

COE589: Digital Forensics

Reading Research Papers

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Outline

- Types of Research Papers
- Structure of Research Papers
- Quality of Papers
- Reading Process
- Efficient Reading
 - Keshav's Approach
- Reading Exercise

Types of Research Papers *(Schulzrinne)*

- Two main categories:
 - survey paper
 - original research paper
 - related work section is a brief/narrow survey
- Original Research Papers: reports novel technical results
 - Algorithm
 - System construct: such as hardware design, software system, protocol, etc.;
 - Performance evaluation: obtained through analyses, simulation or measurements;
 - Theory

Paper Structure *(Schulzrinne)*

- Abstract (100-150 words)
- Introduction
 - introduce problem, outline solution; why the problem is important (motivations)
- Related Work
 - Include most relevant work from literature
 - How your work relates or differs
- Body of paper: meat of the paper
 - problem
 - approach, architecture
 - evaluation: results and discussions
- Bibliography
- Appendices (if needed)

Quality of Papers

- Papers/Journals are judged by citation counts
 - How many times a paper has been cited
 - the more citations the better
- Google Scholar shows citation counts

The screenshot shows a Google Scholar search interface. At the top, the Google logo is on the left, and a search bar contains the text 'digital forensics'. Below the search bar, the word 'Scholar' is displayed in red, followed by the text 'About 35,400 results (0.03 sec)'. The main results area shows a list of articles. The first article is titled 'Statistical tools for digital forensics' in blue, with the author 'A Popescu, H Farid - Information Hiding, 2005 - Springer' listed below it. To the left of the article title, the word 'Articles' is written in red. Below the article title, the text 'Legal documents' is written in red. The article description begins with 'A digitally altered photograph, often leaving no visual clues of having been tampered with...'. At the bottom of the article entry, the text 'Cited by 248' is circled in red. To the right of the article title, the text 'Related articles' is written in blue. At the bottom of the search results, the text 'Any time Since 2012' is written in red.

Google

digital forensics

Scholar About 35,400 results (0.03 sec)

Articles

Legal documents

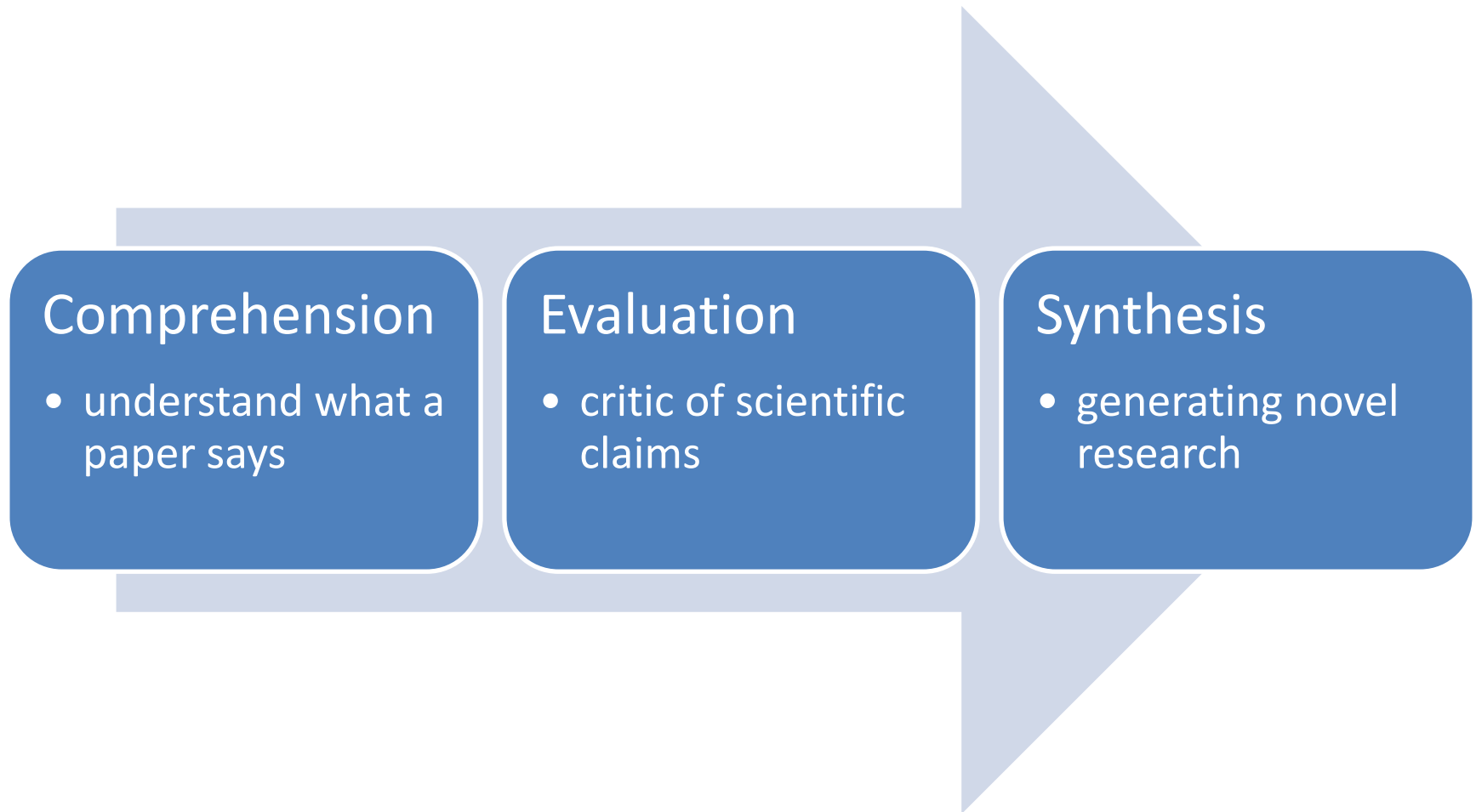
Any time Since 2012

Statistical tools for digital forensics
A Popescu, H Farid - Information Hiding, 2005 - Springer

A digitally altered photograph, often leaving no visual clues of having been tampered with... can be indistinguishable from an authentic photograph. As a result, photographs no longer hold the unique stature as a definitive recording of events. We describe several statistical...

Cited by 248 Related articles Find-it @KFUPM Library All 19 versions Import into...

Reading Process *(Fong 2009)*



Reading Process *(Fong 2009)*

1 Comprehension: understand what a paper says

- don't focus solely on the technicalities
- Ask yourself
 - What is the research problem the paper attempts to address?
 - What are the claimed contributions of the paper (understanding, method, algorithm, ..)?
 - How do the authors substantiate their claims (methods, argument, simulations, ..)?
 - What are the conclusions?

Reading Process *(Fong 2009)*

2 **Evaluation:** be critical of scientific claims

- Ambitious claims are easy to make but difficult to substantiate
- Ask yourself
 - Is the research problem significant?
 - Are the contributions significant? real surprises?
 - Are the claims valid? correct evaluation?
- caveats:
 - Be fair: Consistently, evaluating papers negatively gives a false sense of being critical
 - Requires a comprehensive understanding of the research field as a whole

Reading Process *(Fong 2009)*

3 Synthesis: generating novel research

- reading research papers is one of the most effective ways for generating novel research
- Ask yourself:
 - What is the crux of the research problem?
 - What are some alternative approaches to address it?
 - Is there an alternative way to substantiate the claim of the authors?
 - What is a good argument against the case made by the authors?
 - Can the research results be strengthened?
 - Can the research results be applied to another context?
 - What are the open problems raised by this work?
 - Bottom line: If you were to do the research, how would you do differently?

Efficient Reading (Keshav 2007)

- Keshav's Approach is to read a paper in **three** passes
- Each pass accomplishes specific goals and builds upon the previous pass:
 - **First pass** gives you a general idea about the paper.
 - **Second pass** lets you grasp the paper's content, but not its details
 - **Third pass** helps you understand the paper in depth

Keshav's Approach: Pass 1

- Quick scan of a paper (10 minutes)
 - Title, abstract, and introduction
 - headings of section and sub-section
 - Conclusions
 - References
- Should answer the five C's
 - Category: What type of paper is it?
 - Context: What body of work does it relate to?
 - Correctness: Do the assumptions seem valid?
 - Contributions: What are the main research contributions?
 - Clarity: Is the paper well-written?
- Decide whether to read further...

Keshav's Approach: Pass 2

- More careful reading (1 hour)
 - Read with greater care, but ignore details like proofs
 - Pay special attention to figures, diagrams, and illustrations
 - Mark relevant references for later reading
- should be able to
 - grasp the content of the paper
 - summarize the main thrust of the paper to someone else
- Decide whether to
 - Abandon reading the paper in any greater depth
 - Read background material before proceeding further
 - Persevere and continue on to the third pass

Keshav's Approach: Pass 3

- Virtual re-implementation of the work(5 hours)
 - Making the same assumptions, recreate the work
 - Identify the paper's innovations and its failings
 - Identify and challenge every assumption
 - Think how you would present the ideas yourself
 - Jot down ideas for future work

Reading Exercise

- Practice Kashec's 3-Pass Approach