Introduction to Literature Review

Definition and Purpose: A literature review is a comprehensive survey of scholarly sources on a specific topic. It provides an overview of current knowledge, allowing you to identify relevant theories, methods, and gaps in the existing research. In AI, a literature review helps contextualize your research within the field's ongoing dialogues and innovations.

Objectives: The key objectives are to synthesize the findings from existing research, identify research gaps, and establish the relevance of your project within the field of AI.

Planning Your Literature Review

Choosing Topics: Focus on selecting a topic that is both of interest to you and of significant academic and practical value in AI. Consider emerging technologies, ethical implications, and application areas where AI can have a profound impact.

Focus on cutting-edge technologies and their applications across various sectors:

Medicine: Explore AI's role in personalized medicine, such as using machine learning algorithms for predictive diagnostics or treatment personalization.
Agriculture: Investigate how AI optimizes crop yield predictions, pest control, and sustainable farming practices.
Renewable Energy: Look into AI's contributions to managing and forecasting renewable energy sources, enhancing grid efficiency, and reducing energy consumption.

Identifying Keywords: Use a mix of broad and specific keywords. For AI topics, include specific technologies (e.g., "neural networks", “deep learning in medical diagnostics”, "machine learning", “AI-driven pest management”,"natural language processing", “machine learning for solar energy forecasting”) alongside application areas or theoretical concepts.

On Research Questions

Formulating Research Questions

Defining Clear, Focused Questions: Learn how to craft research questions that are specific, researchable, and significant to the field of AI. For example, "How can deep learning improve diagnostic accuracy in radiology?"
Refining Questions: Techniques for refining your questions based on preliminary literature exploration to ensure they contribute new insights to the field.

Example: From the topic "Artificial Intelligence in Healthcare," a research question might be "How can AI-driven diagnostic tools improve the accuracy of cancer detection in early stages?"

3. Sources for Literature Review

Databases and Search Engines: Utilize IEEE Xplore for technical papers, ACM Digital Library for computing research, ScienceDirect for scientific studies, ArXiv for preprints, and Google Scholar for a broader search.

Identifying High-Quality Sources: Prioritize peer-reviewed articles, reputable conference papers, and authoritative books. Look for recent publications to ensure your review incorporates the latest research.

arXiv: Preprint repository for physics, mathematics, computer science, and more. arXiv.org

Google Scholar: Free web search engine for scholarly literature across many disciplines. Google Scholar

CORE: Aggregates open access research papers from all over the world. CORE

Directory of Open Access Journals (DOAJ): Indexes high quality, open access, peer-reviewed journals. DOAJ

Social Science Research Network (SSRN): Repository for social sciences and humanities, including AI ethics and policy. SSRN

IEEE Access: Open access multidisciplinary journal within the IEEE network. IEEE Access

Preprints.org: Platform for publishing academic papers before peer review. Preprints

OpenAI: Publications from an AI research and deployment company. OpenAI Publications

ResearchGate: Network for scientists and researchers to share papers and collaborate. ResearchGate

4. Conducting the Review

Search Strategies: Utilize Boolean operators to refine search results. For example, searching for "AI AND renewable energy" will yield results that include both terms, focusing the search on AI applications in renewable energy. Alternatively, "AI OR machine learning" broadens the search to include sources that mention either term, useful for gathering a wide range of studies.

Critical Reading and Note-Taking: Encourage a methodical approach to reading. For instance, when reviewing an article on "AI-driven Predictive Maintenance in Manufacturing," note the research methods, key findings, and how these contribute to the broader understanding of AI's industrial applications.

5. Organizing and Writing the Review

Structuring the Review: Organize the literature thematically to highlight trends, theories, and developments in the field. Alternatively, a chronological structure can help illustrate the evolution of ideas and technologies in AI.

Synthesizing Sources: Draw connections between studies, highlighting agreements, contradictions, and gaps. This synthesis is crucial for demonstrating how your research fits into the broader academic conversation.

Writing Strategies: Maintain an academic tone, using precise language and clear structure. Ensure that each section of your review logically leads to the next. Use direct quotes sparingly, preferring summarization and paraphrasing to convey others' findings in your voice.

6. Citing Sources

Citation Styles: APA

Familiarize yourself with the American Psychological Association (APA) citation style, which is commonly used in the social sciences, including areas of computer science and AI research that intersect with human behavior and psychology. APA style prioritizes the author-date system for in-text citations and a comprehensive reference list at the document's end.

In-Text Citations: Mention the author's last name followed by the publication year. For direct quotes, include the page number as well.

Example: (Smith, 2020) or (Smith, 2020, p. 123) for direct quotes.

Reference List Entries: Format entries with the author's last name, initials, publication year, title of the work, and source or publication information. For journal articles, include the journal name, volume number, issue number, and page range. For books, include the publisher name.

Journal Article Example: Smith, J. (2020). Title of the article. Journal Title, Volume(Issue), Page range. https://doi.org/xx.xxx/yyyy
Book Example: Smith, J. (2020). Title of the book. Publisher Name.

Using APA style for references and citations

Reference Management Tools: Mendeley

How To Use Mendeley Reference Manager (Complete Beginner's Guide)

Resources:

SciSpace Tutorial: https://twitter.com/MushtaqBilalPhD/status/1760713758735835198

Citation Machine: https://www.citationmachine.net/