如何高效调研文献？

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主页: https://wowjyu.github.io/

香 港 科 技 大 學
THE HONG KONG
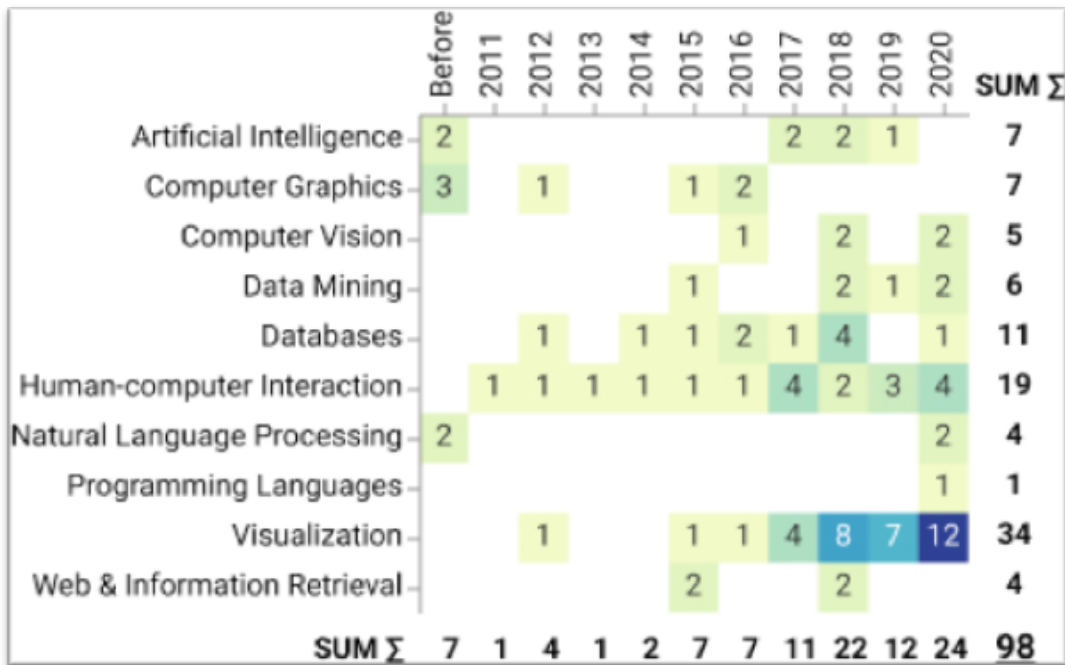UNIVERSITY OF SCIENCE
AND TECHNOLOGY

AI4VIS: Survey on Artificial Intelligence Approaches for Data Visualization

Aoyu Wu, Yun Wang, Xinhuan Shu, Dominik Moritz, Weiwei Cui,
Haidong Zhang, Dongmei Zhang, and Huamin Qu

THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

Microsoft Research 微软亚洲研究院

Carnegie Mellon University

APPLE INC.

AI4VIS

AI4VIS涉及多个计算机领域，而且研究兴趣增长迅速。

	Before	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	SUM Σ
Artificial Intelligence	2							2	2	1		7
Computer Graphics	3		1			1	2					7
Computer Vision							1		2		2	5
Data Mining						1			2	1	2	6
Databases			1		1	1	2	1	4		1	11
Human-computer Interaction		1	1	1	1	1	1	4	2	3	4	19
Natural Language Processing	2										2	4
Programming Languages											1	1
Visualization			1			1	1	4	8	7	12	34
Web & Information Retrieval						2			2			4
SUM Σ	7	1	4	1	2	7	7	11	22	12	24	98

为什么要调研文献？

- ❖ 导师让我读
- ❖ 师兄师姐推荐我读
- ❖ 我需要完成课程作业

读一篇

- ❖ 我需要在组会上做个论文报告
- ❖ 我希望学习一些技巧（比如如何写作）
- ❖ 我需要实现论文里的某一方法
- ❖ 我需要审一篇论文

找一篇 + 读一篇

- ❖ 我想了解某一研究领域
- ❖ 我需要写Literature review
- ❖ 我需要写Literature survey

找N篇 + 读N篇

- ❖ 。。。
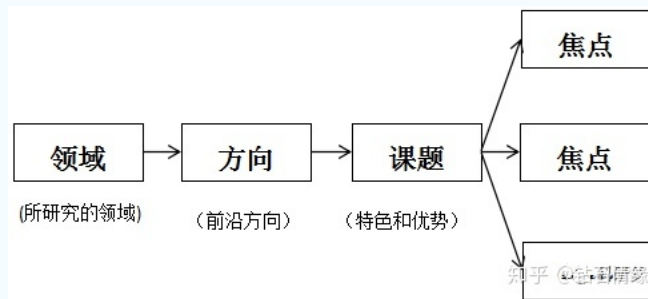
调研论文 = 找 + 读

调研论文 = **找** + 读

找什么论文读？

老板
导师
师兄师姐
。。。

我

找什么论文读？

Step 0: 确定研究方向

什么是研究方向？ => 会议上的 paper session！
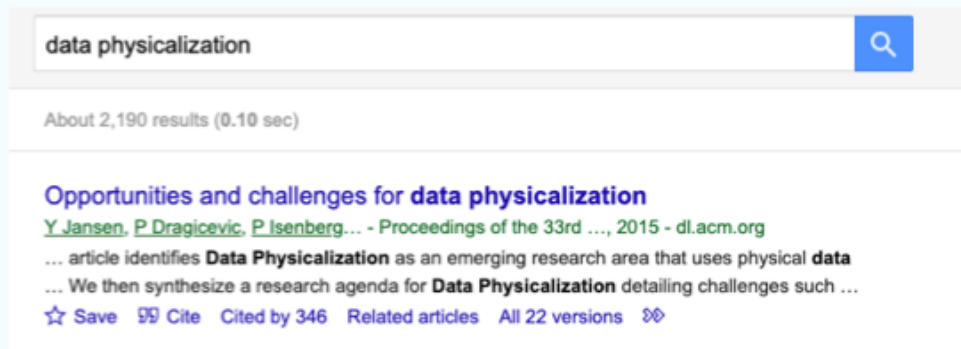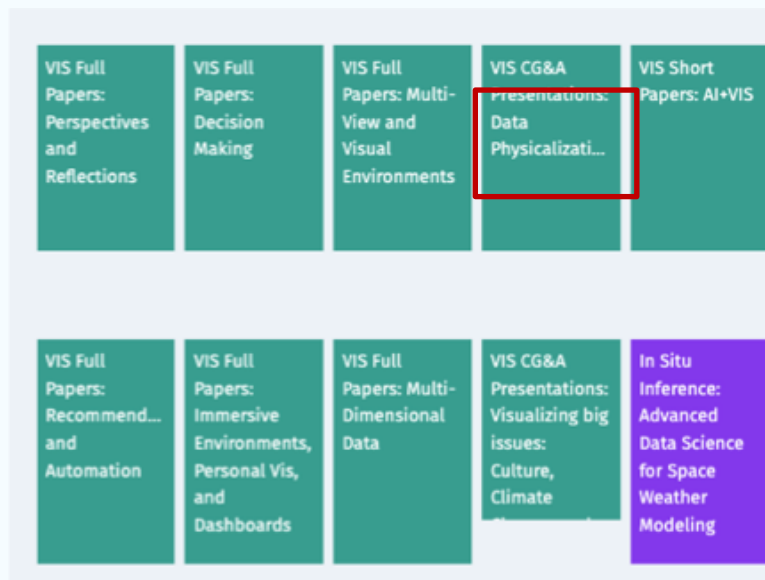
找什么论文读？

Step 0: 确定研究方向

Step 1: 找到并精读综述

找什么论文读？

Step 0: 确定研究方向

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找什么论文读？

Step 0: 确定研究方向

Step 1: 找到并精读综述

VIS Full Papers: Perspectives and Reflections	VIS Full Papers: Decision Making	VIS Full Papers: Multi-View and Visual Environments	VIS CG&A Presentations: Data Physicalizati...	VIS Short Papers: AI+VIS

VIS Full Papers: Recommend... and Automation	VIS Full Papers: Immersive Environments, Personal Vis, and Dashboards	VIS Full Papers: Multi-Dimensional Data	VIS CG&A Presentations: Visualizing big issues: Culture, Climate	In Situ Inference: Advanced Data Science for Space Weather Modeling

多试一点关键词，比如 visualization ⇔ chart, AI ⇔ automation

chart automated

About 455,000 results (0.11 sec)

Chart mining: A survey of methods for **automated chart** analysis
K Davila, S Setlur, D Doermann... - IEEE transactions on ..., 2020 - ieeexplore.ieee.org
... In this survey, we concentrate on published methods for **automated chart** ... **chart** extraction, classification and recognition [9], while our work also covers datasets and applications of **chart** ...
☆ Save 𝟗𝟗 Cite Cited by 27 Related articles All 6 versions Web of Science: 11 ≫

找什么论文读？

Step 0: 确定研究方向

Step 1: 找到并精读综述

Step 2: 找到该方向经典论文

什么是经典论文？
- 在综述里面被 highlight
- 高引用
- 获奖论文(best paper, test-of-time)
- 。。。

在综述里面被highlight

such, much research aims to quantify knowledge about "good" visualizations. In 1986, Mackinlay [87] developed the APT system that **ranked** the effectiveness according to the accuracy rankings of quantitative perceptual tasks for different visual encoding channels.

Automating the design of graphical presentations of relational information
J Mackinlay - Acm Transactions On Graphics (Tog), 1986 - dl.acm.org
... wide variety of information. The approach described in this paper is based on the view that graphical presentations are sentences of graphical languages. The graphic design issues are ...
☆ 储存 ♡ 引用 被引用 2209 次 相关文章 全部共 25 个版本 Web of Science: 617 ≫

在综述里面被mention

scores. Besides, researchers often leverage domain knowledge to design hand-crafted, **rule-based** metrics that measures the visualization quality such as informativeness [90], interesting-ness [77], [78], [106], accuracy [77], [78], significance [107], saliency [108], visual importance [6], complexity [5], and mobile-friendliness [2]. However, designing hand-crafted metrics usually requires considerable effort. More critically, the design process

找什么论文读？

Step 0: 确定研究方向

Step 1: 找到并精读综述

Step 2: 找到该方向经典论文

Step 3: 延伸

找经典论文的 citation 和 reference
- reference 一般在第二章 literature review
- citation 在某网站点"cited by"

找什么论文读？

Step 0: 确定研究方向

Step 1: 找到并精读综述

Step 2: 找到该方向经典论文

Step 3: 延伸

个人习惯：管理一个paper queue
- 从队首选一篇 paper
- 把它的reference和 citation 加进队尾

找什么论文读？

Step 0: 确定研究方向

Step 1: 找到并精读综述

Step 2: 找到该方向经典论文

Step 3: 延伸

个人习惯：管理一个paper queue
- 从队首选一篇 paper
- 把它的reference和 citation 加进队尾

queue 一直 expand，不收敛怎么办？
- 优先选择"经典论文"放在队首
- 过滤论文，不是每篇reference和 citation都相关
- 反思：是不是方向太宽了？是否可以再 break down？

老板
导师
师兄师姐
。。。

我

我读，我读，我读。。。

调研论文 = 找 + 读

读文献为什么困难

❖ 语言问题

❖ 文章写的不好

❖ 文章太长，难以静下心花几个小时读

❖ 缺乏对领域的了解，部分内容读不懂   读什么：阅读的三个层次

❖ 好像读懂了，有好像没有读懂？

❖ 读完了然后呢？   beyond reading：反馈与校正

❖ 。。。

阅读的三个层次 (From Henry Shum)

How do you approach reading papers?

1. **Quick skimming**
   Figure browsing
2. **Critical reading**
   Creative reading

常见

3. **Deep analyzing**

审论文、组会报告、复现方法

- **Reading well** is about understanding how the paper is written

- Longer term, **reading is about enhancing your cognitive model**

阅读的三个层次

Quick skim: 十分钟了解论文的大概

❖ 看图、看视频

4. 图做得专业。配色和谐，疏密有度，乱中有序，复杂中见pattern。图的种类避免单调，颜色避免过于凌乱，图中的字体大小一致，比正文的字体稍大。关键的visual cues，可以用框框或是箭头加强。caption避免过于简略。做到读者只是扫一遍图和caption，就能对文章有个大致的了解。

近年会议的 presentation videos 一般都在6-12 分钟

阅读的三个层次

Quick skim: 十分钟了解论文的大概

❖ 看图、看视频

Critical reading: 一两个小时对论文进行批判性阅读

Donald Geman: A paper has four parts. Spend equal amount of time writing each
1. Title
2. Abstract
3. Introduction
4. The rest of the paper

批判性阅读：

论文的核心问题是什么？这是个新问题还是老问题？是否是个好的科研问题？

论文的核心贡献是什么？是否足够有意义？

论文的方法大致是什么？是新方法还是老方法？是否有效解决了问题？作者是如何验证的？还有什么缺陷？

论文的问题/方法是否能泛化或者有启发意义？

调研论文 = 找 + 读 + 写

为什么写论文笔记？

❖ 好记忆不如烂笔头

❖ 记笔记能帮助训练

❖ 为以后引用论文做功课

论文撰写

▪ 语法
- 标题与关键字
- 摘要
- 简介
- 相关工作
- 问题与方法
- 实验与分析
- 总结
- 文献
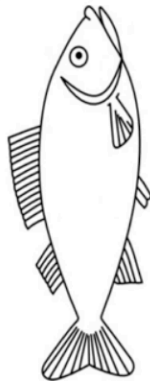
不一定完全依照这个结构，或者完全这个次序，但是该有的都得有

虽然在文学界八股文被抨击，但是学术论文还是需要按照八股文的格式准备。
1. 便于信息定位
2. 保障信息完备

https://img-blog.csdnimg.cn/341783329bc44c95b110d347addf7895.png

论文笔记五要素

❖ Summary：提炼核心

20211030_CHI2021_Classroom Digital Twins with Instrumentation-Free Gaze Tracking

✍️ Summary

This paper has illustrated the construction of Digital Twins in the classroom context to facilitate classroom sensing.

一两句话描述论文研究了什么

论文笔记五要素

❖ Summary：提炼核心

❖ Fact：论文的基本事实

Motivation 、 contribution 、 method、evaluation、finding

Motivation

- **Digital Twin of a Classroom**
  - As an exemplar of the complex physical environment, which contains many physical elements that are contextually or spatially related:
    - Objects of various functions (whiteboards, projection screens, podiums, seats, tables)
    - Occupants in at least two different roles
- Classroom Gaze Information
  - Consider classroom gaze and its utility as a part of professional development for improving instructor-student interactions
- The Specific Problem to be Addressed
  - How to leverage digital twin techniques in the classroom scenario to support classroom sensing, which could potentially improve the instructor professional development?

Contributions

- A generalizable approach to capture the physical environment needed for such a 3D classroom digital twin, and the sensing of a particular feature of interest: instructor and student gaze
- Two evaluations to demonstrate the accuracy of the system: a controlled study and a large-scale deployment in real-world classrooms

Method

1. Digital Twin Capture
2. 6-DOF Head Pose Estimation
3. Foci Estimation & Heatmap Generation

Evaluation

1. A controlled study: use known targets in a classroom to test the accuracy
2. A large-scale deployment in real-world classrooms: recruit cloud workers to mark different information like false positives and compute the accuracy
3. Both studies obtained better results than previous papers
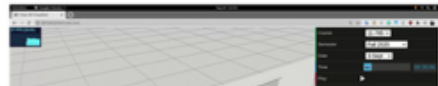
论文笔记五要素

❖ Summary：提炼核心

❖ Fact：论文的基本事实

Motivation 、 contribution 、 method、evaluation、finding

❖ Critical thinking：批判

优缺点

✏️ **Critical Thinking**

😀 **Good**

Idea. The idea of employing digital twins techniques in the classroom sensing is new and interesting. Because the scenario in the classroom could be replayed and even simulated to test and find better teaching tricks.

Evaluation. The two evaluation to obtain the accuracy of their approach is strong which includes both known targets and cloud workers.

😐 **Bad**

Introduction Writing . The specific issue I'd like to point out is the logic of introduction. Form the first three paragraphs, I feel it was a learning science paper that to look for new approaches to facilitate instructors' professional development. However, from the following three paragraphs, I just feel they just want to find a usage scenario for the study of Digital Twins…

The necessity of DT? The major point is not clear enough: why classroom must use DT? Is it only because that it has not been used in the classroom before? But I just can not imagine the necessity of such 3D construction in the classroom. How will this improve the instructors' teaching skills?

论文的核心问题是什么？这是个新问题还是老问题？是否是个好的科研问题？

论文的核心贡献是什么？是否足够有意义？

论文的方法大致是什么？是新方法还是老方法？是否有效解决了问题？作者是如何验证的？还有什么缺陷？

论文的问题/方法是否能泛化或者有启发意义？

。。。

论文笔记五要素

❖ Summary：提炼核心

❖ Fact：论文的基本事实

Motivation 、 contribution 、 method、evaluation、finding

❖ Critical thinking：批判 优缺点

❖ Creative thinking

如何启发了我？

☀️ **Creative Thinking**
Inspired by The West World, I'm wondering if it's possible to get enough classroom data and simulate different teaching strategies to see the different teaching results? — simulate, replay, and refine.

我想到了什么 idea?
怎么进一步 improve ？
如何 generalize ？

论文笔记五要素

- ❖ Summary：提炼核心

- ❖ Fact：论文的基本事实

Motivation 、 contribution 、 method、evaluation、finding

- ❖ Critical thinking：批判

优缺点

- ❖ Creative thinking

如何启发了我？

- ❖ **What I have learned?**

🐘 **What I Learn**

- **Writing**: Most of the writing is easy to understand, especially they are able to narrow down the core contribution via concepts at different levels.
- **Techniques**: for the first time I heard the techniques related to Digital Twin Capturing: use a library of pre-defined ArUco markers for different objects and 6-DOF Head Pose Estimation.

写作、做图上的技巧
新的技术

论文笔记五要素

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优缺点

❖ Creative thinking

如何启发了我？

❖ What I have learned?

Deep Analyzing 精读
一周 1~2 篇

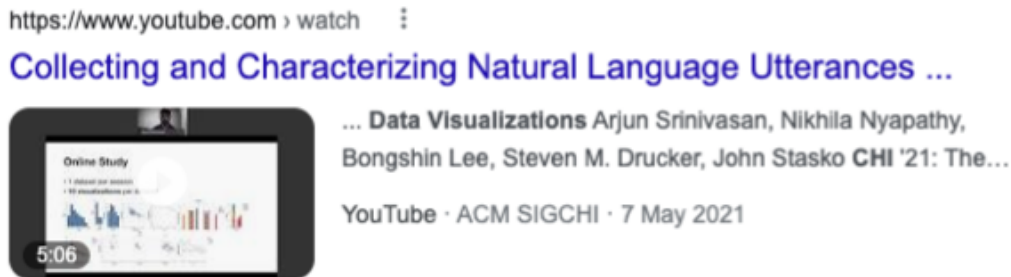调研论文 = 找 + 读 + 写

调研论文 ＝ 找 ＋ 读 ＋ 写 ＋ 反馈

反馈机制

写论文

读论文

读论文的反馈机制

❖ 我是否理解了论文的核心？

https://www.youtube.com › watch ⋮

Collecting and Characterizing Natural Language Utterances ...

... **Data Visualizations** Arjun Srinivasan, Nikhila Nyapathy, Bongshin Lee, Steven M. Drucker, John Stasko **CHI** '21: The...

YouTube · ACM SIGCHI · 7 May 2021

5:06

先自己读论文，提炼并写重点，然后对照作者在几分钟 presentation"画的重点"

读论文的反馈机制

❖ 我是否理解了论文的核心？

❖ 我对论文的批判性思维是否到位？

7.2 **Limitations** and Usage Issues

Our evaluations above have shown that *DeepDrawing* can learn from the training graph drawings (i.e., grid layout, star layout, ForceAtlas2 and PivotMDS) and further generate drawings for new graph inputs. However, the proposed method has limitations and next we discuss some of them.

对照自己和作者总结的 limitation

好像是学霸来了

在组会上做报告。与导师、师兄师姐交流

读论文的反馈机制

❖ 我是否理解了论文的核心？

❖ 我对论文的批判性思维是否到位？

❖ 我的creative thinking是否足够？

Automating the design of graphical presentations of relational information

☐ 搜尋引用以下內容的文章

[HTML] The building blocks of interpretability

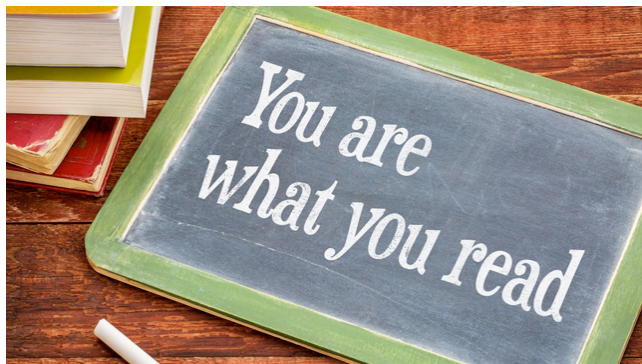C Olah, A Satyanarayan, I Johnson, S Carter… - Distill, 2018 - distill.pub

With the growing success of neural networks, there is a corresponding need to be able to explain their decisions—including building confidence about how they will behave in the …

☆ 儲存 🔖 引用 被引用 490 次 相關文章 全部共 4 個版本 ≫

我想到的 Future work idea 是否被别人做了

总结

❖ 调研论文 = 找 + 读 + **写 + 反馈**

You are what you read

论文笔记五要素

❖ Summary：提炼核心

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Motivation 、 contribution 、 method、 evaluation、 finding

❖ Critical thinking：批判
优缺点

❖ Creative thinking
如何启发了我？

❖ What I have learned?

读论文的反馈机制

❖ 我是否理解了论文的核心？

❖ 我对论文的批判性思维是否到位？

❖ 我的creative thinking是否足够？

主动寻求反馈。
与原作者、导师、师兄师姐等交流对照。

找什么论文读？

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Step 3: 延伸

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2. **Critical reading**
Creative reading
常见

3. **Deep analyzing**
审论文、