

A Free Course Builds an AI Research Assistant That Checks Its Own Search

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Seven weeks from Docker to Telegram bot, search first

- 7 weeks**
One system, end to end
- 6x faster**
After an 80% prompt cut
- 150-400x**
On repeat questions, cached

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A [free seven-week course](#) on GitHub walks you through building one working AI research assistant over arXiv papers, from an empty folder to a Telegram bot. It is for programmers who can read Python and run Docker. Weeks 1 and 2 set up the database and search servers, then pull in and parse the papers. Week 3 adds keyword search using [BM25](#), a classic ranking formula. Week 4 adds embeddings, numeric vectors that capture meaning, then merges both

rankings. Weeks 5 and 6 add a local model that streams answers as they form, then saved answers for repeat questions and tracing of every request.

Most tutorials jump straight to a vector database, which the course calls the AI-first path that ignores search fundamentals. Keyword search first hands you a score you can read. The course's own numbers: trimming redundant metadata from the prompt cut it about 80% and made answers roughly 6x faster, and caching repeat questions returned them 150 to 400 times faster. Everything runs locally for nothing, or \$2 to \$5 with cloud APIs.

Week 7 turns the pipeline into an agent. A first check rejects questions outside computer science and machine learning. A grader scores each retrieved passage for relevance. When the grade is poor, a rewriter restates the query and searches again. A second interface runs the plain pipeline and the agent side by side. The course dates from 2025, and its main branch last changed in April 2026.

Read More: [RAG Agents and MCP: Teaching a Retriever to Decide When to Search](#)

Sources:

- [The course repository and README](#)
- [Week 5: the complete RAG system with a local model](#)
- [Week 6: monitoring and caching](#)
- [Week 7: agentic RAG with LangGraph and Telegram](#)

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