

Reading Research Papers

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706.015 - Introduction to Scientific Working

Reading Research Papers

How to learn and stay up-to-date with a research field?

Introduction

About

How You Should Read Research Papers According To Andrew Ng (Stanford Deep Learning Lectures)

Consider watching the original video:

<https://www.youtube.com/watch?v=733m6qBH-jI&t>

Or, read the summary by Richmond Alake:

<https://towardsdatascience.com/>

[how-you-should-read-research-papers-according-to-andrew-ng-stanford-deep-learning-lectures](https://towardsdatascience.com/how-you-should-read-research-papers-according-to-andrew-ng-stanford-deep-learning-lectures)

Introduction

How many papers should one read?

- **5-20** papers
 - Basic understanding
- **50-100** papers
 - Very good understanding (of the domain/field)

Shortlist of Papers

Suggestion

Since reading 100 papers in one go is quite much \Rightarrow create a **shortlist**, and focus on reading the resources from the shortlist!

Sources of Papers

- What **platforms** to use?
 - Scopus
 - Google Scholar (only 60%)
- Based on **persons**
 - DBLP
 - Personal home page

Sources of Papers

- Conference organisers
 - How to find conferences?
 - From published (seminal) papers
 - KDNuggets, WikiCfP
 - <https://www.kdnuggets.com/meetings/index.html>
- Thomas Reuters, highly influential scientists ranking
- Recommender systems
 - Mendeley Suggest
 - Google Scholar
- OpenKnowledgeMap

Sources of Papers

Additional tips on finding papers

- Twitter, Reddit (machine learning, deep learning), ...
- ArXiv sanity
- Conferences
- Friends, coworkers, ...

Shortlist of Papers

Create shortlist

- Collect relevant papers
- Collect relevant blog entries/videos/...
- ... there is no limit on how many you collect
- But, then create a **shortlist**

Searching for relevant papers

Use academic search engines, etc.

Shortlist of Papers

Curate shortlist

- Consider using a **understanding table** to track the progress
- If a paper does not appear to be worthy to continue
 - \Rightarrow drop it from the shortlist
- If additional papers, e.g., **via citations**, appear to be valuable
 - \Rightarrow add it to the shortlist

Reading sequence

Read multiple papers at the same time (hop around)

Shortlist of Papers

Understanding level

| Resource | <input checked="" type="checkbox"/> 10% - 20% | <input checked="" type="checkbox"/> 20% - 40% | <input checked="" type="checkbox"/> 40% - 60% | <input checked="" type="checkbox"/> 60% - 80% | <input checked="" type="checkbox"/> 80% - 100% |
|---|---|---|---|---|--|
| https://www.tensorflow.org/lite/models/pose_estimation/overview | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| https://medium.com/tensorflow/track-human-poses-in-real-time-on-android-with-tensorflow-lite-e66d0f3e6f9e | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| https://arxiv.org/pdf/1602.00134.pdf | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| https://arxiv.org/pdf/1603.06937.pdf | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| https://arxiv.org/pdf/1505.07427.pdf | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| https://arxiv.org/pdf/1703.06870v3.pdf | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| https://arxiv.org/pdf/1812.03595v3.pdf | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Updated Understanding level table of resources By Richmond Alake

Reading a Single Paper

Suggestion

Instead of reading a paper a **single time** from top to bottom, read the paper **multiple times**, selectively! **Note: At least three times.**

Reading a Single Paper

First pass

- Selectively just read:
 1. Title
 2. Abstract
 3. Figures
- Get an overview of the paper

Reading a Single Paper

Second pass

- Selectively just read:
 1. Introduction
 2. Conclusions
 3. Optionally, the figures
- Understanding of the contributions

Reading a Single Paper

Third pass

- Selectively just read:
 1. Remaining sections
 2. ... but may skip
 - Formulas
 - Technical terms, if alien
- Understanding of the work

Reading a Single Paper

Additional passes

- Read sections, that were skipped
 - Focus on math, algorithms, techniques, ...
- In-depth understanding of the work

Reading a Single Paper

Recap paper

- Write your own summary of
- ... key discoveries/contributions
- ... key insights/findings
- ... main techniques

Fun Part

Test the strategy

Pick a paper (or one is being suggested), follow the strategy to read it and try to answer these questions:

- What did the authors try to accomplish?
- What were the key elements of the approach?
- *What can you use yourself?*
- *What other reference do you want to follow?*

Recap: 1. title, abstract, & figures → 2. introduction, & conclusions (maybe figures) → 3. other sections (skip math/complex stuff/details, related work) → n. math, & complex stuff

Understanding the complex parts

Tips for complex formulas, code

For understanding the mathematical/algorithmic/... underpinnings of a paper, try to **rederive it yourself**, or to **reimplement it from scratch**.

Conclusions

- The more you read¹
- ... the more you can read²

¹on a regular basis

²due to more practice and in-depth understanding

Thank You

For your attention!