

Research Methodology in Computer Science (AI800)

Lecture 3

Introduction to literature Review (Part 2)



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Outlines

- Learning Outcomes
- Literature Review Sources
- Building a Literature Review: A Road Map
- How to find Sources
- How to Read the Sources
- How to Select the Journal
- Analyzing Sources
- Sources Evaluation
- Writing Up Literature Review
- Citations Styles
- Focus of MLA & APA Styles
- Comparing In-Text Citations
- Comparing References
- Citation Different Types of References
- Reference management software
- Mendeley



Learning Outcomes

- To help you understand the literature review sources, find resources, read resources, find journal, analyze and evaluate resources.
- To help you to build the literature review .
- To help you simplify your reference citation, creation and management workflow.
- To provide demo that illustrate how to manage your literature review using Mendeley reference manager



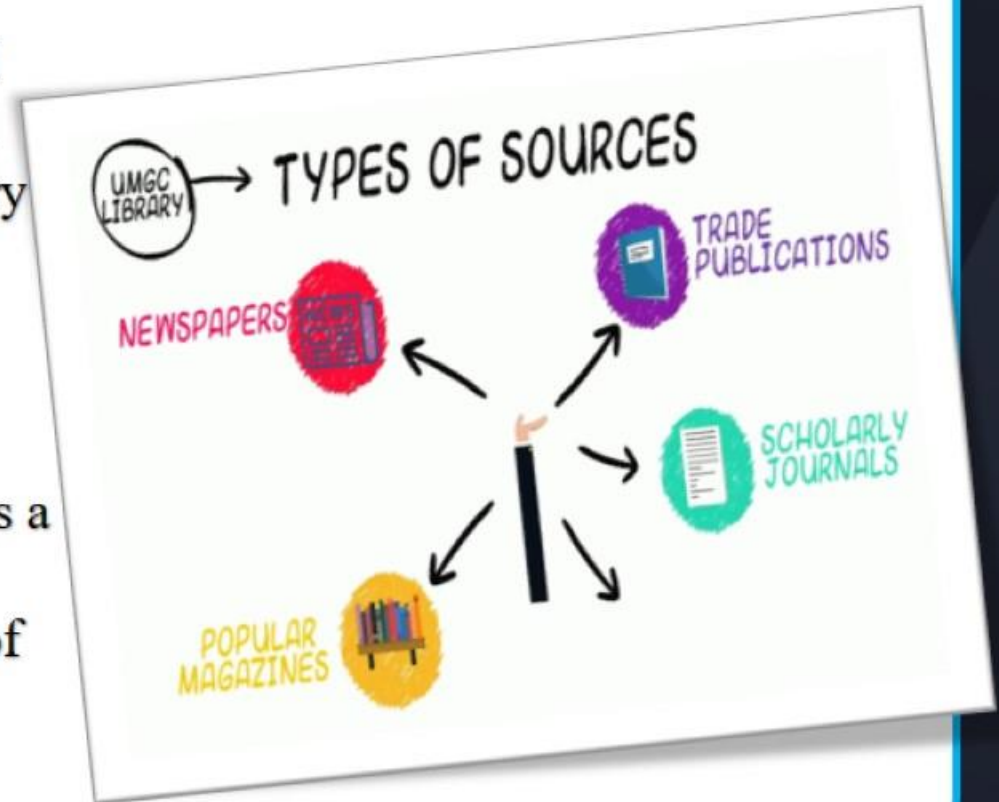
Literature Review Sources

❑ *Libraries:*

Libraries often hold archival pieces of information and other types of primary sources that cannot be retrieved online. Good researchers get acquainted with the library catalog, reference desk, and programs and systems for accessing information.

❑ *Online Databases*

Online databases are electronic sources the library pays a fee to have access to. Published articles are found through electronic databases. They search thousands of journals, books, chapters in edited books, government documents, newspapers, and theses/dissertations.



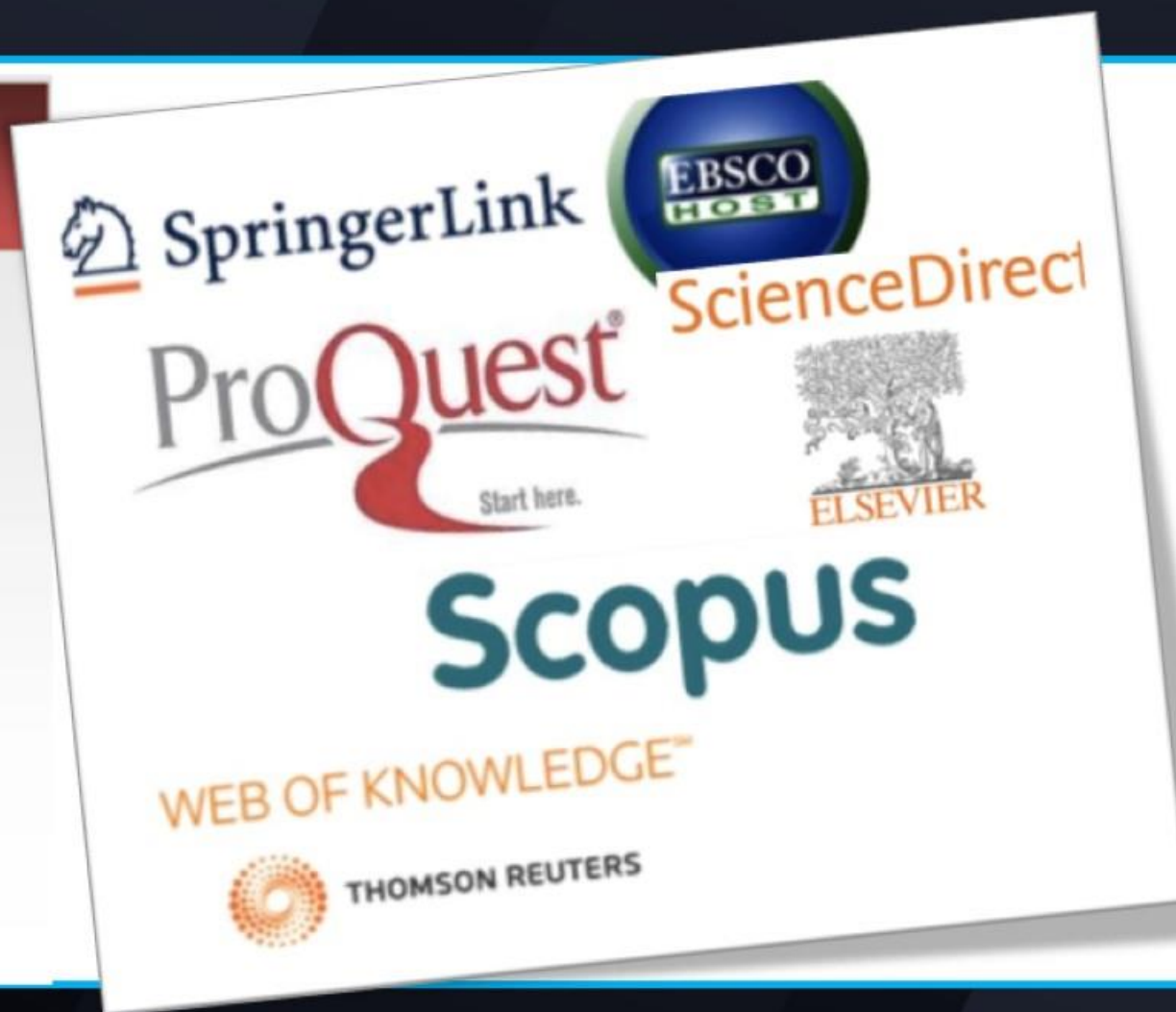
(VanderMey et al., 2011; Sheperis et al., 2017)



Literature Review Sources (cont.)

Sources & organizations providing publications

Academic libraries
Public libraries
National libraries
Museums
Archives
Special collections
Commercial organizations
Commercial databases (SCOPUS,
Web of knowledge, Springerlink)



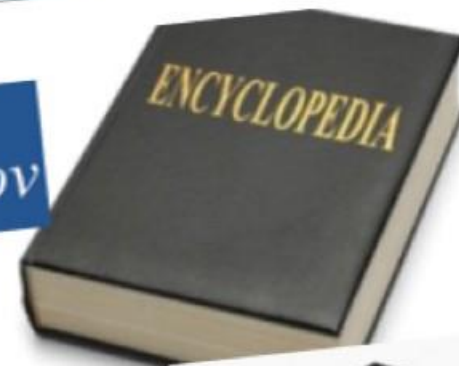


Literature Review Sources (cont.)

Tools for searching published works & data

- Library catalogues
- Subject indexes
- Subject abstracts
- Bibliographies
- Encyclopedia
- Internet directories
- Internet search engines

PubMed.gov



Google



YAHOO! SEARCH

bing

ResearchGate



Literature Review Sources (cont.)

Sources where research & information is published

Textbooks

Articles

Theses

Government publications

Legal & professional publications

Trade literature

Conference papers

Monographs

Statistics





Literature Review Sources (cont.)

Organizing information

Summarize, tabulate
Use bibliographic software
(Endnote)





Other Sources

1. **Internet Sources.**
2. **Primary Sources:** presents the immediate results of research activities.
 1. It often includes analysis of data collected in the field or laboratory.
 2. Primary literature presents original research and/or new scientific discoveries.
3. **Secondary Sources** summarizes and synthesizes the primary literature.
 1. It is usually broader and less current than primary literature.
 2. Since most information sources in the secondary literature contain extensive bibliographies, they can be useful for finding more information on a topic.
4. **Tertiary Literature:** presents summaries or condensed versions of materials usually with references to primary or secondary sources.
 1. They can be a good place to look up facts or get a general overview of a subject.

(VanderMey et al., 2011; Sheperis et al., 2017)



Other Sources (cont.)

PRIMARY LITERATURE



- Original research and/or new scientific discoveries

- Immediate results of research activities
- Often includes analysis of data collected in the field or laboratory

EXAMPLES:

- Original research published as articles in peer-reviewed journals.
- Dissertations
- Technical reports
- Conference proceedings

SECONDARY LITERATURE

- Summarizes and synthesizes primary literature
- Usually broader and less current than primary literature



EXAMPLES:

- Literature review articles
- Books

Since most information sources in the secondary literature contain extensive bibliographies, they can be useful for finding more information on a topic

TERTIARY LITERATURE

- Summaries or condensed versions of materials
- Usually with references to primary or secondary sources
- Good place to look up facts or get a general overview of a subject

EXAMPLES:

- Textbooks
- Dictionaries
- Encyclopedias
- Handbooks





Peer Reviewed Journals

- ☐ *Published journal articles* are a common source of literature.
- ☐ *Published journal articles* require an editorial board to review the work, make corrections, and determine if it can be published.
- ☐ The work has been reviewed, edited, evaluated and corrected.



(Sheperis, Young, and Daniels, 2017)



Building a Literature Review: A Road Map

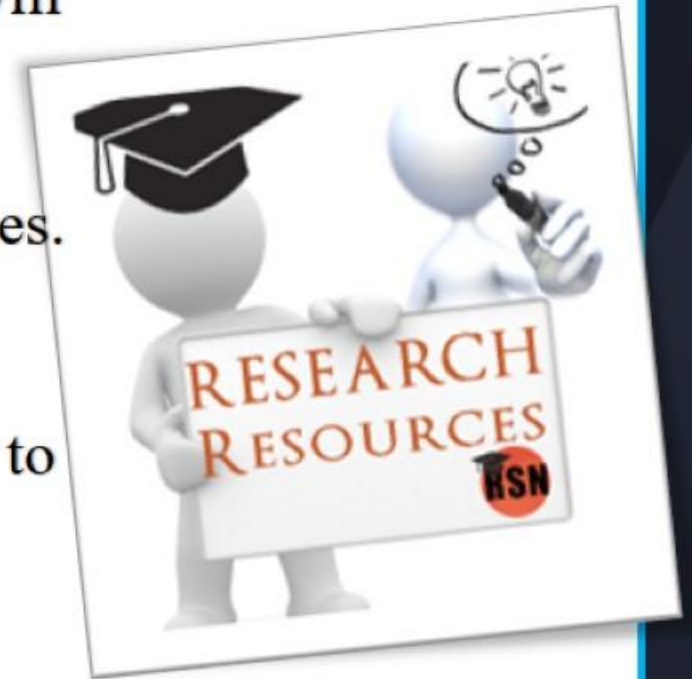
- ❑ *Find* the relevant material and resources for your literature review.
- ❑ *Analyze and evaluate* the selected resources.
- ❑ *Integrate by* making links between studies.
- ❑ *Document by* writing up your research literature review





How to find Sources

- ☐ Look for key *authors* within the *field-- big name authors* will be found often within bibliographies.
- ☐ Computer literature searches-- most universities have an extensive *on-line library* with full text and *citation* databases.
- ☐ Write or call key authors.
- ☐ Look at *literature* in other disciplines.
- ☐ Go from beginning to end of a very concern *Review Paper* to your field of study.





How to Read the Sources

1 SKIM



First get the "big picture" by reading the title, key words and abstract carefully; this will tell you the major findings and why they matter.

- Quickly scan the article without taking notes; focus on headings and subheadings.
- Note the publishing date; for many areas, current research is more relevant.
- Note any terms and parts you don't understand for further reading.

3 INTERPRET



- Examine graphs and tables carefully.
- Try to interpret data first before looking at captions.

- When reading the discussion and results, look for key issues and new findings.
- Make sure you have distinguished the main points. If not, go over the text again.

RE-READ 2

Read the article again, asking yourself questions such as:



- What problem is the study trying to solve?
- Are the findings well supported by evidence?
- Are the findings unique and supported by other work in the field?
- What was the sample size? Is it representative of the larger population?
- Is the study repeatable?
- What factors might affect the results?

If you are unfamiliar with key concepts, look for them in the literature.

SUMMARIZE 4

- Take notes; it improves reading comprehension and helps you remember key points.
- If you have a printed version, highlight key points and write on the article. If it's on screen, make use of markers and comments.





How to Select the Article

1. Go To <https://www.sciencedirect.com/>
2. Select Advanced Search

ScienceDirect

Journals & Books ? Register Sign in

Search for peer-reviewed journal articles and book chapters (including open access content)

Find articles with these terms In this journal or book title Author(s)

Search Q Advanced search

**Confidence
IN RESEARCH**

Elsevier has partnered with leading science organizations and Economist Impact for a global collaboration to understand the impact of the pandemic on **confidence in research** — and to identify areas for action to support researchers.

[Read the Economist Impact report ↗](#)

Explore scientific, technical, and medical research on ScienceDirect

FEEDBACK



3. Search for articles using title, abstract or author- specified keywords

The screenshot shows the ScienceDirect Advanced Search page. At the top left is the ScienceDirect logo. At the top right is a link for 'Journals & Books' with a help icon. The main heading is 'Advanced Search'. Below this is a 'Search tips' link. The primary search area is a large text box labeled 'Find articles with these terms'. Below this are several smaller input fields: 'In this journal or book title' and 'Year(s)' in the first row; 'Author(s)' and 'Author affiliation' in the second row; and 'Volume(s)', 'Issue(s)', and 'Page(s)' in the third row. At the bottom left is a link 'Show all fields' with a dropdown arrow. At the bottom right is a blue 'Search' button with a magnifying glass icon.



How to Select the Article (cont.)

<https://scholar.google.com/>

Google Scholar

☒ Articles ☐ Case law

× Advanced search 🔍

Find articles

with **all** of the words

with the **exact phrase**

with **at least one** of the words

without the words

where my words occur ☒ anywhere in the article
☐ in the title of the article

Return articles **authored by**
e.g., "PJ Hayes" or McCarthy

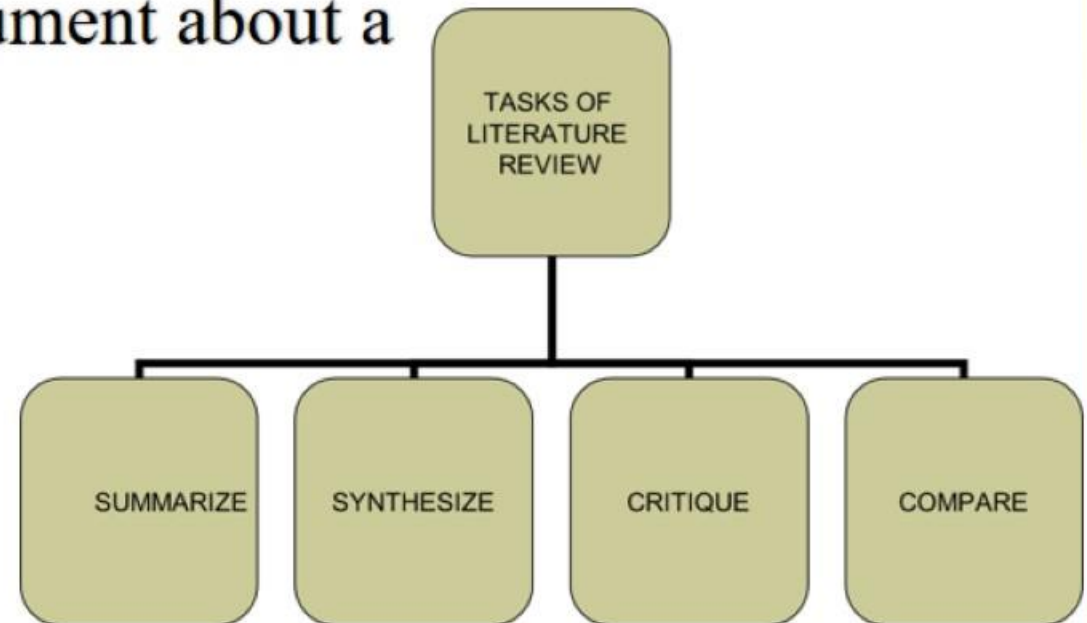
Return articles **published in**
e.g., J Biol Chem or Nature

Return articles **dated between** —
e.g., 1996



Analyzing Sources

- A literature review is never just a list of studies—it always offers an argument about a body of research
- Analysis occurs on two levels:
 - Individual sources
 - Body of research





Critical analysis checklist

- What is the main idea being put forward?
- What evidence is provided?
- Do you agree with the conclusions?
- Is it a response to another work?
- Underlying theory or assumption?
- Model?
- Strengths / weakness / limitations?

(VanderMey et al., 2011; Sheperis et al., 2017)



Sources Evaluation

Researchers may want to consider the following questions when examining existing literature:

Is the research Source Trustworthy?
Is the author an expert?
Is the source current?
Is the source complete?
Is the source biased or unbiased?
Is the source accurate and logical?



(VanderMey et al., 2011; Sheperis et al., 2011)



Synthesis Matrix for Literature Review

A synthesis matrix, often used in literature reviews, is a way to organize and synthesize information from multiple sources on a specific topic. Below is a simple template for creating a synthesis matrix:

Study	Authors	Year	Research Design	Key Findings/Results	Methodology	Limitations
Study 1						
Study 2						
Study 3						
Study 4						



Synthesis Matrix for Literature Review (cont.)

- 1. Research Question or Subtopic:** Clearly define the specific research question or subtopic you are exploring.
- 2. Study:** Provide a space to list the studies or sources you are reviewing.
- 3. Authors:** List the authors of each study or source.
- 4. Year:** Mention the publication year of each source.
- 5. Research Design:** Describe the research design or methodology used in each study (e.g., experimental, survey, case study).
- 6. Key Findings/Results:** Summarize the main findings or results of each study. Be concise and clear.
- 7. Methodology:** Briefly describe the methodology used in the study, including data collection methods, sample size, and any relevant details about how the research was conducted.
- 8. Limitations:** Highlight the limitations or weaknesses of each study. This could include any biases, constraints, or issues with the research design or methodology.



Synthesis Matrix for Literature Review (cont.)

Study	Authors	Year	Research Design	Key Findings/Results	Methodology	Limitations
Study 1	Smith, J., & Johnson, A.	2020	Survey	Increased use of social media is associated with higher levels of anxiety and depression in young adults.	Survey of 500 young adults; self-report measures	Self-reported data may be subject to response bias. Limited demographic diversity in the sample.
Study 2	Garcia, R., & Lee, B.	2019	Meta-analysis	A meta-analysis of 15 studies shows a small but significant negative correlation between social media use and well-being.	Meta-analysis of existing studies; quantitative data	Limited to existing data and may not capture all relevant variables.



Writing Up Literature Review

*It is important to write a draft of your literature review and take notes on important points and ideas such as : **purpose** of study reviewed, **synopsis** of content, **research design or methods** used in study, and brief review of **findings**.*

THIS WILL HELP YOU STAY ORGANIZED.....

1. Keep a record and notes of the literature you collect.
2. Take care to make your review accurate and complete.
3. Record too many references, where and when you retrieved the information.
4. Use a citation manager program like Mendely or EndNote

The path to consensus
via science is rarely
straight; it can take years
to achieve and the
battles can be bloody.
But, eventually, the
accumulation of
evidence is hard, even
impossible, to ignore.

- CHESTER FINN JR -





Writing Up Literature Review (cont.)

Two studies were examined to understand the impact of social media on mental health. The first study conducted by **Smith and Johnson in 2020** utilized a survey of 500 young adults and self-report measures to investigate the relationship between social media usage and mental health. Their findings revealed a significant association between increased use of social media and higher levels of anxiety and depression among young adults. However, it's important to note that the data in this study is self-reported, which may introduce response bias, and the sample had limited demographic diversity.

The second study, carried out by **Garcia and Lee in 2019**, employed a meta-analysis approach, aggregating data from 15 previous studies to assess the impact of social media use on well-being. Their meta-analysis showed a small but statistically significant negative correlation between social media use and overall well-being. This approach allowed for a broad perspective, considering existing research. However, it is limited to the data available from those previous studies, and it may not capture all relevant variables contributing to the complex relationship between social media and mental health.



Citations Styles

A citation style, also known as a reference system, is a set of rules for properly crediting the sources you've used in your writing.

There are several different citation styles that are commonly used are categorizes in:

1. *Parenthetical Citations*: identifying details of the source in parentheses in the text—usually the author's last name and the publication date, plus a page number if relevant (author-date). Sometimes the publication date is omitted (author-page).
2. *Numerical Citations*: a number in brackets or in superscript, which corresponds to an entry in the numbered reference list.
3. *Note Citations*: a full citation in a footnote or endnote, which is indicated in the text with a superscript number or symbol.



Focus of MLA & APA Styles

Modern Language Association (MLA)

- ☐ Humanities and related areas (i.e. literature)
- ☐ Focuses on authorship: “...(Smith and Johnson)”
- ☐ Format is designed for ease of presentation
- ☐ Often viewed as “easier” to follow by students
- ☐ Commonly taught first to students

American Psychological Association (APA)

- ☐ Social sciences (i.e. psychology, sociology, and linguistics)
- ☐ Focuses on date of publication: “...(Smith & Johnson, 2009)”
- ☐ Format is designed for comparison of research and determining relevance
- ☐ Often thought of as more difficult by students
- ☐ Commonly taught as an alternative citation style



Basics of MLA & APA Citations (Book Example)

Modern Language Association (MLA)

- ☐ Name(s) of author(s)
- ☐ Work title
- ☐ Publication city and year
- ☐ Publisher
- ☐ Publication medium (i.e. print, web)

American Psychological Association (APA)

- ☐ Name(s) of author(s)
- ☐ Publication year
- ☐ Work title
- ☐ Publication city
- ☐ Publisher

☐ In-text citations:

- ☐ MLA: "...no significant results" (Johnson 34).
- ☐ APA: "...no significant results" (Johnson, 2003, p. 34).

☐ Reference citations:

- ☐ MLA: Johnson, Thomas. *Studies in College*. New York: McGraw-Hill, 2003. Print.
- ☐ APA: Johnson, T. (2003). *Studies in college*. New York, NY: McGraw-Hill.



Comparing In-Text Citations

In-text citations are used when you need to give credit to an author for using a quote (exact wording), paraphrasing (rewording), or discussing his/her ideas. Example: (Mathis and Jones, 2009, pg. 74)

All in-text citations for MLA and APA must reference the author's name.

Reference to the page number or publication year depends on the situation and citation style.

- ☐ When using APA, always give the year of publication.
- ☐ When quoting, always give the page number in MLA & APA.
- ☐ When paraphrasing or simply referencing, no page number is needed for either style.



Comparing In-Text Citations (Cont..)

Example: “The study provided no significant findings regarding the relationship of gender and success in language classes.” -- Johnson, Thomas and Arlene Maiden. *Studies in College*. New York: 2003. McGraw-Hill. Print.

Paraphrase

MLA: As stated by Johnson and Maiden, the research showed that there was...

APA: As stated in Johnson & Maiden (2003), the research showed that...

Quote (incorporation in text)

MLA: As Johnson and Maiden explained, their “study...classes” (34).

APA: As Johnson & Maiden (2003) explained, their “study...classes” (p. 34).

Quote (no incorporation in text)

MLA: “...in language classes” (Johnson and Maiden 34)

APA: “...in language classes” (Johnson & Maiden, 2003, p. 34)



Comparing References

A portion at the end of every research paper must be devoted to listing the details for each source you used. All the sources you cited, summarized, or quoted are included here.

If you've done your citing right, you'll have mentioned each reference work at least once in your paper and included a reference citation for every source you used.

Different citation styles use different terms for this section:

- **MLA**: Bibliography (Works Cited title)
- **APA**: Reference Page (Reference title)

Citations in MLA and APA styles should be arranged alphabetically by the first letter of the author's last name.



Citation Different Types of References

Book Template

MLA: Lastname, Firstname. Title of Work. City of Pub: Publisher, Year. Medium.

APA: Lastname, First Initial. (Year). Title of work. City of Pub, State: Publisher.

Articles in Journals Template

MLA: Lastname, Firstname. "Title of Work." Journal Title Volume.Issue (Year):
page numbers. Medium.

APA: Lastname, First Initial. (Year). Title of work. Journal Title, Volume(Issue), page
numbers.

Online Sources Template

MLA: Author. Title of Site. Sponsor, Date created (use n.d. if not given). Medium.
Date accessed. <URL (optional)>.

APA: Author. (Year, Month[use n.d. if not given]). Article or page sub-title. Major
Publication Title, volume or issue number (if available). Retrieved from
<http://url>.



Reference management software

Reference management software is a type of **computer program** that helps researchers keep track of the **sources** they use, **retrieve** and **organize** those sources, **incorporate in-text citations** into their **writing**, and generate a **reference list** in a consistent format across a variety of **citation styles**.

Why Reference management software need??

1. Organize and tag citations & documents
2. Create instant references in standard formats.
3. Create personal citation database of articles on your topics.
4. Format papers with in-text citations and bibliographies in standard formats.
5. Share your database of citations/articles with others.

Features Of Reference Management Software



Functions of Reference management software

Storing and Managing References
Creating Bibliographies
Searching and Retrieving References from Online Databases

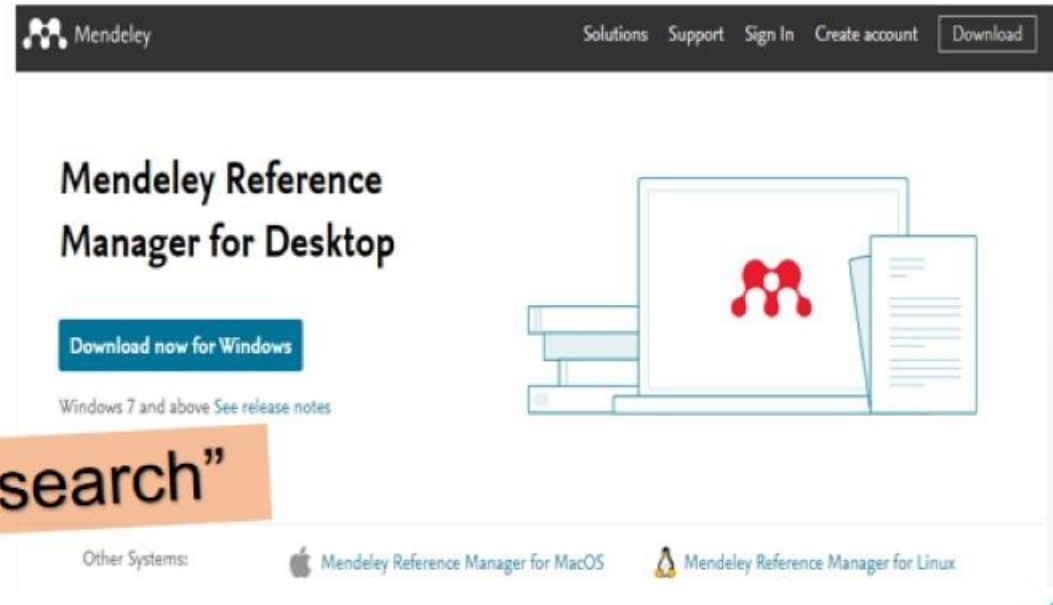


***Mendeley** is a free, award-winning, desktop and web program for managing and sharing research papers, discovering research data and collaborating online available for Windows, Mac, and Linux.*

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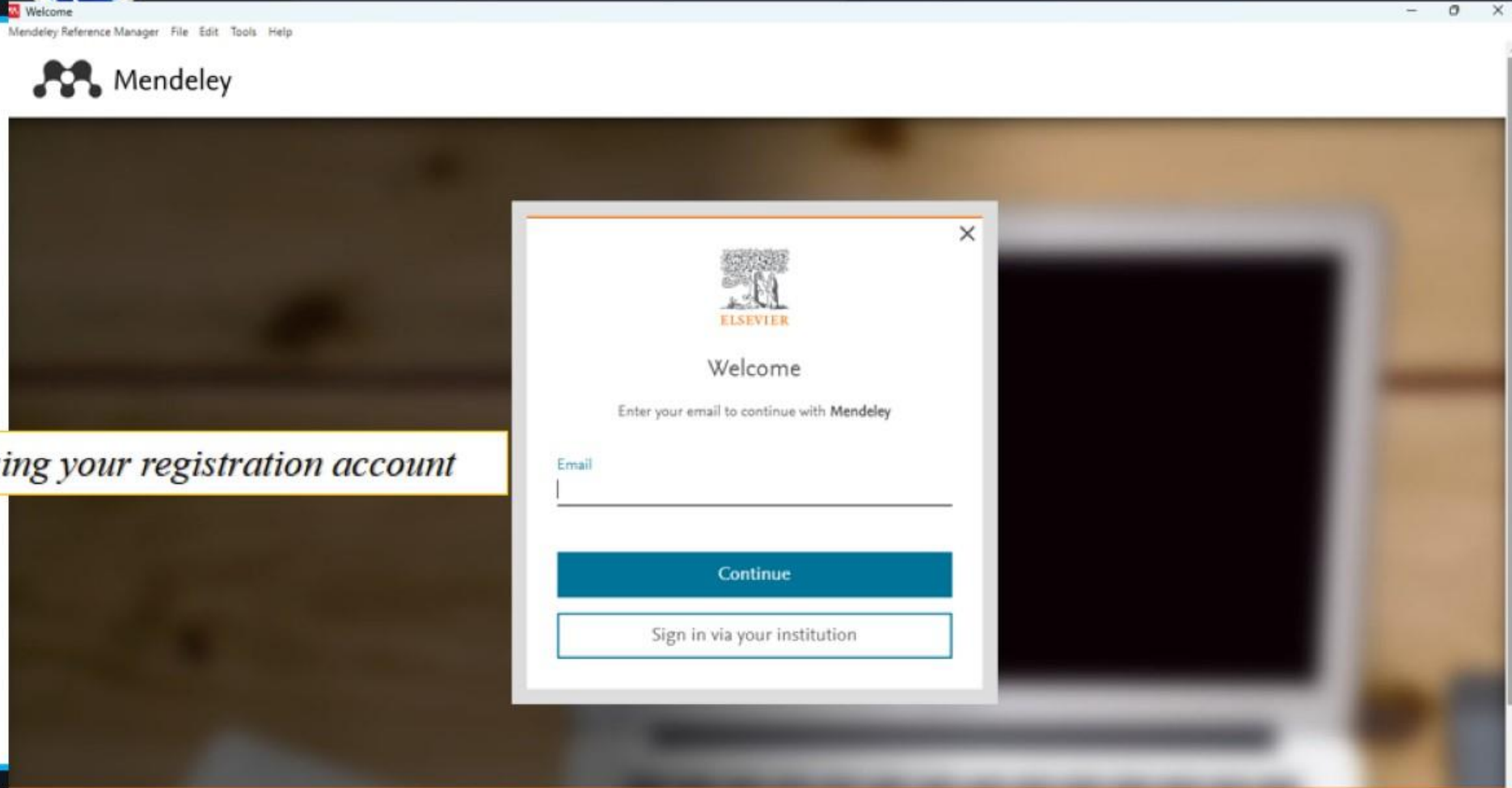
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Select a file or document to add from your computer

Import You Reference From
BibTex, Endnote or RIS

File(s) from computer

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Endnote XML (*.xml)

RIS (*.ris)

All References

AUTHORS

YEAR

TITLE

SOURCE

ADDED

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2020

Word parts dictionary: standard and reverse listings of prefixes, suffixes...

9/18/2023

...

A Review on Security Techniques in Image Steganography

IJACSA) International Jo...

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2021

Survey on Data Hiding Based on Block Truncation Coding

Applied Sciences

9/11/2023

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Adaptive 3D Reversible Data Hiding Technique Based on the Cumulativ...

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Applied Sciences

9/11/2023

2012

An innovative information hiding technique utilizing cumulative peak hist...

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7/14/2023

2023

Efficient Reversible Data Hiding Using Two-Dimensional Pixel Clustering

Electronics (Switzerland)

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2023

High-Embedded Low-Distortion Multihistogram Shift Video Reversible D...

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2020

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Sādhanā

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Eastern-European Journ...

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2020

Detection Techniques of Distributed Denial of Service Attacks on Softwa...

IEEE Access

6/18/2023

2021

Impact of coronavirus pandemic crisis on technologies and cloud comp...

Journal of Electronic Sci...

6/18/2023

Add resources (cont.)

Select add entry manually

Library | Notebook

Add new

- File(s) from computer
- Add entry manually
- Import library >
- Trash

COLLECTIONS

New Collection

PRIVATE GROUPS

New Group

Add entry manually

Identifiers (ArXivID, DOI or PMID)

Enter identifiers and look up for metadata.

Reference Type

Journal Article

Title

Authors

Please enter author names as 'last name, first name' (e.g. 'Smith, Jane').

+ Add another author

Journal

Year

Pages

Add entry Cancel

Enter DOI, ArXiv, or PMID + click on the magnifying glass to start lookup

TITLE	SOURCE	ADDED	FILE
Word parts dictionary - standard and reverse listings of prefixes, suffixes		9/18/2023	
A Review on Security Techniques in Image Steganography	(IJACSA) International Jo...	9/11/2023	✓
Survey on Data Hiding Based on Block Truncation Coding	Applied Sciences	9/11/2023	
Adaptive 3D Reversible Data Hiding Technique Based on the Cumulativ...	Electronics	9/11/2023	
Reversible Data Hiding in Encrypted Images with Extended Parametric ...	Applied Sciences	9/11/2023	
An innovative information hiding technique utilizing cumulative peak hist...	Journal of Systems and I...	7/14/2023	
Efficient Reversible Data Hiding in Encrypted Images	Electronics (Switzerland)	7/12/2023	✓
High-Embedded Low-Distortion Histogram Shift Based Reversible D...	Electronics (Switzerland)	7/12/2023	✓
DHCPv6Auth: a mechanism to improve DHCPv6 authentication and pri...	Sādhanā	6/18/2023	
IDENTIFYING OPTIMAL MESSAGE EMBEDDING LOCATION IN AUDI...	Eastern-European Journ...	6/18/2023	
Detection Techniques of Distributed Denial of Service Attacks on Softwa...	IEEE Access	6/18/2023	
Impact of coronavirus pandemic crisis on technologies and cloud comp...	Journal of Electronic Sci...	6/18/2023	

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All References

Q Search

Filters

☐	AUTHORS	YEAR	TITLE	SOURCE	ADDED	FILE
☐	☆ Sharifi A, Goli-Bidgoli S	2022	IFogLearn++: A new platform for fog layer's IoT attack detection in critical infrastructure using machine learni...	Computers and Electrical E...	12:56 AM	
☐	☆ Dey A, Gupta G, Sahu S	2022	Hybrid Meta-Heuristic based Feature Selection Mechanism for Cyber-Attack Detection in IoT-enabled Networks	Procedia Computer Science	12:56 AM	
☐	☆ Yang R, He H, Wang Y, Qu Y, Zhang W	2023	Dependable federated learning for IoT intrusion detection against poisoning attacks	Computers and Security	12:55 AM	
☐	☆ Ma W, Ma L, Li K, Guo J	2023	Few-shot IoT attack detection based on SSDSAE and adaptive loss weighted meta residual network	Information Fusion	12:55 AM	
☐	☆ Vu L, Nguyen Q, Nguyen D, Hoang ...	2020	Deep Transfer Learning for IoT Attack Detection	IEEE Access	10/15/2023	
☐	☆ Türkoğlu M, Polat H, Koçak C, Polat O	2022	Recognition of DDoS attacks on SD-VANET based on combination of hyperparameter optimization and featu...	Expert Systems with Applic...	10/15/2023	
☐	☆ Adhikary K, Bhushan S, Kumar S, D...	2020	Hybrid Algorithm to Detect DDoS Attacks in VANETs	Wireless Personal Commu...	10/15/2023	

Create category folders

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Read and Work in the PDF Viewer

Hybrid Algorithm to Detect DDoS Attacks in VANETs, Adhikary K, Bhushan S et al. 2020

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Wireless Personal Communications
<https://doi.org/10.1007/s11277-020-07549-y>

Check for updates

Hybrid Algorithm to Detect DDoS Attacks in VANETs

Kaushik Adhikary¹ · Shashi Bhushan² · Sunil Kumar³ · Kamlesh Dutta⁴

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Abstract

Security and safety are fundamental issues in any wireless network. The problem becomes serious when the specified network is Vehicular Adhoc Network (VANET). VANET faces Distributed Denial of Service (DDoS) attacks, when several vehicles carry out various types of Denial of Service (DoS) attacks to disrupt the normal functioning of network, thereby endangering human lives. A highly efficient and reliable algorithm is required to be developed to detect and prevent DDoS attacks in VANET. This paper presents a hybrid detection algorithm based on the SVM kernel methods of AnovaDot and RBFDot for detecting DDoS attacks in VANETs. In this hybrid algorithm, features like collisions, packet drop, jitter etc. have been used to simulate real time network communication scenario where the network is operating under normal conditions, as well as under DDoS attacks. These features are used both for training and for testing the model based on the proposed hybrid algorithm. The performance of the model based on the proposed hybrid algorithm is compared with the models based on single SVM kernel algorithms AnovaDot and RBFDot based on Accuracy, Gini, KS, MER and H. The experimental results show that the model based on the proposed hybrid algorithm is superior to detect DDoS attacks as compared to the models based on single SVM kernel algorithms AnovaDot and RBF-Dot. The results also prove that by combining the the SVM kernel algorithms, an efficient and effective hybrid algorithm can be developed.

JOURNAL ARTICLE

Hybrid Algorithm to Detect DDoS Attacks in VANETs

Adhikary K, Bhushan S, Kumar S et al. See more

Wireless Personal Communications, (2020), 2013:2034–114(4)

See more information

Read

ABSTRACT

Security and safety are fundamental issues in any wireless network. The problem becomes serious when the specified network is Vehicular Adhoc Network (VANET). VANET faces Distributed Denial of Service (DDoS) attacks, when several vehicles carry out various types of Denial of Service (DoS) attacks to disrupt the normal functioning of network, thereby endangering human lives. A highly efficient and reliable algorithm is required to be developed to detect and prevent DDoS attacks in VANET. This... [Read more](#)

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Annotate and Highlight

Hybrid Algorithm to Detect DDoS Attacks in VANETs. Adhikary K, Bhushan S et al. 2020

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Wireless Personal Communications
<https://doi.org/10.1007/s11277-020-07549-y>

Check for updates

Hybrid Algorithm to Detect DDoS Attacks in VANETs

Kaushik Adhikary¹ · Shashi Bhushan² · Sunil Kumar³ · Kamlesh Dutta⁴

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Abstract

Security and safety are fundamental issues in any wireless network. The problem becomes serious when the specified network is Vehicular Adhoc Network (VANET). VANET faces Distributed Denial of Service (DDoS) attacks, when several vehicles carry out various types of Denial of Service (DoS) attacks to disrupt the normal functioning of network, thereby endangering human lives. A highly efficient and reliable algorithm is required to be developed to detect and prevent DDoS attacks in VANET. This paper presents a hybrid detection algorithm based on the SVM kernel methods of AnovaDot and RBFDot for detecting DDoS attacks in VANETs. In this hybrid algorithm, features like collisions, packet drop, jitter etc. have been used to simulate real time network communication scenario where the network is operating under normal conditions, as well as under DDoS attacks. These features are used both for training and for testing the model based on the proposed hybrid algorithm. The performance of the model based on the proposed hybrid algorithm is compared with the models based on single SVM kernel algorithms AnovaDot and RBFDot based on Accuracy, Gini, KS, MER and H. The experimental results show that the model based on the proposed hybrid algorithm is superior to detect DDoS attacks as compared to the models based on single SVM kernel algorithms AnovaDot and RBF-Dot. The results also prove that by combining the the SVM kernel algorithms, an efficient and effective hybrid algorithm can be developed.

Keywords VANETs · SVM kernels · Hybrid algorithm · DDoS attacks · DDoS attack detection · Machine learning



Annotate and Highlight (cont.)

Abstract

Security and safety are fundamental issues in any wireless network. The problem becomes serious when the specified network is Vehicular Adhoc Network (VANET). VANET faces Distributed Denial of Service (DDoS) attacks, when several vehicles carry out various types of Denial of Service (DoS) attacks to disrupt the normal functioning of network, thereby endangering human lives. A highly efficient and reliable algorithm is required to be developed to detect and prevent DDoS attacks in VANET. This paper presents a hybrid detection algorithm based on the SVM kernel methods of AnovaDot and RBFDot for detecting DDoS attacks in VANETs. In this hybrid algorithm, features like collisions, packet drop, jitter etc. have been used to simulate real time network communication scenario where the network is operating under normal conditions, as well as under DDoS attacks. These features are used both for training and for testing the model based on the proposed hybrid algorithm. The performance of the proposed hybrid algorithm is compared with the model based on AnovaDot and RBFDot based on Accuracy, Gini index, and F1 score. The results show that the model based on the proposed hybrid algorithm performs better than the model based on single SVM kernel algorithms AnovaDot and RBFDot. The results also prove that by combining the the SVM kernel algorithms, an efficient and effective hybrid algorithm can be developed.

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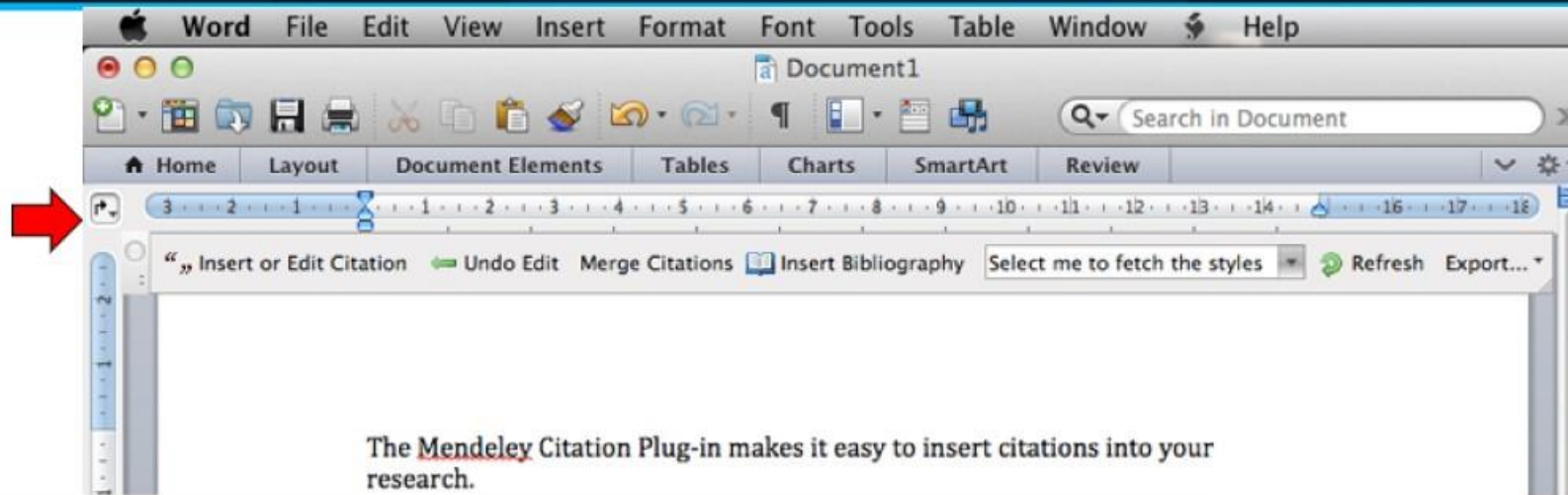
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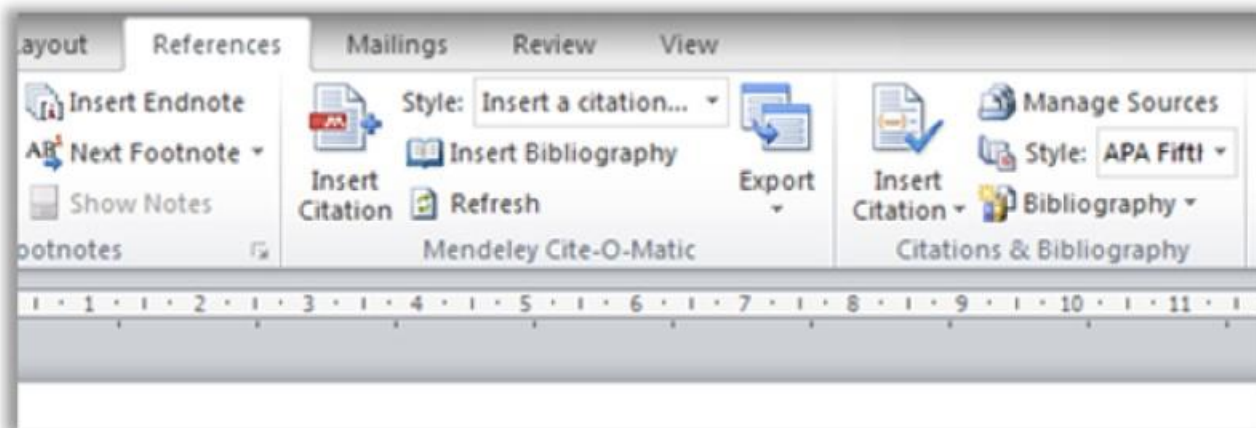
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