Classification as an IR task: Experiments and Observations

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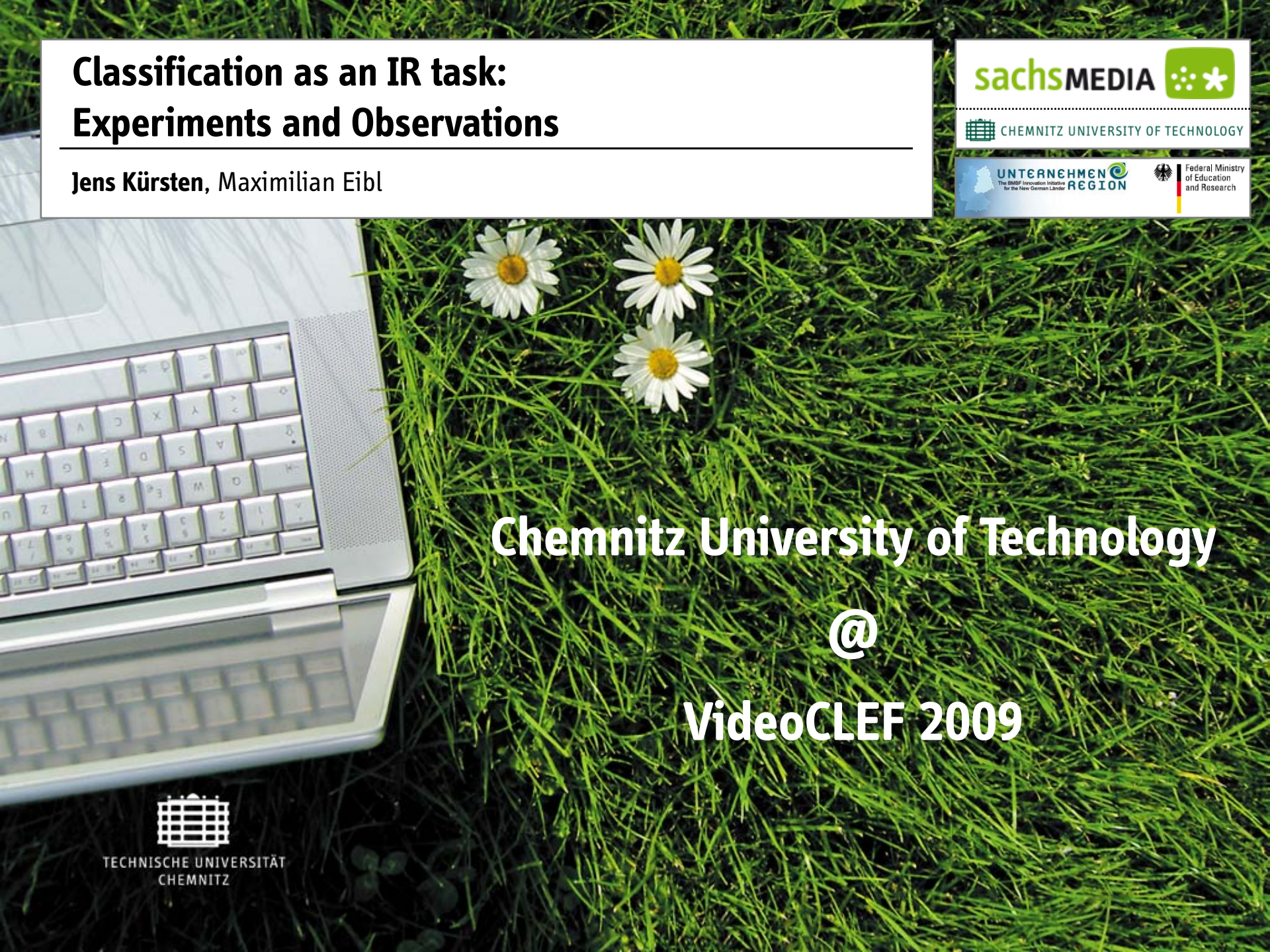

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VideoCLEF 2009

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Outline

- Motivation
- System description
  - Approach
  - Resources
- Experimental results and analysis
- Conclusions and future work

Motivation

- Research project sachsMedia
- Annotation and retrieval of audiovisual media
  - Video analysis (text OCR, persons, buildings, ...)
  - Audio analysis (speaker recognition, ASR, ...)
  - Metadata handling (combining metadata for retrieval)
- Digital Distribution via:
  - Broadcast (terrestrial – classical + handhelds)
  - IP and Next Generation Networks

System description – approach

- Classification as IR – last year's experience
- Xtrieval Framework
  - Lucene (TF.IDF) IR model
- Creating 3 index fields:
  - asr, meta and asr_meta
- Query Expansion:
  - PRF with 1 term from top-5 docs
  - English thesaurus from OO.org + Google Language API

System description – assign labels

- manually predefined Cut-off level n = 1,2,3,∞
- automatically calculated Cut-off

$$T_{DpL} = RSV_{avg} + 2 \times \frac{RSV_{max} - RSV_{avg}}{Num_{docs}}$$

Experimental results – training data set

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ID	Fields	QE	Limit	# Labels	Correct Rate	Avg. Recall	MAP
CUT1	asr	no	1	33	0,3333	0,0558	0,0485
CUT2	asr	yes	∞	1.566	0,0390	0,3096	0,1099
CUT3	asr	yes	1	181	0,1602	0,1472	0,1006
CUT4	meta	no	1	70	0,4714	0,1675	0,1546
CUT5	meta	yes	∞	1.932	0,0813	0,7970	0,4999
CUT6	meta	yes	1	188	0,3617	0,3452	0,2985
CUT7	meta	yes	2	312	0,3013	0,4772	0,3928
CUT8	meta	yes	3	368	0,3043	0,5685	0,4395
CUT9	meta	yes	auto	395	0,2886	0,5787	0,4407
CUT10	asr + meta	no	1	108	0,4537	0,2487	0,2163
CUT11	asr + meta	yes	∞	1.999	0,0795	0,8071	0,4975
CUT12	asr + meta	yes	1	205	0,3659	0,3807	0,3059
CUT13	asr + meta	yes	2	336	0,3036	0,5178	0,3993
CUT14	asr + meta	yes	3	414	0,2874	0,6041	0,4523
CUT15	asr + meta	yes	auto	470	0,2681	0,6396	0,4689

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Experimental results – test data set overview

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ID	Fields	QE	Limit	# Labels	Correct Rate	Avg. Recall	MAP
CUT1	asr	no	1	27	0,0741	0,0101	0,0067
CUT2	asr	yes	∞	1.996	0,0310	0,3065	0,1010
CUT3	asr	yes	1	171	0,1111	0,0958	0,0842
CUT4	meta	no	1	63	0,6349	0,2010	0,2003
CUT5	meta	yes	∞	1.778	0,0889	0,7940	0,4505
CUT6	meta	yes	1	194	0,3763	0,3668	0,2867
CUT7	meta	yes	2	300	0,3300	0,4975	0,3706
CUT8	meta	yes	3	354	0,3051	0,5427	0,4006
CUT9	meta	yes	auto	389	0,2853	0,5578	0,4073
CUT10	asr + meta	no	1	112	0,5000	0,2814	0,2586
CUT11	asr + meta	yes	∞	1.885	0,0838	0,7940	0,4389
CUT12	asr + meta	yes	1	196	0,3622	0,3568	0.2531
CUT13	asr + meta	yes	2	328	0,3018	0,4975	0,3704
CUT14	asr + meta	yes	3	393	0,2723	0,5379	0,3813
CUT15	asr + meta	yes	auto	444	0,2455	0,5478	0,3844

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Result analysis – Official experiments

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ID	Fields	QE	Limit	# Labels	Correct Rate	Avg. Recall	MAP
CUT1	**asr**	**no**	**1**	**27**	**0,0741**	**0,0101**	**0,0067**
CUT2	asr	yes	∞	1.996	0,0310	0,3065	0,1010
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CUT14	**asr + meta**	**yes**	**3**	**393**	**0,2723**	**0,5379**	**0,3813**
CUT15	asr + meta	yes	auto	444	0,2455	0,5478	0,3844

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Result analysis – QE parameter

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CUT1	asr	no	1	27	0,0741	0,0101	0,0067
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Result analysis – All parameters

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Conclusion

- Classification as IR task performs good again
- BUT: Evaluation Scenario might be two-fold
  1. Classification for user exploration (by browsing)
  2. Classification for labeling of big video databases
- 1st scenario evaluation: MAP, Recall, ...
- 2nd scenario evaluation: Correct Classification Rate,...

Future work

- Include other automatically generated metadata
- Different IR models
- Field weights for combination of ASR + metadata
- Apply further resources for QE or training (Wikipedia,...)
- Combine IR and classification approaches

Q & A

- Thank you!
- Questions, answers and discussion