
A SOFTWARE INFRASTRUCTURE FOR CS RESEARCH DISSEMINATION

Aditya Puri
Foothill High School
Pleasanton, CA 94566
ap1016@pleasantonusd.net

Aahan Bagga
Las Lomas High School
Walnut Creek, CA 94596
aahan.bagga24@auhsdschools.org

Manish Arora
LearnDesk, Inc.
Pleasanton, CA 94588
manish@learndesk.us

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ABSTRACT

Reading research papers is integral to computer science education, especially at the graduate and senior undergraduate levels. Students, as well as researchers, spend much time understanding research work. While this is an essential part of computer science education, little work has been done to understand, aid, and formally assess research dissemination processes and methodologies. This short paper summarizes work in progress to build a comprehensive software infrastructure for understanding and disseminating research. The tool distributes various media and files with the research paper that aid in understanding the research paper. It enables researchers to provide documents, videos, media, data, code, etc., related to their research work through a single, well-organized, easy-to-use interface. It allows easy organizing of online discussion groups and research talks to help improve understanding. This short paper summarizes the tool's structure. It highlights the use of the software infrastructure to enhance and formally assess the comprehension, evaluation, and synthesis of research for CS graduate and senior undergraduate students.

Keywords understanding of research · research dissemination · research papers

1 Introduction and Motivation

CS graduate students, senior undergraduates, and researchers read papers regularly. This could be to build a background, stay abridged, as a part of the coursework, or build critical thinking. A typical CS graduate student may spend hundreds of hours every year reading papers [1]. While students spend much effort in the process, they are frequently driven to frustration as the research paper alone may not provide enough background, context, or explanations.

Over time, methodologies have emerged to understand research papers [1][2]. In [1], the author proposes a three-pass approach to reading research papers. The first pass gives a general idea of the work, the second is designed to grasp the paper's content, and the third one helps the reader understand the details and the paper in depth. Other approaches to reading research papers include the comprehension, evaluation, and synthesis approach[2]. In this approach, the first step is understanding what a paper says. Evaluation includes being critical of scientific claims. Lastly, in the synthesis step, readers interact with the scholarly community to generate novel research ideas.

The CS research community has started implementing aids for understanding research. Many CS conferences ask authors to upload prerecorded video talks [3] or provide slides/video recordings of the talk [4] for viewing later. Researchers regularly post presentation slides on their websites or upload talks to YouTube. Websites that enable discussions around research papers have also sprung up [9][8].

To enable easier dissemination of research and to address the critical need of students and researchers to understand research, we [6] are developing a software infrastructure called "LearnDesk Papers" [5]. LearnDesk Papers pushes the state-of-the-art in research dissemination by providing extensive software support for researchers to provide documents, videos, media, data, code, etc., related to their research work through a single, well-organized, easy-to-use interface. It enables organizing online discussion groups and live research talks to help improve understanding.

By enabling researchers to easily provide supplementary materials and enabling online and/or live discussions, LearnDesk Papers simplifies and enables research dissemination.

2 Summary of LearnDesk Papers

LearnDesk Papers provides a set of software tools for understanding CS research. The software works with existing research comprehension frameworks, e.g., the comprehension, evaluation, and synthesis method [2]. It aids and assists such methods with software support.

The first goal of reading a paper is to understand it. While papers are written to aid comprehension, the paper alone may not be sufficient for readers of varying backgrounds. The tool allows authors to provide relevant articles, presentations, documents, reports, and multimedia (videos, audio, etc.) that explain the paper. Ability is provided to link related work to provide a broader context.

Community contributions to supplementary materials are possible. The additional materials combined with the paper content enable easier comprehension. The functionality within LearnDesk Papers exceeds the commenting or discussion features available in existing solutions [9][8].

Solid scholarship involves carefully validating the scientific claims of the work; an integral component is being critical of them. LearnDesk Papers allows the distribution of research data, including files/data sets, to enable the community to generate and verify results. A source code distribution system is included. Ability is provided to share execution environments, e.g., containers [7] with the community. This enables the critical evaluation of research.

Interacting with the scholarly community effectively generates novel research agendas. The software infrastructure allows the ability to launch discussion groups. A meeting scheduler is provided that enables the authors to conduct live interactive talks or to organize meetings and workshops. Ability is provided for the community to share research notes and paper summaries. These features aid interactions and the synthesis of new ideas.

Lastly, LearnDesk Papers provides the ability to survey and measure the understanding of the paper. This enables the formal assessment of research dissemination methodologies through a measurement framework. For example, researchers can measure the impact of a reader attending a live talk on the understanding of the research work.

3 Conclusion

While CS graduate students, senior undergraduates, and researchers spend a lot of time reading research papers, there is a lack of tools to easily disseminate research and methods that measure the efficacy of dissemination. This short paper summarizes work-in-progress on LearnDesk Papers, an infrastructure to improve CS research dissemination. This paper highlights the use of the proposed software infrastructure to enhance and formally assess the comprehension, evaluation, and synthesis of research.

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