technische universität
dortmund

Wordspotting (segmentierungsfrei) mit einem patchbasierten Ansatz

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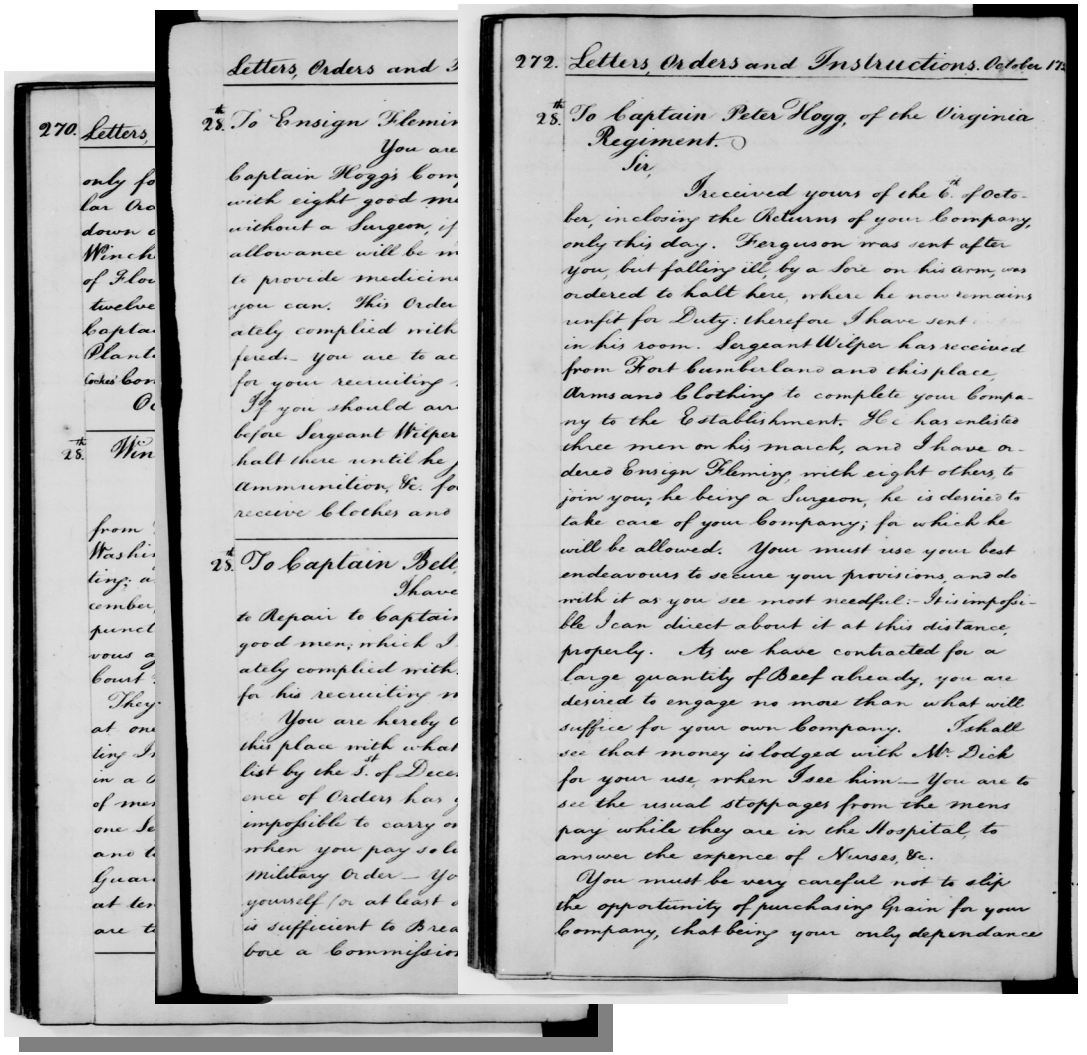
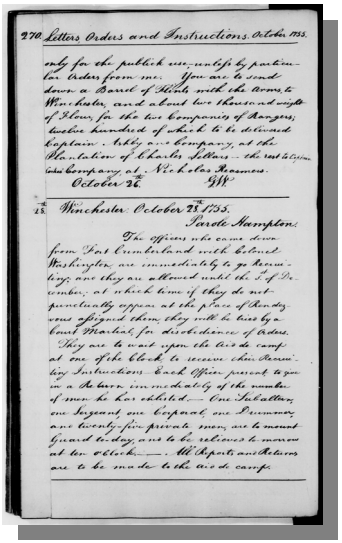
Unser Problem

Suchen in:

- **Query: Bildausschnitt aus einem Dokument**
- **Ziel: Alle Vorkommen des Querys finden**
- **Patchbasiert**



Unser Vorgehen



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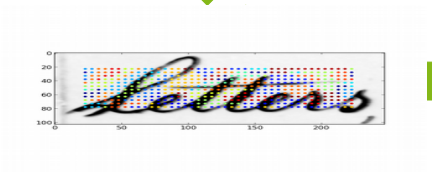
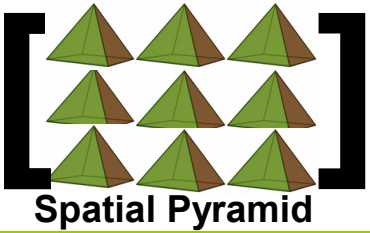
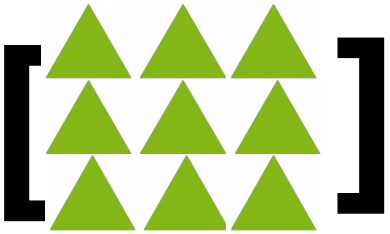


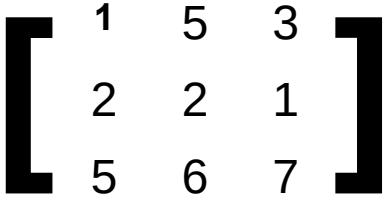
SIFT



Spatial Pyramid

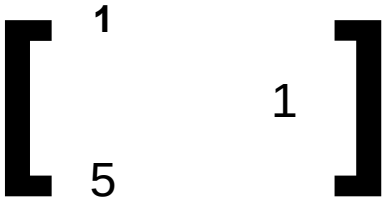
Dimensionsreduktion





Distanzmatrix

Non-Maximum Supression



Unser Vorgehen

Document Level

SIFT

Spatial Pyramid

Dimensionsreduktion

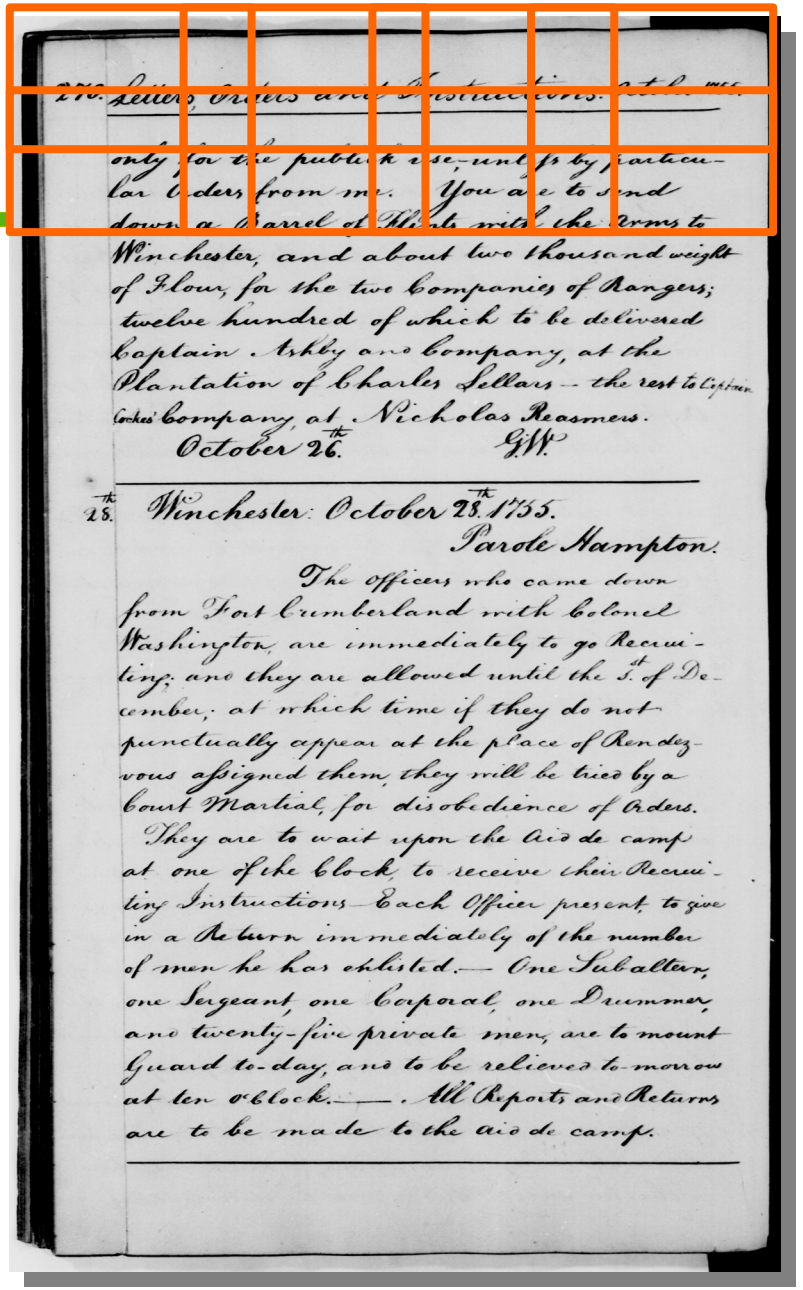
Distanzmatrix

Non-Maximum Supression

Patches extrahieren

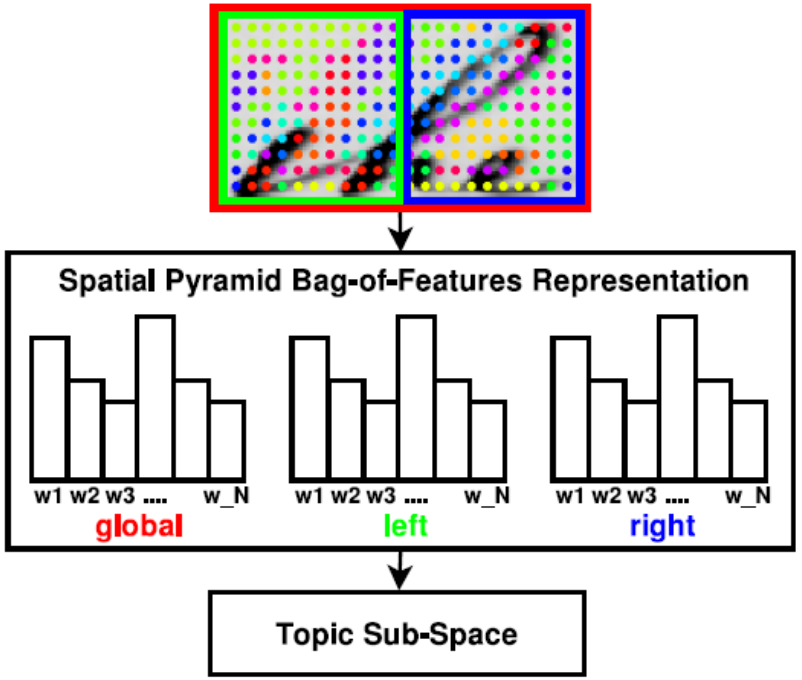
- Einteilung des Bildes in Bereiche
- Überlappung
- Dynamische Patchbreite nach Querybreite

- Patches beinhalten zu Visual Words quantisierte Sift Diskreptoren



Spatial Pyramid Berechnung

- Drei Histogramme
  - Gesamter Ausschnitt
  - Linker Ausschnitt
  - Rechter Ausschnitt
- Gesamte Spatial Pyramid aus den Histogrammen konkateniert.
- Histogrammgröße: Größe des Codebooks
- Gesamtgröße: 3* Größe des Codebooks



Rothacker, Leonard; Fink, Gernot: „Dokumentenanalyse 2016“, unter: http://patrec.cs.tu-dortmund.de/lectures/SS16/dokumentenanalyse/document-analysis.pdf (abgerufen am 05.07.2016)

Unser Vorgehen

Document Level

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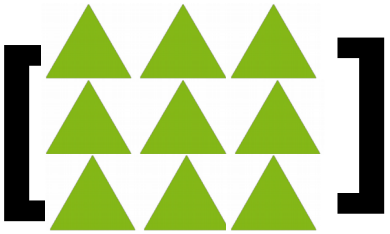
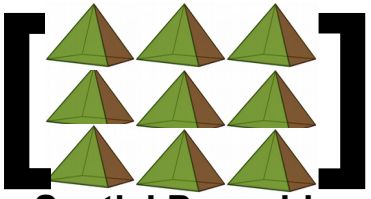




Spatial Pyramid

Dimensionsreduktion

Distanzmatrix

Non-Maximum Supression

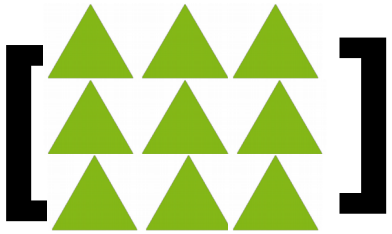
Dimensionsreduktion

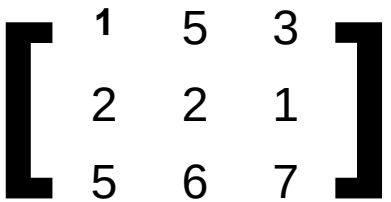
- Latent Semantic Indexing
- Reduziert Anzahl der Dimensionen
- Erleichtert Distanzberechnung im nächsten Schritt
- Topic Feature Transform

- Query muss in den gleichen Unterraum transformiert werden

Unser Vorgehen

Document Level





Distanzmatrix

Dimensionsreduktion

Non-Maximum Supression

SIFT

Spatial Pyramid

Unser Vorgehen

Document Level

SIFT

Spatial Pyramid

Dimensionsreduktion

1	5	3
2	2	1
5	6	7

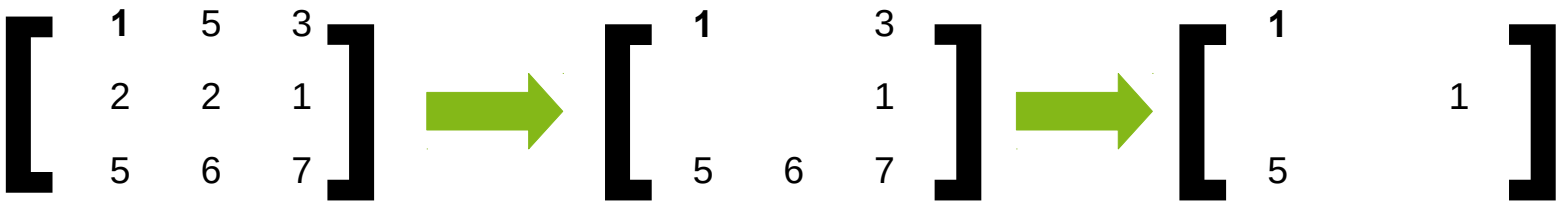
Distanzmatrix

Non-Maximum Supression

1	
	1
5	

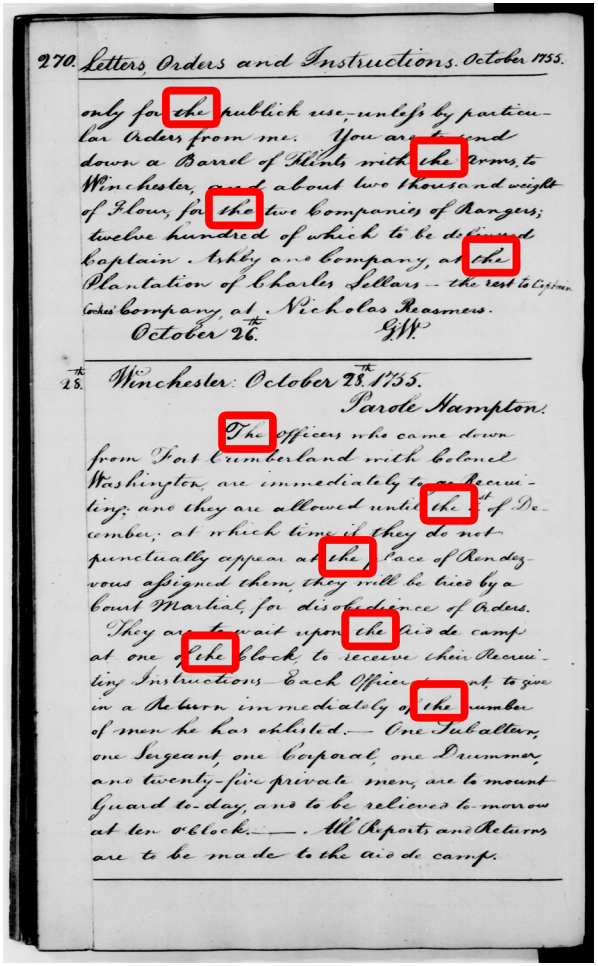
Non-Maximum Suppression

- Patches überlappen sich
- Durch Non-Maximum Suppression wird das beste Patch genutzt



- Danach: Patches nach Distanz sortieren und ausgeben

Vorkommen von ‚the‘ auf Seite 1



270. Letters, Orders and Instructions. October 1755.

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October 26th GW.

28th Winchester October 28th 1755.

Parole Hampton.

The Officers who came down from Fort Cumberland with Colonel Washington, are immediately to go Recruiting: and they are allowed until the 1st of December: at which time if they do not punctually appear at the place of Rendezvous assigned them, they will be tried by a Court Martial, for disobedience of Orders.

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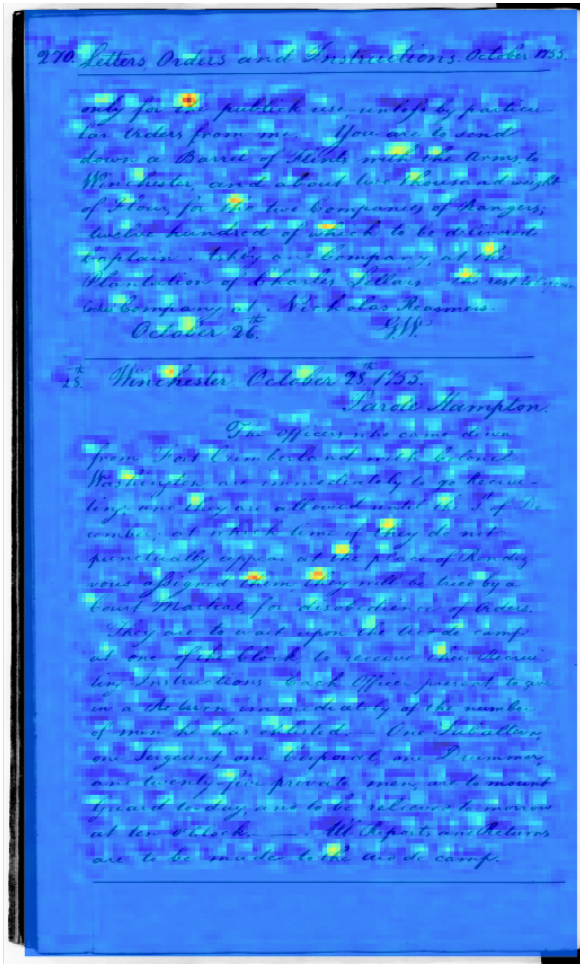

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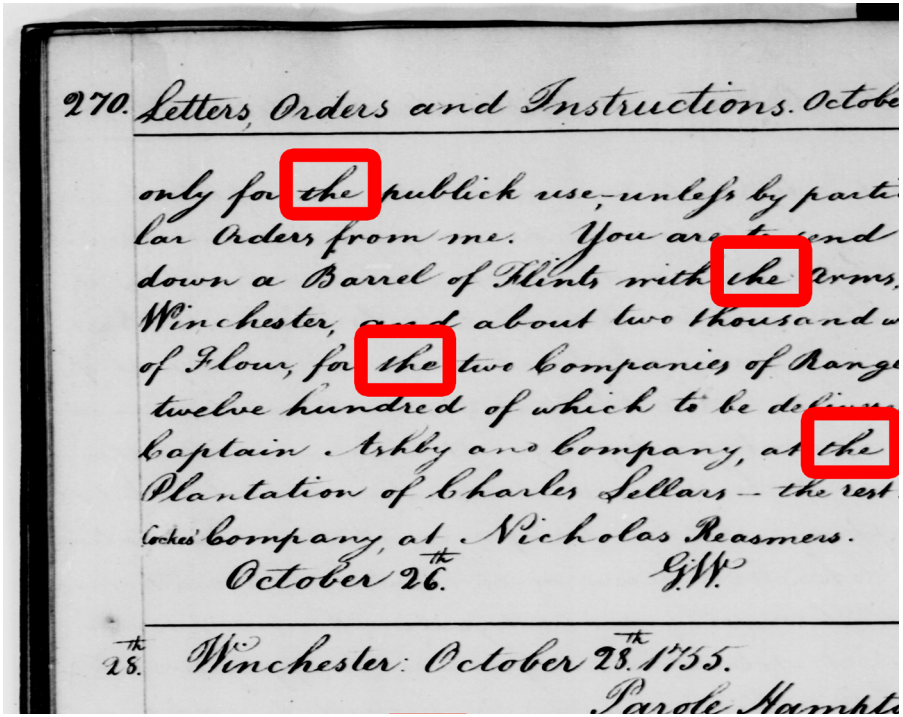

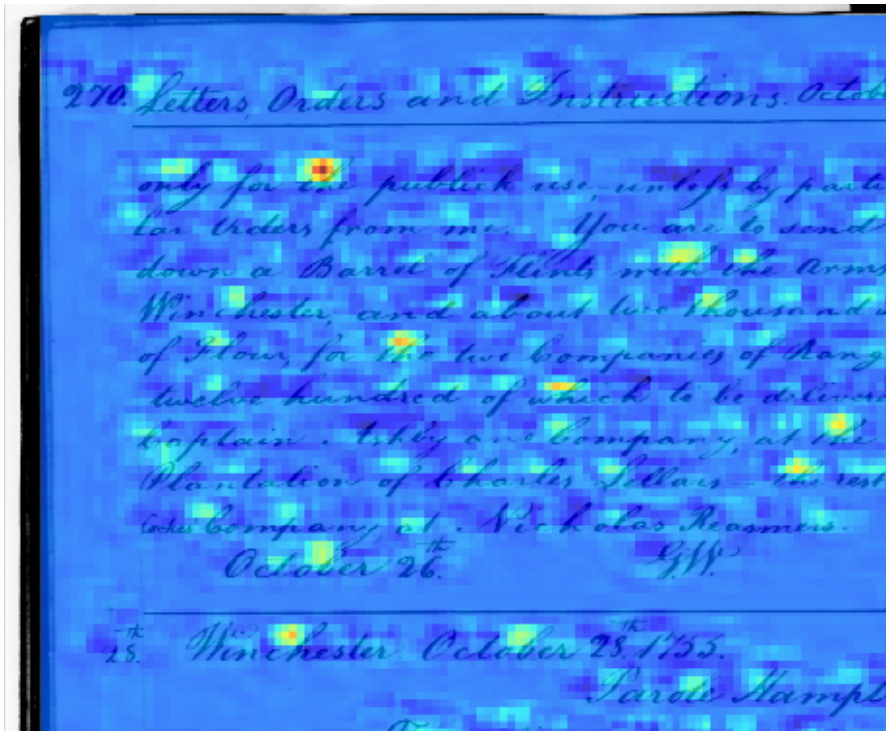

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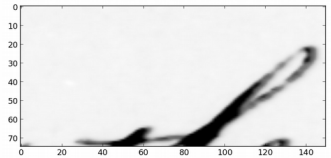

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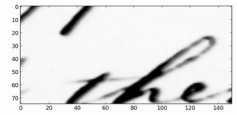

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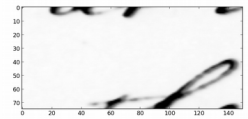

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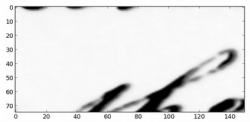

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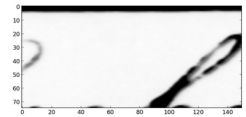
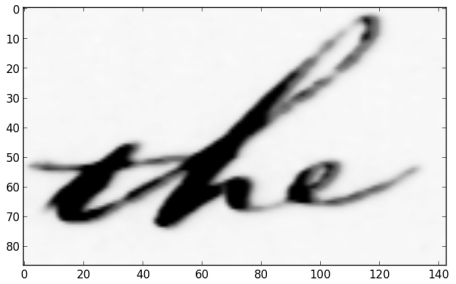
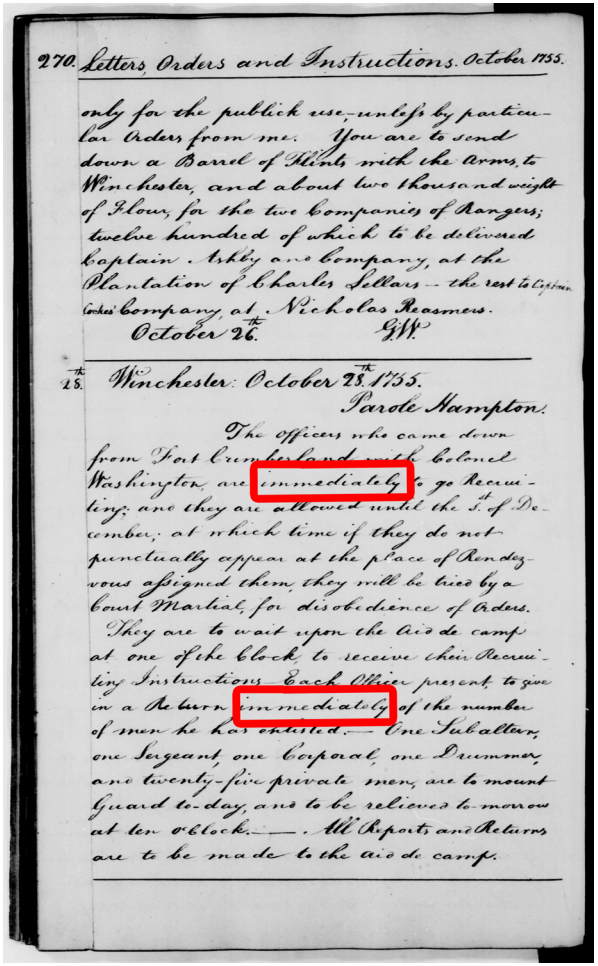


Eingabe Query



Vorkommen von ‚immediatly' auf Seite 1



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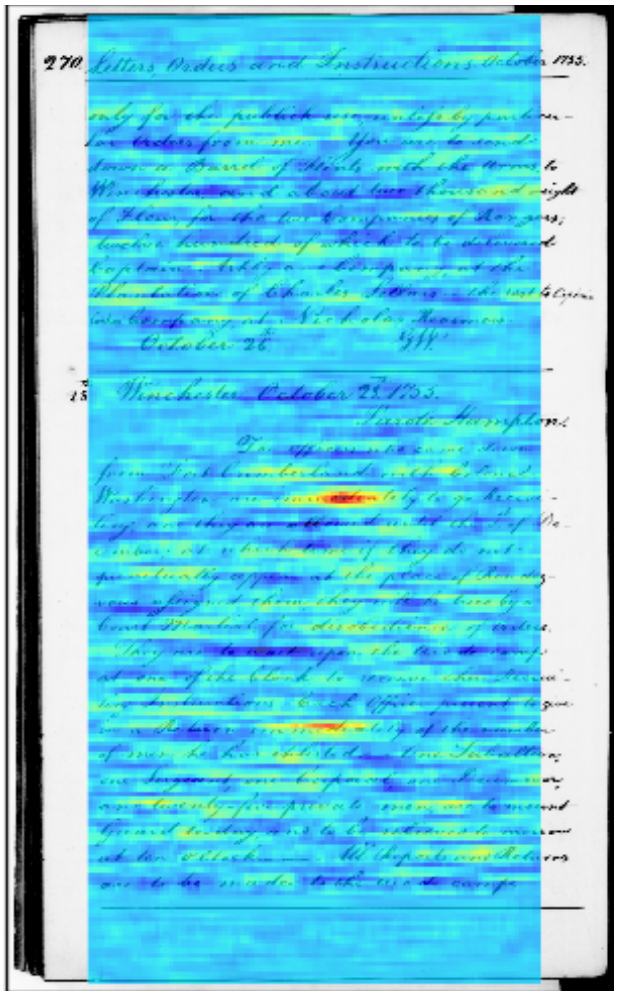

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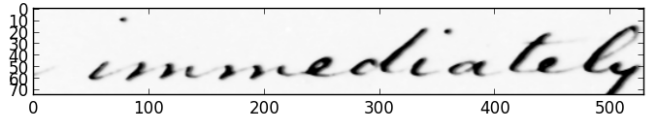
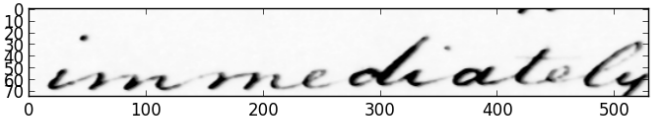
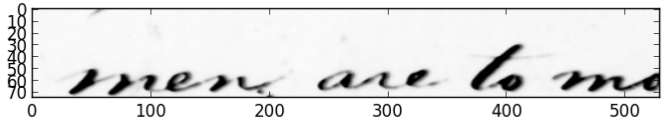
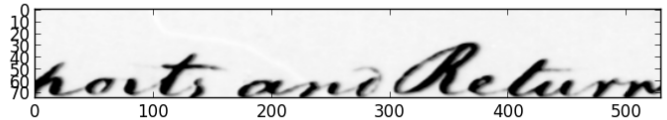
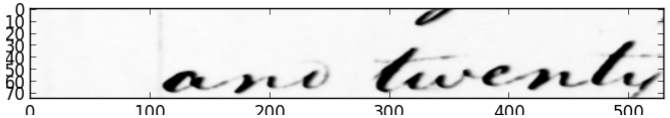
1. 

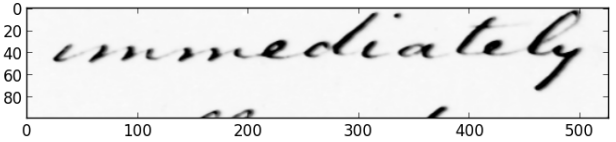
2. 

3. 

4. 

5. 

Eingabe Query



Quantitative Evaluation: patch_hop_size variieren

Konfiguration	
Sift hop_size	5
Sift cell_size	15
Sift n_visual_words	200
Dimensionen Topic Raum	200
patch_hop_size	10, 20, 25

Resultate

patch_hop_size	mean_recall	mean_avg_precision
10	20 %	12 %
20	22 %	11,9 %
25	19,4 %	10,3 %