB	981
ج_E	jaE	346
ج_M	jaM	1218
ج_Bل_M	jaMlaB	539
ح_A	haA	314
ح_B	haB	2483
ح_E	haE	295
ح_M	haM	1804
ح_Bل_M	haMlaB	365
ح_Bل_Mم_M	haMmaMlaB	64
ح_Bن_M	haMnaB	100
خ_A	khA	341
خ_B	khB	863
خ_E	khE	321
خ_M	khM	425
خ_Bل_M	khMlaB	310
د_A	daA	2718
د_E	daE	4883
ذ_A	dhA	353
ذ_E	dhE	703
ر_A	raA	6252
ر_E	raE	9369
ز_A	zaA	1764
ز_E	zaE	2718
س_A	seA	873
س_B	seB	4218
س_E	seE	811
س_M	seM	1110
ش_A	shA	475
ش_B	shB	1617
ش_E	shE	351
ش_M	shM	1277
ص_A	saA	355
ص_B	saB	956
ص_E	saE	357
ص_M	saM	1096
ض_A	deA	351
ض_B	deB	730
ض_E	deE	343
ض_M	deM	328

ط_A	toA	343
ط_B	toB	359
ط_E	toE	350
ط_M	toM	1258
ظ_B	zaB	339
ظ_M	zaM	690
ع_A	ayA	915
ع_B	ayB	1650
ع_E	ayE	347
ع_M	ayM	1990
غ_B	ghB	326
غ_M	ghM	600
ف_A	faA	319
ف_B	faB	898
ف_E	faE	316
ف_M	faM	1647
ق_A	kaA	397
ق_B	kaB	2608
ق_E	kaE	348
ق_M	kaM	1307
ك_B	keB	1221
ك_E	keE	335
ك_M	keM	980
ل_A	laA	1485
ل_B	laB	14340
ل_E	laE	1056
ل_M	laM	2594
م_A	maA	890
م_B	maB	3886
م_E	maE	536
م_M	maM	4626
م_Bل_M	maMlaB	458
ن_A	naA	1267
ن_B	naB	3723
ن_E	naE	2119
ن_M	naM	2912
ه_A	heA	696
ه_B	heB	1924
ه_E	heE	351
ه_M	heM	347
و_A	waA	3511
و_E	waE	6529
ى_A	eeA	322
ي_A	yaA	2932

ي_B	yaB	4383
ى_E	eeE	350
ي_E	yaE	2167
ي_M	yaM	7759

Note:

- "llL" is often added and means ligature "chadda"
- The character shape indicators (A,B,M,E) are sometimes supplemented with a "1" or a "2", like "baA1". In this case there is a point error detected. Take care: this feature is not consistent over the whole database ☹. We recommend ignoring these kinds of label supplements.