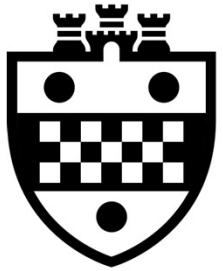
Decoding Medical Notes with Little Help from Python

AI buddy for simplifying clinical notes.



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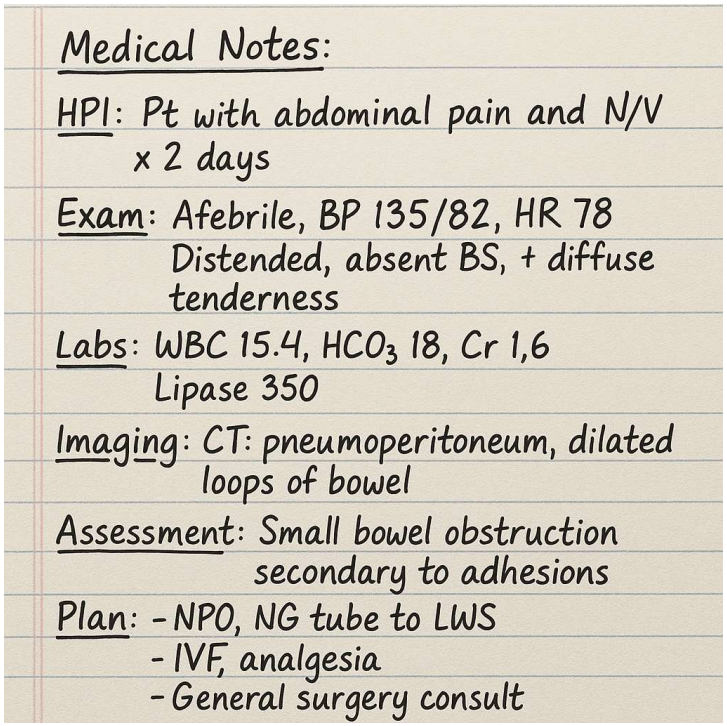
Health Sciences and Sports Analytics

Cloud Innovation Center powered by aws

About me:

- Varun Shelke
  - MS in Information Science at Pitt
  - Backend Developer at the Cloud Innovation Center, powered by AWS
  - Lifelong Formula 1 Fan

The Problem: Medical Notes Are a Mess



Source: ChatGPT

- Doctors are overwhelmed - limited time to explain complex reports
- Patients often receive dense, jargon-filled documentation
- Caregivers struggle to understand or summarize critical info
- Misinterpretation can lead to anxiety, delays, or wrong decisions

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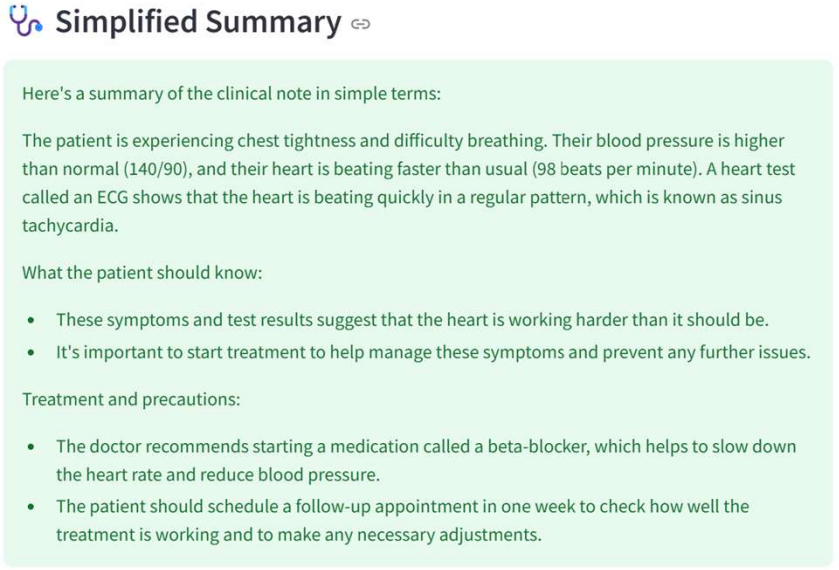
Pythonic Attempt to Simplify This

Turning Confusing Medical Notes into Clear Conversations

Patients complain of chest tightness and shortness of breath. Vital signs show elevated BP (140/90) and HR of 98 bpm. ECG reveals sinus tachycardia. Recommendation: Begin beta-blockers and schedule follow-up in 1 week.



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Wait… Isn’t This Just ChatGPT?

- 🧠 “Sure, you could ask ChatGPT to summarize your medical notes…”

…but you also could text your lab results to a group chat. Please don’t.

- 🛑 Privacy Matters:
  - ChatGPT? You’re sending your health data to the cloud.
- 🔒 AWS Bedrock = Private & Compliant:
  - Your input is not stored or used for model training
  - IAM roles control access
  - Fully deployable in secure, private environments

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Lol

🔍 3. “Privacy and Control: ChatGPT can’t give you that.”

> 🗣️ **Say this:**
> *“When you paste your medical data into a public AI app, who owns that data? Where does it go? Med-BhAI solves that by using AWS Bedrock — your prompts aren’t used to train models. Your data stays yours.”*

This is *key* for the healthcare domain:

- Bedrock = **No training on your input**
- Secure access via IAM roles
- Deployable inside private environments

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What Does Med-BhAI Really Do?

- 📝 Input: Raw medical notes with technical jargon and fragmented sentences
- 🔍 Processed by: Bedrock-powered LLM (Claude/Nova) via tailored prompts
- 💡 Output: Clear, simple summary - understandable by any family member
- 👵 Bonus: Can adapt tone for different users (e.g., elderly, caregivers)

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What's Under the Hood?

- 🔄 Backend: Python-based API calls to Amazon Bedrock (Claude & Nova models)
- 🧠 Prompt Engineering: Tuned for accuracy, empathy, and medical caution
- 🧪 Streamlit Frontend: Interactive UI for input/output without needing code
- 🛡️ Security Considerations: No PHI stored - input only, inference-only design
- 🧰 AWS Integration: IAM roles + Bedrock runtime = scalable and secure
- 🚫 No fine-tuning, no pretraining - just smart prompt + smart platform

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What I Learned (and Struggled With)

- 🤖 Learned how to engineer prompts that sound human but stay medically accurate.
- 🔒 Realized the importance of not storing sensitive health info - inference-only design.
- 🧠 Understood how to balance creativity with real-world safety constraints
- 🧩 Spent hours debugging IAM role permissions and Bedrock invocation errors.
- 🌐 Faced WebSocket + CORS issues when deploying with ECS Fargate & Streamlit.
- 🐞 Encountered traffic routing issue on AWS – WebApp not accessible to public

💡 Biggest win? Watching a confusing report turn into something my non-tech mom could understand

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The Impact & What's Next

- Tools like Med-BhAI can bring clarity, dignity, and empowerment to care
- We're building an email-based delivery system — summaries go straight to your inbox, not our servers
- I'm continuing to improve Med-BhAI with features like speech input and summarization tuning
- 🙏 Huge thanks to Maciej Zukowski, whose guidance helped shape this into more than just an idea

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Let’s Stay Connected

- 💻 GitHub Profile: github.com/VarunShelke
- 🧠 Med-BhAI Repo: github.com/VarunShelke/Med-BhAI
- 🔗 LinkedIn: linkedin.com/in/vashelke/
- 📬 Email: Varun.Shelke@pitt.edu / Varun.Shelke@hotmail.com
- 💬 Whether it's feedback, feature ideas, or collaboration - I’d love to hear from you!

GitHub

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Med-BhAI Repo

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