Biometrics and Machine Learning Group (BMLG) Meeting

Literature Reviews

May 23, 2017

- What are they?

- Why are they important?

- How are they used?

- What questions should be answered?

- How do you complete a literature review?

- Conclusions

What is a Literature Review?

A literature review is a *critical* analysis of published sources on a particular topic.

Why are literature reviews important?

- Assist in the development of a clear understanding of research problems

- Obtain knowledge of previous techniques and methods

    What did and did not work?

- Assist in the development of novel research approaches/ideas

- Obtain understanding of evaluation metrics and standards for problem domain

- Awareness of which groups are working in problem domain

How are they used?

- Can be used as a survey paper

- Material is typically included in previous work sections of conference and journal submissions

- They make up a significant portion of the first sections of theses/dissertation proposals, theses/dissertations, and grant proposals.

- Help others who are new to research area get up to speed quickly (Survey Paper)

What questions should be answered?

- What is the overall research problem?

- Why is the research problem difficult?

- What are the potential impacts if the problem is solved? (Motivation)

- What is considered the state-of-the-art?

- How has the problem been addressed in previous works?

  - What are the assumption/constraints?

  - What are the strengths and weaknesses of previous approaches?

  - What are the similarities and differences of previous approaches?

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- What research problems are still unsolved?
- What publicly available data sets are used for research?

  Should include details of data set properties

- What metrics and experiment protocols are used for evaluation?
- What are the most popular publication venues for this research problem?

How do you complete literature review?

- Typically use Google Scholar for paper searches

  May have to use many different search terms

- Use paper bibliography and citations

  - Who does the paper cite?

  - Which other papers cite this paper ?

- Read in this order: abstract, conclusions/future work, results/analysis, methods/experiments

- Previous work sections of papers can assist search

- Focus on more recent work

How do you complete literature review? (cont,)

- Focus on most cited papers

- Focus on work in best venues (journals vs. conferences)

- Keep notes on papers*

- Use BibTex to create bibliography

- Construct tables that summarize important information

Table V: Face attribute estimation results
CV - cross-validation, LOPO - Leave-one person-out

Attribute	Testing		Methods	Arch.	Training		#classes	MAE	Acc (%)
	Dataset	#img			Dataset	#img			
Age	MORPH-II	-	[Guo and Mu 2013]	BIF + KCCA	-	-	-	3.98	-
		-	[Guo and Mu 2011]	BIF + KPLS	-	-	-	4.04	-
		5-fold CV	[Huerta et al. 2015]	CNN*	MORPH-II	55134	Regr.	3.88	-
		42635	[Yi et al. 2014]	CNN*	MORPH-II	10634	Regr.	3.63	-
		5670	[Qiu et al. 2015]	CNN*	MORPH-II	47582	Regr.	3.41	-
		44634	[Li et al. 2015b]	CNN*	MORPH-II	10500	Regr.	3.61	-
		1095	[Wang et al. 2015]	CNN*	MORPH-II	4380	Regr.	4.77	-
	Adience	5-fold CV	[Levi and Hassner 2015]	CNN*	Adience	26000	8	-	84.70 ± 2.2
Gender	MORPH-II	-	[Guo and Mu 2013]	BIF + KCCA	-	-	-	-	98.45
		-	[Guo and Mu 2011]	BIF + KPLS	-	-	-	-	98.35
		42635	[Yi et al. 2014]	CNN*	MORPH-II	10634	2	-	97.90
		44634	[Li et al. 2015b]	CNN*	MORPH-II	10500	2	-	98.48
	AR	1275	[Jiang et al. 2014]	CNN*	FERET, CAS-PEAL	10800	2	-	70.50
		3288	[Juefei-Xu et al. 2016]	CNN*	MugshotDB, Pinellas	89003	2	-	85.62
	Adience	5-fold CV	[Levi and Hassner 2015]	CNN*	Adience	26000	2	-	86.80 ± 1.4
	LFW	5-fold CV	[Mansanet et al. 2016]	DNN*	LFW	13233	2	-	96.25
		13233	[Ranjan et al. 2016]	CNN*	AFLW	20997	2	-	94.00
Ethnicity	MORPH-II	-	[Guo and Mu 2013]	BIF + KCCA	-	-	-	-	98.95
		-	[Guo and Mu 2011]	BIF + KPLS	MORPH-II	10634	2	-	99.0
		42635	[Yi et al. 2014]	CNN*	MORPH-II	10634	2	-	98.60

*Deep learning approach

Conclusions

- Literature review could be most important step in the research process

- Has major effect on the success of research effort
  - Allows for complete view of research topic
  - Assists in avoiding less promising research directions
  - Allows the duplication of research efforts to be avoided

Questions?