19ECS 792: Technical Paper Writing

Topic: Tips to writing a successful technical report

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Research Process

- Choose a topic
- Read Papers
- Technical Writing
- Oral Presentation

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Potential Topics

- (To be frozen after today's discussion)
- Any other consult with the instructor

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Good Paper Sources

- Conferences
  - IEEE, ACM, USENIX
- Journals
  - ACM Transactions on Information and System Security
  - IEEE Transactions on Dependable and Secure Computing
  - IEEE Transactions on Information Forensics and Security

Ways of Reading a Paper

- Related work can help finding more references
- Speed Reading
  - Read by layer to if it is interesting
    - Abstract: what is it about
    - Introduction: why is it important, if it is
    - Conclusion: is the approach good
    - Body: read the rest if it is worth it
- Peek Reading
  - Read the first sentences of every paragraph to get an idea of the paper
  - Read the whole paper if it is worth it

Questions?

- What is the problem?
- What is being done?
- How well does it perform?
- What are bad aspects of the approach?
- How could you make it better?

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- **Technical Writing**
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Technical Writing

- An art form different from creative writing
- Most characterized by *discipline*
  - Say as little as possible
  - As simple as possible
  - Easy words when possible
  - Understandable to as many as possible
- Technical writing is about the scientific subject matter, not about the writers
  - Therefore, “we” is not the subject

Technical Writing Requirements

- Cohesion
  - The presence of keywords that keep flow from one sentence to the other
  - Try to match end words with first words
- Coherence
  - One topic
  - First sentence emphasizes at the end the themes of the topic

More on Coherence

- Shared Context – Problem – Solution (motivating coherence)
  - Cause a small surprise, cause reader to feel it knows everything but show not
    - Historical Background
    - An Event
    - Belief

Defining a problem

- But/However, if shared in context is deceiving
  - Has to have a **condition**, situation, or recurring event
  - Has to have a **cost**, or intolerable consequence

Types of Problems

- Practical: happens in real world scenario
  - What should we do?
- Conceptual: happens in academia, relates to how we think
  - What should we think?
  - Condition: something we don't know or understand
  - Cost: dissatisfaction to the unknown (can be expressed as a larger question)
  - **So what?**

Type of Ordering

- Chronological
  - Cause: first, then, finally
  - Effect: as a result, because of that, so on
- Coordinate
  - Pillars of a whole, e.g. there are three reasons why: 1st …, 2nd …, etc.
  - Logical
    - Example and generalization (vice versa)
    - Premise and conclusion: for example, on the other hand, it follows that

Abbreviations

- Use acronyms after the word has been defined
  - HWMN
  - Heterogeneous Wireless Mesh Network (HWMN)
- For example (e.g.)
- That is (i.e.)

Technical Writing Structure

- Subjects
  - Familiar to the audience
  - **Characters** of the story, which make an **action**
  - Many verbs may exist, the main verb (action) is tied to the character
  - **short**
- Sentence
  - First the known then the unknown
- Paragraph
  - Meet all requirements of the sentences
  - Each sentence should explain more what the previous one ended

Technical Writing by Section

- Abstract: Provides an idea of what the paper is about
- Introduction: Motivates the reader to read further
  - Answers the question:
    - what is the problem?
    - **why is it a problem?**
    - what is the solution?

Technical Writing by Section II

- Conclusion and future work: Reverse process of introduction
  - Answers:
    - What was the problem?
    - What is the solution?
    - **What now?**
  - Avoid future work if you don't want others to work on your future work
- Background: gives credibility to your work
  - Should relate to your work
  - Can be cited across the paper, or in a separate section

Technical Writing by Section III

- Methodology: presents your work
  - Should be clear
- Experiments: describe your experiments in detail such that others can replicate your work
- Results and Discussion: enumerate your results and discuss upon them
  - Provide details on performance
  - Comparisons
  - If they are good the reader should get the message without you having to explicitly write it

Technical Writing Tips

- Avoid “we”
  - “We” is also a crutch to avoid thinking about sentence structure
- Never say “this” alone
  - Technical writing is hard enough to read without having to figure out what “this” refers to
- Avoid the verb “to use”
  - It is a crutch like “we” to avoid thinking about the main verb
  - It distorts sentence structure

Technical Writing Tips 2

- Avoid unnecessary emphasis
  - "The results are good" is better than "The results are very good"
- Avoid fancy words
- Words should only add information; cut those that do not
- Avoid advertising; results should speak for themselves
- Keep language objective

Technical Writing Tips 3

- Avoid “actual” and “actually”
  - Does not add information
- Avoid “seems that” and “essentially”
  - Wordy and controversial
- No colloquialisms
- “That” vs. “which” : which is parenthetical
- Learn about semicolons
- Learn about i.e. and e.g.

Technical Writing Tips 4

- Reduce expressions with “of”
  - “The results of the experiment” -> “The experimental results”
- Verbs should be descriptive
- Avoid inventing new terms
  - Learn the customary terminology

Summary Tables

Order	Introduction	Conclusion
1	Prelude (optional)	Main Claim (solution)
2	Shared Context (but, however)	Its significant (answer “so what”)
3	Problem [Condition + Cost]	Further questions (answer “now what”)
4	Solution / Main Point	End with a postulate
Fixed	Topic (focus)	Stress (emphasis)
Variable	Simple, short, familiar	Complex, long, new
Fized	Subject | Verb	
Variable	Character | Action	

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- Choose a topic
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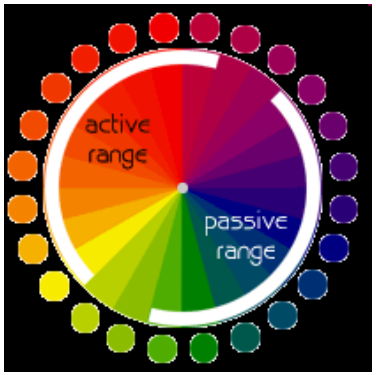
- **Oral Presentation**
  - **Slide preparation**
  - When presenting

Presentation Tips

- Use figures and animations
  - a picture is worth 1000 words
  - Readable pictures
- Do not overload slides with text
- Be focused
  - No time to explain the whole paper
  - Better transmit one simple idea that none

Presentation Tips II

- Readable text: big font, clear color
- Background should make contrast with text
  - Use the wheel color



- A projector usually has smaller resolution and fewer colors than a computer screen

Presentation Tips III

- Text should be concrete
  - Some people prefer to read the slides, rather than listen
  - It should however, provide only key points for presenter
- Acknowledge other people's work

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Speaking Tips

- Speak loud but do not scream
- Talk slower on very important aspects of the work
- Do not read slides
  - They should provide a guide for you

Speaking Tips II

- Practice makes perfect
  - Prepares your vocabulary
  - Helps with memorization of the presentation order
  - Shows confidence when being questioned
- Explain the figures