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محرف

Muharaf: Manuscripts of Handwritten Arabic Dataset for Cursive Text Recognition

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NEURAL INFORMATION PROCESSING SYSTEMS

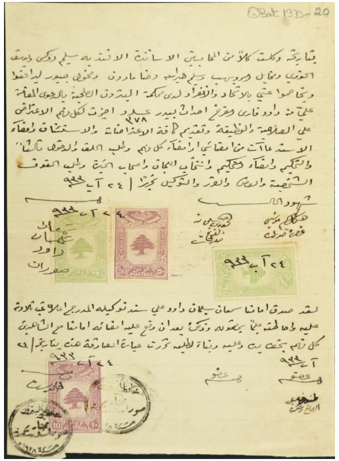
Outline

- Muharaf dataset
- Contribution
- Data collection
- Handwritten text recognition (HTR) results
- Future directions

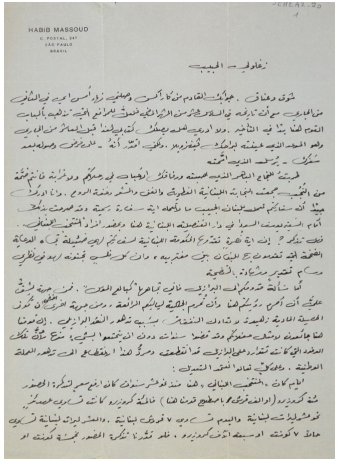
Muharaf Dataset

- Purpose: Train handwritten text recognition system for historic Arabic manuscripts with casual writing styles
- Composition: Annotated and transcribed text lines
- Muharaf: 1,644 images (1,216 public, 428 restricted)

- Time period: 1800-2011
- Text lines: 36,311
- Text regions: 4,867



Al Batroun Collection



HABIB MASSOUD
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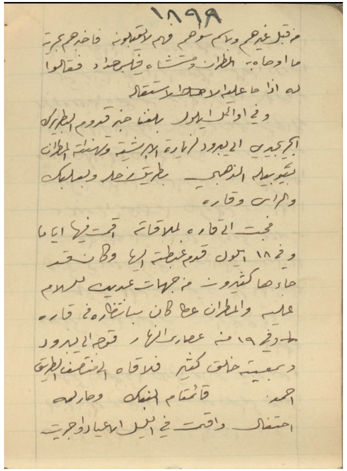
Joseph El Hachem Collection



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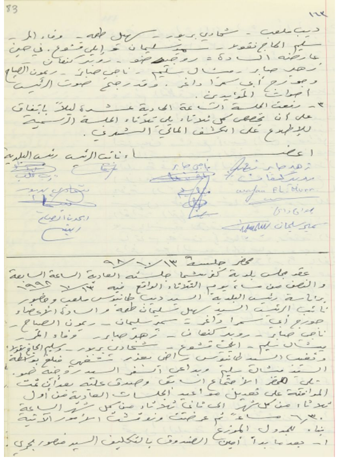
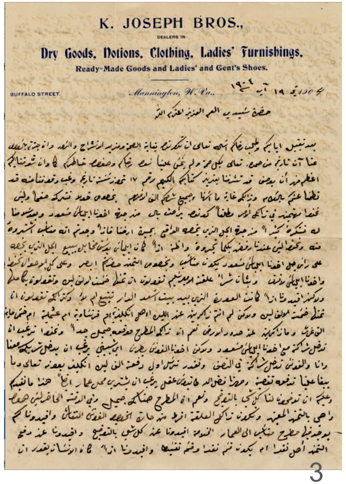
Hanna Gaith Collection



Papers of Kfarchima Municipality



K. JOSEPH BROS.,
DEALERS IN
Dry Goods, Notions, Clothing, Ladies' Furnishings,
Ready-Made Goods and Ladies' and Gent's Shoes.

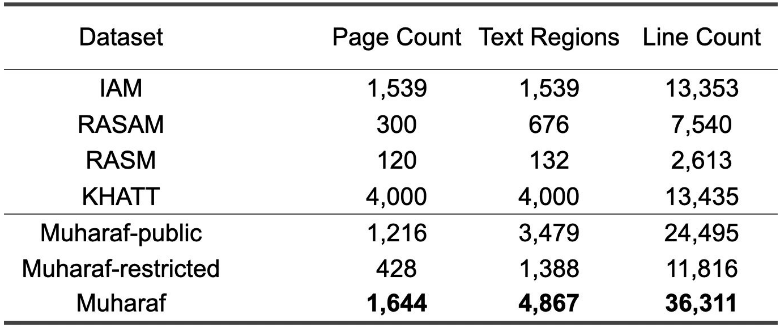
BUFFALO STREET. Mannington, W. Va., ١٩٠٤ آب ١٩ ي 1904

حضرة سيدي العم العزيز اعزه الله

K. Joseph Collection

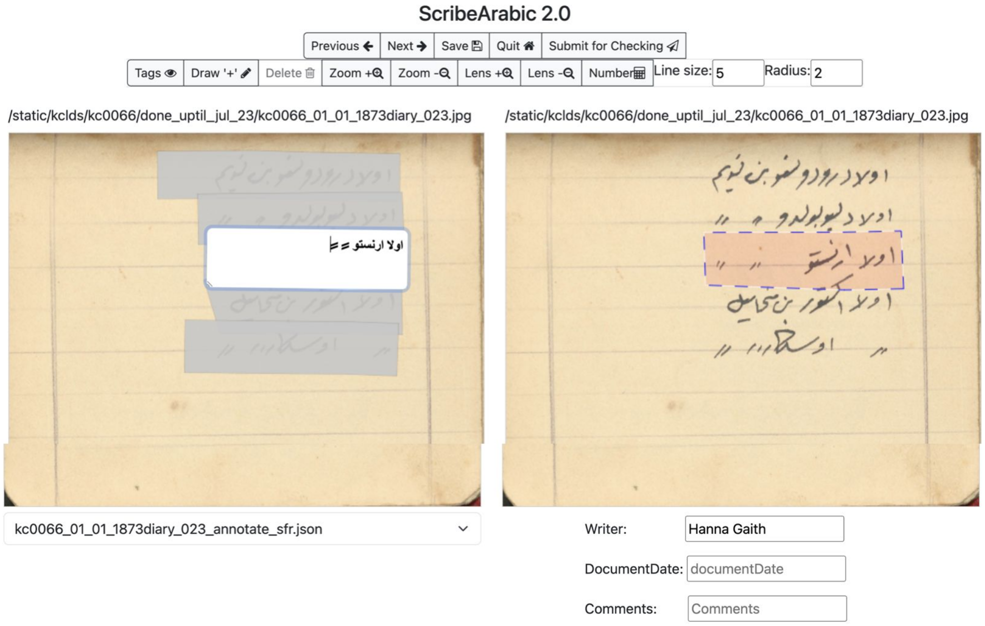
Contribution

- Largest publicly available historic Arabic dataset for handwritten text recognition
- Unlike IAM and KHATT (scribed under controlled experimental conditions)
- Ruq‘ah: Casual/informal style of writing
- Uses: HTR, text-line segmentation, layout detection, writer identification
- Challenges: Ink bleeds, crossed-out text, barely legible handwriting, torn paper



Dataset	Page Count	Text Regions	Line Count
IAM	1,539	1,539	13,353
RASAM	300	676	7,540
RASM	120	132	2,613
KHATT	4,000	4,000	13,435
Muharaf-public	1,216	3,479	24,495
Muharaf-restricted	428	1,388	11,816
Muharaf	**1,644**	**4,867**	**36,311**

ScribeArabic - Software for Data Collection



Line size: 5 Radius: 2

/static/kclds/kc0066/done_uptil_jul_23/kc0066_01_01_1873diary_023.jpg

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kc0066_01_01_1873diary_023_annotate_sfr.json

Writer: Hanna Gaith

DocumentDate: documentDate

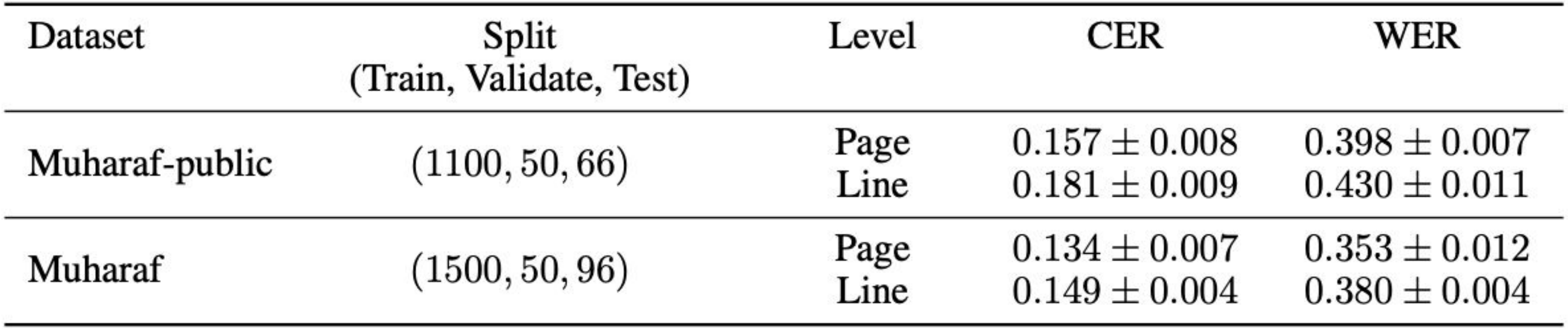
Comments: Comments

Transcription Team

- History professor from Lebanese Association for History.
- Two expert Arabic manuscript archivists at Holy Spirit University of Kaslik (USEK).
- QA: History professors at USEK and NC State.

Experimental Results

- CNN based Start, Follow, Read (Wigington et al., 2018) - Adapted for Arabic
- End-to-end full page handwritten text recognition



Dataset	Split (Train, Validate, Test)	Level	CER	WER
Muharaf-public	$(1100, 50, 66)$	Page	0.157 ± 0.008	0.398 ± 0.007
		Line	0.181 ± 0.009	0.430 ± 0.011
Muharaf	$(1500, 50, 96)$	Page	0.134 ± 0.007	0.353 ± 0.012
		Line	0.149 ± 0.004	0.380 ± 0.004

Wigington, Tensmeyer, Davis, Barrett, Price, & Cohen. Start, Follow, Read: End-to-end full-page handwriting recognition, *ECCV,* 2018.

Future Work

- Identification of writers
- Classification of styles
- Train more state-of-the-art HTR systems
- Extract linguistic knowledge and identify historic colloquial form of Arabic

Thank you!

Reach out to us for any questions/comments on Github:

https://github.com/MehreenMehreen/muharaf