


NASA researchers face the challenge of sifting through numerous databases and papers to extract relevant information. Our solution simplifies this process by leveraging the power of vector (“semantic”) search using OpenAI embeddings and PineconeDB.

Users input text, receiving relevant NTRS articles and papers from arXiv.org. The OpenAlex API is then used to retrieve a selected author's body of work, all accessible through our prototype's dynamic interface. This information is fed as context to a ChatGPT prompt, generating a user-friendly research summary (a.k.a., a “completion”).

 Research Assistant Prototype

Welcome to the NASA Research Assistant!

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The impact of applied research and development on productivity

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Recommended Articles from arXiv.org:

[Are Happy Developers more Productive? The Correlation of Affective States of Software Developers and their self-assessed Productivity](#)

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Categories: cs.SE, cs.HC, D.2.8; K.6.3; H.1.2

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Description: For decades now, it has been claimed that a way to improve software developers' productivity is to focus on people. Indeed, while human factors have been recognized in Software Engineering research, few

Based on the provided information, here are the key findings and guidance for the user: ArXiv Articles: 1. [Title of ArXiv Article 1] - Authors: [Authors] - Published: [Published Date] - Summary: [Summary] 2. [Title of ArXiv Article 2] - Authors: [Authors] - Published: [Published Date] - Summary: [Summary] These ArXiv articles provide valuable insights into the research direction and interests. However, without the specific details of the articles, it is challenging to provide precise guidance. Here are some general suggestions: 1. Read the summaries of the ArXiv articles carefully to identify the key findings and research methodologies used. Pay attention to any novel approaches or significant results mentioned. 2. Consider the authors' expertise and track record in the field. This can help gauge the credibility and reliability of their research. Recommended NTRS Articles: 1. [Title of NTRS Article 1] - Score: [Score] - [Link to NTRS Article 1] 2. [Title of NTRS Article 2] - Score: [Score] - [Link to NTRS Article 2] These NTRS articles

Recent advancements emphasize deep neural networks and bi-encoder architecture for search. We explore the need for a dedicated "vector store" and demonstrate vector search with OpenAI embeddings and PineconeDB. Our methodology involves utilizing the OpenAI ada2 model for embeddings and PineconeDB for indexing.

Our methodology is centered on:

- **Embedding Generation:** Using OpenAI ada2, we create embeddings with 1536 dimensions for article titles and queries, efficiently managing a substantial dataset.

- **Indexing with PineconeDB:** PineconeDB supports cosine similarity scoring and top-k retrieval, aligning with vector search.
- **Data:** We work with 100,000 NTRS article titles and around 1.1 million arXiv article titles. The OpenAlex API also returns an author's body of work, as mentioned.

Encoding 100,000 NTRS titles took less than 15 minutes at a cost of \$0.0001 per 1,000 token embeddings. However, a bottleneck was PineconeDB's limit for "bottom-tier" subscribers, capping databases at 100,000 records, unless they're willing to upgrade and incur a \$70 per month cost. Open source alternatives like Postgres' pgvector were considered, but pose technical limitations (the use of Euclidean, or L2, distance instead of cosine similarity for scoring).

In conclusion, our demonstration showcases the efficiency of vector search with OpenAI embeddings and PineconeDB in contemporary AI stacks. Our pitch deck can be found [here](#).