

# **Practical GPT Development for Business**

Ernest W. Lessenger  
July 27, 2023

# About the Presenter

- BS in Technical Writing (CS minor) from Carnegie-Mellon University
- Master of Business Administration from Rice University
- Various Certifications from Amazon, Microsoft, SEI, and PMI
- 20 years of experience in PaaS
- Focus on integrating emerging technology into the Enterprise





# Source Code



`chat.openai.com`

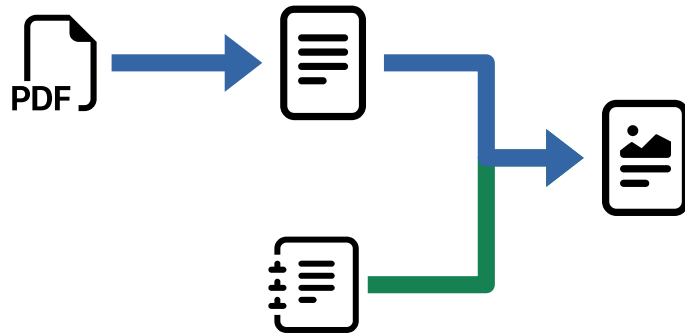
`platform.openai.com`

`python.langchain.com`

<https://github.com/ernestlessenger/PracticalGPT>

# Use Case: Format a resume

- Given a single resume, reformat it to be easy to read.



## Ernest W. Lessenger

(832)868-3695 - Oregon, USA

<http://www.linkedin.com/in/elessenger> - [ernest@lessenger.net](mailto:ernest@lessenger.net)

### Summary

Ernest Lessenger is a Software Architect, Business Analyst, and Developer with 20 years of experience in IT management and consulting. His experience spans the range of IT needs from low-level network and infrastructure management to software requirements gathering, design, and implementation/development.

Ernest received his master's degree in Business Administration from Rice University, and has a Bachelor of Science degree in Technical Writing from Carnegie-Mellon University. He is a qualified ServiceNow administrator, is a Salesforce.com Certified Technical Architect, and is Agile Scrum Master trained and certified.

As Chief Technology Officer of multiple Small-to-Medium consulting companies, Ernest has guided and participated in hundreds of Sales and Service implementation projects. His particular interests include process automation, data modeling, integration, and data visualization with experience in a wide variety of COTS and Enterprise platforms. Recent projects have included complex integrations between Salesforce, ServiceNow, SAP, Talend, AWS, and Azure (multiple platform services).

### Education

#### Progressive certifications from Salesforce, ServiceNow, Microsoft, and AWS

*Continuing Education*

#### Software Engineering Institute | Carnegie Mellon University

Pittsburgh, PA

*Continuing Education*

SEI Software Architecture Professional Certificate (March, 2014)

#### Rice University, Jones Graduate School of Management

Houston, TX

*May 2006*

Master of Business Administration, May 2006. GPA: 3.98. Vernon "Doc" Neuhaus scholarship recipient, and member of consulting and entrepreneurship clubs.

#### Carnegie Mellon University

Pittsburgh, PA

*May 2002*

Bachelor of Science in Technical Writing and Communication; minor in Computer Science. GPA: 3.94. University Honors, Phi Beta Kappa, and Dean's List. Alan and Gloria Siegel Award for Professional Writing.

# Step 1: Convert the resume to text

- For each page...
- Extract the text
- There will be a lot of extra junk, bad formatting, etc...  
ChatGPT handles this well!

```
□ Led multiple teams of 2-5 consultants in developing custom software for clients:
□ Consulted with clients on appropriate use of new technology and on the most efficient use of technology budget.
□ Provided out-sourced project management for non-development projects at select customers.
Senior Systems Engineer Porterville, CA
Olson Computer Services / OACYS Technology (www.ocsn.net)
1999 – July 2004
□ Designed and wrote software for internal use (Billing Management and Account Management; C, C++, ColdFusion) and consulting clients.
□ Identified revenue-generating projects and quantified potential for success. Developed value-add products, including web content filtering and email virus scanning, to allow 25% fee increase while retaining customers during a major industry downturn.
□ Prototyped wireless technology that increased competitiveness against telecom firms and allowed OACYS to double revenue to $1MM per year over two years.
□ Made purchase recommendations to expand network capabilities and feature offerings.
□ Led CEO and VP client interaction. Negotiated project specifications and contract terms.
Delivered final product on time and under budget.
Ernest W. Lessenger Page 3 of 5
Ernest W. Lessenger
(832)868-3695 – Oregon, USA
```

# Step 2: Create a prompt

You are a recruiter for a Fortune-500 IT department.

Reformat this resume to be easy to read.

Use only information provided in this resume. Do not add information or use information from other sources. Be concise and use business formal language.

Include four sections: A two-paragraph summary; Education; Experience; Familiar Technologies

Format your response as Markdown with the first header at level 1. Enclose your response in <response></response> tags.

<resume>...</resume>

# Step 3: Call ChatGPT

- ChatGPT takes an array of chat messages, and simply adds a new message to the end.
- Anthropic Claude just completes a string with “\n\nAssistant:” as the delimiter.

```
import os
import openai
openai.api_key = os.getenv("OPENAI_API_KEY")

completion = openai.ChatCompletion.create(
    model="gpt-4",
    messages=[
        {"role": "system", "content": "You are a helpful assistant."},
        {"role": "user", "content": "Hello!"}
    ]
)

print(completion.choices[0].message)
```

<https://platform.openai.com/docs/api-reference>





# Step 4: Profit!

- Use Commonmark to convert Md to HTML
- Use a tool to convert from HTML to PDF
- If you make a stupid mistake, ChatGPT generally won't warn you.

## Resume

### Summary

The candidate holds a Bachelor's degree in Computer Science from the University of California, Berkeley and has experience in full-stack software development. They have demonstrated skills in multiple programming languages including Java, Python, and C++, as well as experience with databases such as SQL and NoSQL. The candidate also has a strong foundation in data structures, algorithms, and software engineering principles.

In addition, the candidate possesses excellent problem-solving skills and the ability to work in fast-paced environments. They have a proven track record of delivering high-quality work on time and within budget, as evidenced by their successful projects at Google and Microsoft. Furthermore, they have experience in developing scalable and efficient software solutions, and are familiar with Agile methodologies and DevOps practices.

### Education

- Bachelor's Degree in Computer Science, University of California, Berkeley

# Interlude: Problems with ChatGPT

- Hallucinations

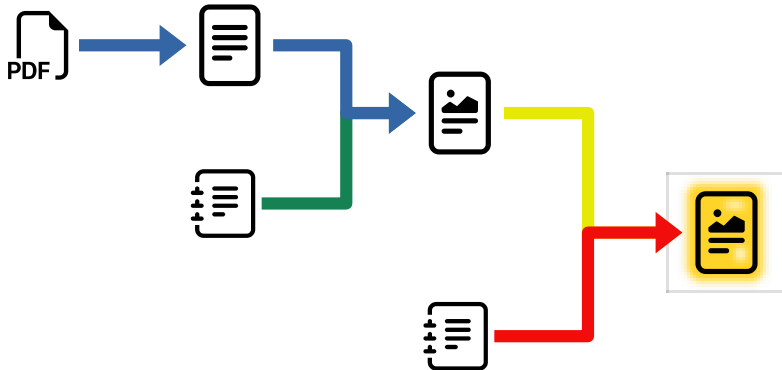
Writing FROM the context vs  
Writing ABOUT the context vs  
Writing BASED ON the context

- Consistency of results
- Reliability of formatting
- Accuracy of answers

- Precision of answers
- Small context
- Access to context data
- Lack of training material
- Speed of APIs

# Step 5: Profit!

- ChatGPT is good at extending, correcting, and augmenting
- But it gets really cool when you mashup contexts...



## Ernest W. Lessenger

Contact: (832)868-3695

Location: Oregon, USA

LinkedIn: <http://www.linkedin.com/in/elessenger>

Email: [ernest@lessenger.net](mailto:ernest@lessenger.net)

### Summary

Ernest Lessenger is a seasoned Software Architect, Business Analyst, Developer, and IT leader with two decades of experience in IT management and consulting. His expertise spans low-level network and infrastructure management to software requirements gathering, design, and implementation/development. Ernest has served as Chief Technology Officer for several small to medium consulting companies, guiding numerous Sales and Service implementation projects. His interests encompass process automation, data modeling, integration, and data visualization, with experience in a wide variety of COTS and Enterprise platforms.

He possesses a master's degree in Business Administration from Rice University and a Bachelor of Science degree in Technical Writing from Carnegie-Mellon University. He is Agile Scrum Master trained and certified, a qualified ServiceNow administrator, and a Salesforce.com Certified Technical Architect. His recent projects have involved complex integrations between Salesforce, ServiceNow, SAP, Talend, AWS, and Azure (multiple platform services).

### Education

- Master of Business Administration, Rice University, Jones Graduate School of Management, Houston, TX, May 2006
- Bachelor of Science in Technical Writing and Communication (Minor in Computer Science), Carnegie Mellon University, Pittsburgh, PA, May 2002
- SEI Software Architecture Professional Certificate, Software Engineering Institute, Carnegie Mellon University, Pittsburgh, PA, March 2014
- Progressive certifications from Salesforce, ServiceNow, Microsoft, and AWS

### Experience

# Steps 6+: Moar Profit!

You are a recruiter for a Fortune-500 IT department. Write a 1000 word cover letter explaining why this candidate is the perfect person for the job described below. This job does not yet exist, so you will need to also explain why this job position would benefit Peace Health. Format your response as Markdown with the first header at level 1. Enclose your response in <response></response> tags.

<job>Peace Health in Eugene, Oregon is looking for the right person to manage their Artificial Intelligence practice. The ideal candidate will have recent experience working with Generative AI, Machine Learning, and Data Science.</job>

<resume>  
# Ernest W. Lessenger

## Summary

Ernest Lessenger is a seasoned Software Architect, Business Analyst, and Developer with two decades of experience in IT management and consulting. His vast knowledge spans from low-level network and infrastructure management to software requirements gathering, design, and implementation/development. Ernest has served as the Chief Technology Officer for multiple Small-to-Medium consulting companies, guiding and participating in numerous Sales and Service implementation projects. He has a keen interest in process automation, data modeling, integration, and data visualization with experience in a broad spectrum of COTS and Enterprise platforms. Recent projects have included sophisticated integrations between Salesforce, ServiceNow, SAP, Talend, AWS, and Azure (multiple platform services).

## Ernest W. Lessenger: The Ideal Candidate for AI Practice Manager at Peace Health

Peace Health, an esteemed healthcare organization in Eugene, Oregon, is advancing its technological capabilities to leverage the power of Artificial Intelligence (AI). To effectively manage this transformation, it is crucial to onboard an individual with proven expertise in AI, Machine Learning (ML), and Data Science. Ernest W. Lessenger, with his robust experience in IT management, consulting, and technical knowledge, is the perfect fit for this position.

## Why Peace Health Needs an AI Practice Manager

Healthcare organizations worldwide are realizing the transformative potential of AI. It is revolutionizing patient care, predicting diseases, improving diagnostics, and streamlining administrative processes. To stay competitive, Peace Health needs to harness the power of AI, which calls for the creation of a dedicated position - the AI Practice Manager.

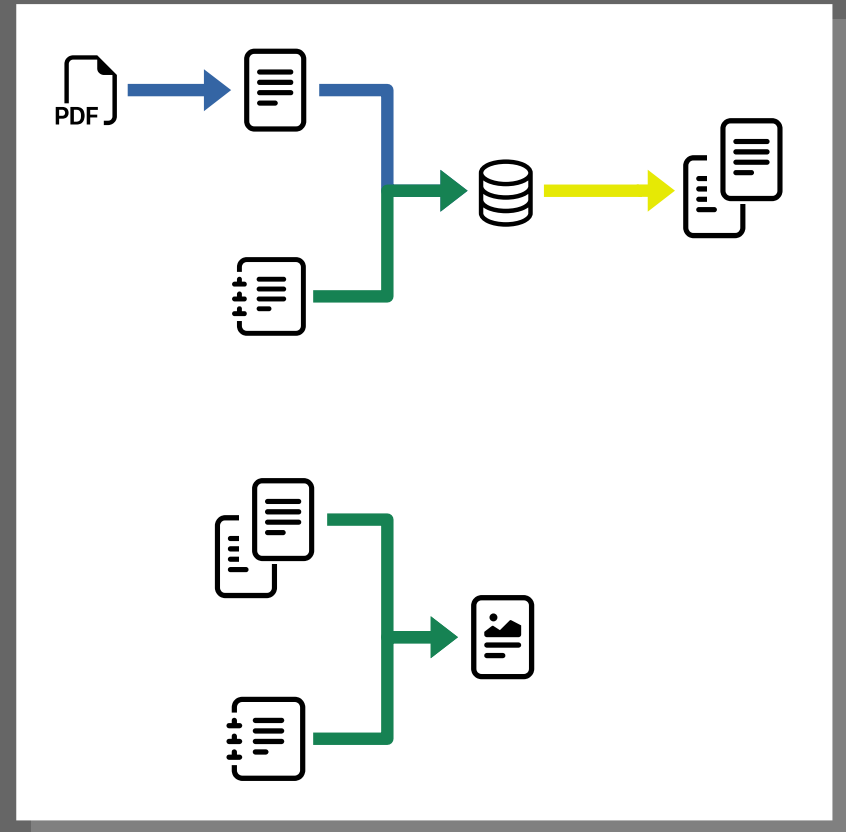
This role will be responsible for developing and implementing AI strategies, aligning AI initiatives with business objectives, and ensuring smooth AI

# Use Case: Chatting with PDFs

1. I have a bunch of documents
2. I want to be able to ask questions about the documents and engage in a chat about it.

Examples:

1. Does my health plan cover hearing aids?
2. What types of hearing aid are covered?
3. What brands and models of hearing aid are covered?

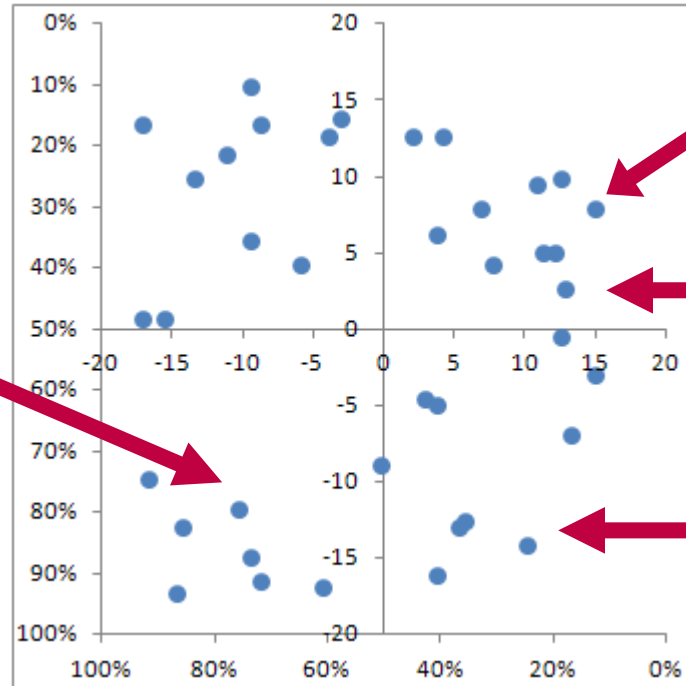


# More Terminology

- **Embeddings**

- **Vector Database**

“The ‘ABC’ plan pays for annual doctors visits...”



“What hearing aids are covered by my plan?”

“The ‘XYZ’ plan covers most unfitted hearing aids...”

“The XYZ plan covers hip replacements with a prior approval...”

# Step 1: Build the database

1. Convert all the documents to text
2. Split the documents into reasonable-sized chunks
  1. Because there is an 8k token (2k word) limit per completion
  2. Fewer topics per document results in more precise search results
3. Obtain embeddings for each document
4. Upload the embeddings to Pinecone

# Step 2: Search the database

1. Get a question from the end-user
2. Obtain an embedding from OpenAI
3. Using the new embedding, search Pinecone for the nearest 5 “chunks” of document.
4. You now have:
  1. The text of the chunk of document
  2. A link to the original document



# Step 3: Build the Prompt

1. Inject the document chunks into a prompt, along with the question:

Use the five document fragments below to answer the question "Does my insurance plan cover hearing aids?". If you need additional information, use the provided APIs to obtain it. Format your response as an XML document enclosed in <response> tags, and list the source documents that you used in <source> tags.

<fragments>...</fragments>

# Step 4: Answer the customer

1. Parse the response and extract any structured content.
2. Display the answer to the customer:

According to your insurance plan document XYZ12b, hearing aids are covered if your request is submitted on a form AB34z that has been signed by your primary care physician, your case worker, and three specialists.

# Conclusion

# Where I see things going

- APIs will mature, and models will become less important
  - OpenAI ChatGPT has a better API, and is supported by Microsoft.
  - Anthropic Claude has a more reliable and trustworthy responses.
  - AWS is focused on providing tools to call any number of models with a single API.
  - Google PaLM2 focuses more on citations, and has an “okay” API
- Structured access to data will become more important
  - OpenAI steered conversations
  - Functions
  - Structured input

# Lessons Learned

- Writing good prompts is critical
  - Writing good pipelines is even more critical
- Create escape hatches for unexpected business situations, or use functions
- Context size is a limiting factor... The public, paid APIs have enough context to do cool things but not REALLY cool things.
- Structured interaction is a challenge
  - Obtaining context, getting clarification, responding, and acting on the response
- I don't know which APIs and which companies will be around in 12 months

# Thank you!



<https://github.com/ernestlessenger/PracticalGPT>

# Tools I Use

- Salesforce
- ServiceNow
- Talend
- Laptop, Operating System
- Office365
- IntelliJ IDEA
- GitHub Copilot
- GitHub (or Bitbucket)
- Snowflake, Databricks
- Fivetran and DBT
- Postman
- GitKraken

# Tools I Use for AI

- OpenAI ChatGPT
  - Chat API
  - Embeddings
- Anthropic Claude
  - Completion API
- Pinecone
  - Vector Database
- Amazon  
Lambda/S3/ElasticSearch
- Microsoft Teams  
(transcription)
- Vaadin (Java UI)
- Python and langchain
- DBT and Snowflake



# Thank you!



<https://github.com/ernestlessenger/PracticalGPT>