Computerlinguistik I

Vorlesung im WiSe 2018/2019
(M-GSW-09)

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http://www.julielab.de

TREC Medicine

- Genomics Track (2004-08)
  - Retrieving information about genes
- Clinical Decision Support Track (2014-16)
  - Retrieving information from the Electronic Health Record
    - Evidence- based information (in the form of full-text literature articles) to clinicians for a specific patient (represented as a case description or admission note)

TREC Precision Medicine

- **Precision Medicine Track (2017-2018)**
  - **Precision medicine paradigm**
    - **Personalized treatment for patients based on their genetic, environmental and life style characteristics**
  - **Focus on genetic mutations of cancer**
  - **Retrieving scientific abstracts (Medline) relevant for patient‘s case**
  - **Retrieving clinical trials documents (ClinicalTrials.gov) most similar to patient‘s case**

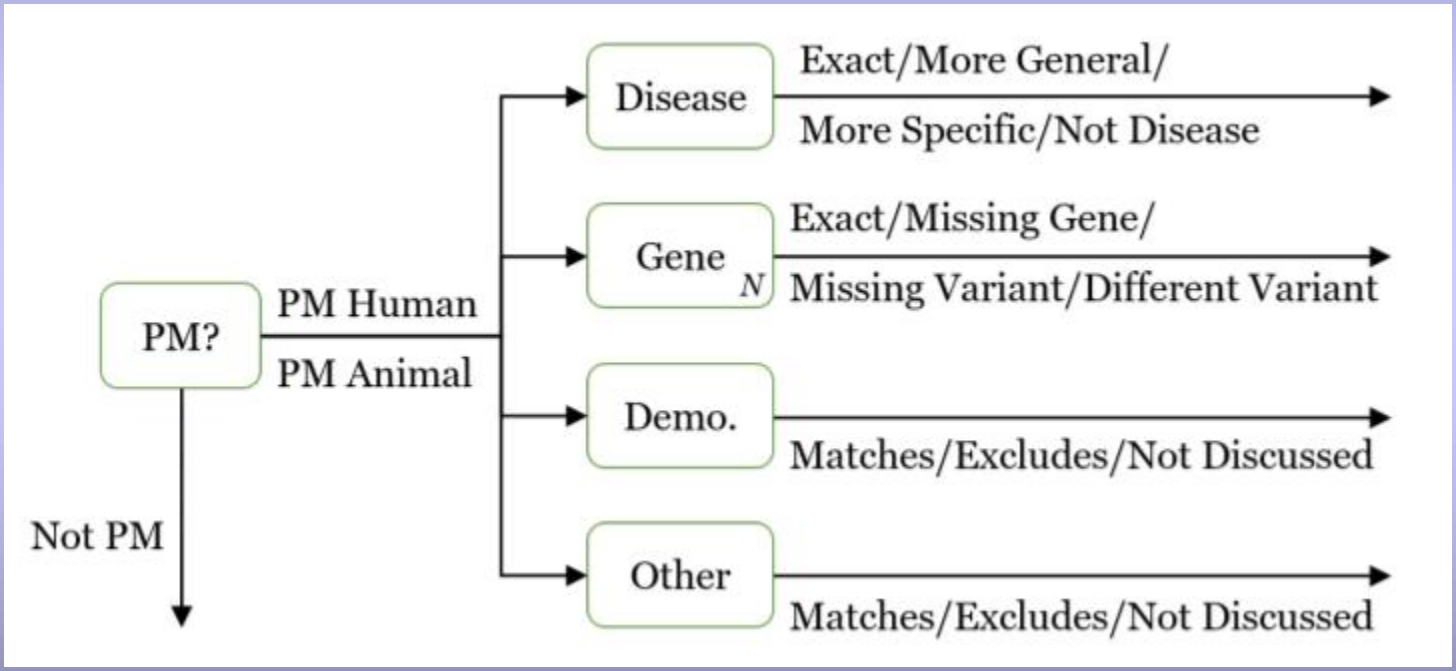
TREC PM 2017/2018

- TREC-PM 2017/2018
  - Initialized 2017, largely repeated in 2018
  - 30 synthetically created topics
  - each topic is described by 4 items
    - disease (e.g., type of cancer)
    - genetic variants (primarily the genetic variants in the tumors themselves as opposed to the patient's DNA)
    - demographic information (e.g., age, sex), and
    - other factors (which could impact certain treatment options)

TREC-PM Topics

Disease: Liposarcoma **Variant:** CDK4 Amplification **Demographic:** 38-year-old male **Other:** GERD
Disease: Colon Cancer **Variant:** KRAS (G13D), BRAF (V600E) **Demographic:** 52-year-old male **Other:** Type II Diabetes, Hypertension
Disease: Cervical Cancer **Variant:** STK11 **Demographic:** 26-year-old female **Other:** None
Disease: Cholangiocarcinoma **Variant:** IDH1 (R132H) **Demographic:** 64-year-old male **Other:** Neuropathy

TREC PM 2017
Result Assessment



Roberts, Kirk, & Demner-Fushman, Dina, & Voorhees, Ellen M., & Hersh, William R., & Bredrik, Steven, & Lazar, Alexander J., & Pant, Shubham (2017). Overview of the TREC 2017 Precision Medicine Track. in: TREC 2017 – Proceedings of the 26th Text REtrieval Conference. Gaithersburg, Maryland, USA, November 15-17, 2017, 1-13.

TREC PM 2018 Evaluation Criteria

Evaluation

The evaluation will follow standard TREC evaluation procedures for ad hoc retrieval tasks. Participants may submit a maximum of **five automatic or manual runs for each corpus (scientific abstracts and clinical trials)**, each consisting of a ranked list of up to one thousand IDs (**PMIDs for MEDLINE abstracts, provided IDs for extra abstracts (part of file name), and NCT IDs for trials**). The highest ranked results for each topic will be pooled and judged by physicians trained in medical informatics.

Assessors will be instructed to judge abstracts and clinical trials according to each of the four topic dimensions (disease, gene, demographic). Each of these corresponds to 3-4 categories (e.g., a disease can be an "exact", "more general", "more specific", or "not disease" match). Please read the Relevance Guidelines for more details.

Scientific Abstracts: The goal of retrieving scientific abstracts is to identify relevant articles for the *treatment*, *prevention*, and *prognosis* of the disease under the specific conditions for the given patient. Abstracts discussing information not useful for these goals will not be considered relevant.

Clinical Trials: The goal of retrieving clinical trials is to identify trials for which the given patient is eligible to enroll, or *would have been* eligible to enroll had the trial been open. *The timing and location of the trial are not factors in determining relevance, only the eligibility criteria.*

As in past evaluations of medically-oriented TREC tracks, we are fortunate to have the assessment conducted by the Department of Medical Informatics of the Oregon Health and Science University (OHSU). We are extremely grateful for their participation.

http://www.trec-cds.org/2018.html

inferred normalized distributed cumulative gain (infNDCG)

- Graded relevance
- Decreasing discounts at lower ranks

Literature Articles

infNDCG

Team	Run	Score
Cat_Garfield	MSIIP_BASE	0.5621
hpi-dhc	hpipubnone	0.5605
UCAS	UCASSA5	0.5580
MedIER	MedIER_sa13	0.5515
SIBTextMining	SIBTMlit4	0.5410
imi_mug	imi_mug_abs2	0.5391
udel_fang	UDInfoPMSA2	0.5081
RSA_DSC	RSA_DSC_LA_5	0.4855
UTDHLTRI	UTDHLTRI_NL	0.4797
IKMLAB	IKMLAB_3	0.4710

R-prec

Team	Run	Score
MedIER	MedIER_sa13	0.3684
hpi-dhc	hpipubcommon	0.3658
UCAS	UCASSA2	0.3654
imi_mug	imi_mug_abs1	0.3630
SIBTextMining	SIBTMlit3	0.3574
udel_fang	UDInfoPMSA1	0.3289
Cat_Garfield	MSIIP_PBPK	0.3257
SINAI	SINAI_Base	0.3082
FDUDMIIP	raw_medline	0.3072
cbnu	cbnuSA1	0.2992

P @ 10

Team	Run	Score
hpi-dhc	hpipubnone	0.7060
Cat_Garfield	MSIIP_BASE	0.6680
SIBTextMining	SIBTMlit5	0.6320
UVA_ART	UVAEXPBSTEXT	0.6260
MedIER	MedIER_sa11	0.6220
UTDHLTRI	UTDHLTRI_NL	0.6160
imi_mug	imi_mug_abs2	0.6000
UCAS	UCASSA5	0.5980
IKMLAB	IKMLAB_3	0.5960
udel_fang	UDInfoPMSA2	0.5800

Clinical Trials

infNDCG

Team	Run	Score
hpi-dhc	hpictall	0.5545
Cat_Garfield	MSIIP_TRIAL1	0.5503
ims_unipd	IMS_TERM	0.5395
UCAS	UCASCT4	0.5347
udel_fang	UDInfoPMCT1	0.5057
NOVASearch	NS_PM_5	0.4992
Poznan	BB2_vq_noprf	0.4894
UTDHLTRI	UTDHLTRI_NLT	0.4794
RSA_DSC	RSA_DSC_CT_5	0.4743
IRIT	irit_prf_cli	0.4736

R-prec

Team	Run	Score
Cat_Garfield	MSIIP_TRIAL1	0.4294
ims_unipd	IMS_TERM	0.4128
Poznan	BB2_vq_noprf	0.4101
hpi-dhc	hpictphrase	0.4081
UCAS	UCASCT4	0.4005
udel_fang	UDInfoPMCT3	0.3967
NOVASearch	NS_PM_5	0.3931
UTDHLTRI	UTDHLTRI_SST	0.3920
RSA_DSC	RSA_DSC_CT_5	0.3721
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RSA_DSC	RSA_DSC_CT_3	0.5480
UCAS	UCASCT1	0.5460
hpi-dhc	hpictphrase	0.5400
UTDHLTRI	UTDHLTRI_NLT	0.5380
udel_fang	UDInfoPMCT5	0.5240
InfoLabPM	tinfolabBF	0.5240

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	imi_mug	imi_n	
	udel_fang	UDIn	
	RSA_DSC	RSA_	
	UTDHLTRI	UTD	
	IKMLAB	IKMI	

R-p

	Team	Run	Score
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	UCAS	UCA	
	imi_mug	imi_n	
	SIBTextMining	SIBT	
	udel_fang	UDIn	
	Cat_Garfield	M	
	SINAI	SINAI_Base	0.3082
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	UTDHLTRI	UTDHLTRI_NLT	0.5380
	udel_fang	UDInfoPMCT5	0.5240
	InfoLabPM	tinfolabBF	0.5240

2nd Rank (Overall)

Team ID	Affiliation	# Runs	
		Articles	Trials
ASU_Biomedical	Arizona State University	3	0
Brown	Brown University	5	5
Cat_Garfield	Tsinghua-iFlytek Joint Laboratory	5	5
cbnu	Chonbuk National University	3	3
CSIROmed	Commonwealth Scientific and Industrial Research Organisation	3	3
ECNUica	East China Normal University	5	5
FDUDMIIP	School of Computer Science, Fudan University	5	5
hpi-dhc	Hasso Plattner Institute **Med. Universität Graz, JULIE Lab**	5	5
IKMLAB	Institute of Medical Informatics of National Cheng Kung Univ.	5	5
imi_mug	Medical University of Graz	5	5
ims_unipd	Information Management Systems (IMS) Group	0	3
InfoLabPM	InfoLab, Faculty of Engineering, University of Porto	4	3
IRIT	Institut de Recherche en Informatique de Toulouse	0	1
KlickLabs	Klick Inc.	4	5
MayoNLPTeam	Mayo Clinic	4	3
MedIER	University of Michigan	5	0
NOVASearch	Universidade NOVA Lisboa	0	5
PM_IBI	Integrative Biomedical Informatics Group, Barcelona	3	0
Poznan	Poznan University of Technology	1	5
RSA_DSC	Research Studios Austria / Studio Data Science	5	5
SIBTextMining	SIB Text Mining Group (HES-SO)	5	4
SINAI	Universidad de Jaen	3	0
UCAS	University of Chinese Academy of Sciences	5	5
udel_fang	InfoLab at University of Delaware	5	5
UNTIIA	University of North Texas	5	0
UTDHLTRI	The University of Texas at Dallas	5	5
UVA_ART	University of Virginia Medical Center	5	0
Total	**27 Teams**	103	90

Table 5: Participating teams and submitted runs.


Finis !