Exploring Archives with OCR (and LLMs)

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New Technologies — New Possibilities

• Huge collections of digitized materials

• Easy photography + scanner access makes low-cost digitization possible

• Clearly not everything, but lots and lots of stuff.
Falling Behind the Material?

More information than we know what to do with...but not the techniques for engaging with it.

Optical Character Recognition is the first step for making this material accessible to basic digital methods (like keyword search) but also a whole lot more.
OCR – Increasingly Accessible

• Numerous commercially existing OCR programs.

• Also public-facing engines (tesseract), although these tend to require more coding.

• Different quality for different types of material: layouts, clarity, “normalcy” all matter.
LLMs like ChatGPT work by probabilities

AI doesn’t know anything.

The probability model is absurdly complicated, but all it does is reproduce the relationships between the words on which it was trained.

LLMs generate text, not answers.

There is no reasoning.

So what can it do?

AI will offer “facts” that are hallucinations, especially the further you get from well-worn data (like python coding).
To use LLMs effectively, you need to learn their strengths and weaknesses

<table>
<thead>
<tr>
<th>Weakness</th>
<th>Strength</th>
</tr>
</thead>
</table>
| **Data** | • LLMs should not be trusted for facts  
          | • LLMs are very good at manipulating data that you provide  
          | • Code Interpreter in ChatGPT 4, Claude AI 2, and Bard all allow for different uploading of data  
          | • Exploratory data analysis  |
| **New Ideas** | • LLMs will never generate novel ideas, only recycle existing ones  
               | • You do not often need to innovate techniques to find answers. You usually need to ask novel questions.  |
| **Complexity** | • LLMs are unreliable in breaking complicated requests into simpler steps.  
                | • Through chains of prompts, you can lead Chat to do very complicated projects  |
To use AI, you need to simply be a little creative and a lot lazy

**AI + Domain Knowledge**

AI doesn’t, by itself, do anything. You need to apply it to your “domain knowledge” which is a nice way of saying whatever your unique work problems and frustrations are. Nobody else can tell you what AI can do for you.

**AI is an assistant, not SkyNet**

AI is a semi-reliable, way too enthusiastic intern who is good at oddly specific tasks related to language. It is a people pleaser and will *always* offer an answer, even when incorrect.

**AI is a low-end tech consultant**

AI can write totally standard, run-of-the-mill computer code for totally-normal problems, which are nearly all of your problems.

*AI-generated image of “semi-reliable, too enthusiastic intern”*
**Different LLMs focus on different features**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>RUNS CODE</th>
<th>SEE IMAGES</th>
<th>READS FILES</th>
<th>INTERNET CONNECTION</th>
<th>PERSONALITY</th>
<th>WHAT IS IT</th>
<th>WHEN TO USE IT</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChatGPT/ GPT-3.5</td>
<td></td>
<td></td>
<td></td>
<td>No</td>
<td>Neutral, bland</td>
<td>This is the free version of ChatGPT that came out in November. It is very fast and pretty solid at writing and coding tasks.</td>
<td>It is fast and cheap and capable, but other models are now better. Also, it is not connected to the internet, so don’t use it like a search engine.</td>
</tr>
<tr>
<td>ChatGPT/ GPT-4</td>
<td></td>
<td>Soon</td>
<td></td>
<td>No</td>
<td>Helpful, a little preachy</td>
<td>Currently available to paying customers. The most powerful LLM for most purposes. Does a lot.</td>
<td>Better at everything (writing, coding, summarizing) than GPT-3.5. Still not connected to the internet.</td>
</tr>
<tr>
<td>ChatGPT/ Code Interpreter/ Plugins</td>
<td>Yes</td>
<td>Yes</td>
<td>Limited</td>
<td>No</td>
<td>Helpful sometimes witty</td>
<td>Adds new capabilities to ChatGPT. Plugins and web browsing still have rough edges. Code Interpreter lets the AI run Python code &amp; work with files.</td>
<td>Code Interpreter is great for working with data of all sorts, and is the most generally impressive AI implementation so far. Plugins are generally not that useful, yet. The web browsing is being updated.</td>
</tr>
<tr>
<td>Bing (Uses GPT-4 in creative &amp; precise modes)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Friendly but also somewhat insane</td>
<td>Connected to the internet. It is GPT-4 with a grab-bag of powerful features. The weirdest model. Creative mode lets you use GPT-4 and is free.</td>
<td>Does a remarkably wide range of stuff, from working as a browser companion to creating art. Is connected to the internet. Has a strong, weird personality.</td>
</tr>
<tr>
<td>Bard</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>None</td>
<td>None</td>
<td>Bard is a name for a variety of models used by Google. Current offerings are weak, but improving over time</td>
<td>This should be your last choice of AIs for now, but recent updates show promise. High levels of hallucination.</td>
</tr>
<tr>
<td>Claude 2</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Pleasant when not scolding</td>
<td>Almost as powerful at GPT-4, but built to be “safer” and more pleasant to use. Has 100k context window - enough “memory” to hold a book.</td>
<td>Terrific on working with large documents, due to its extended context window and ability to upload content. It is very new so it is unclear how it stacks up.</td>
<td></td>
</tr>
</tbody>
</table>

*as of Summer 2023, oneusefulthing.org*
Often the best use of Chat in this way is a “centaur task”

<table>
<thead>
<tr>
<th>Task category</th>
<th>Definition</th>
<th>Types</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Tasks</td>
<td>Either the AI is not capable of doing them, it is too hard to get the AI to do a good job, or you are unwilling to give them up.</td>
<td>Tasks that require creativity, questioning, and unexpected connections</td>
<td></td>
</tr>
<tr>
<td>Centaur Tasks</td>
<td>These are tasks where you learn to work seamlessly with the AI, integrating into your workflow, passing work back and forth.</td>
<td>Tasks that have a technical component for the AI, but require human curiosity to drive the analysis</td>
<td></td>
</tr>
<tr>
<td>Delegated Tasks</td>
<td>These are tasks that you will get AI help with, with tight oversight, including checking for errors and giving feedback. Few iterations.</td>
<td>Tasks that have well-defined rules, but the AI will make mistakes that need to be corrected.</td>
<td></td>
</tr>
<tr>
<td>Automated Tasks</td>
<td>Tasks that no human should do. If you do it more than 3 times and it takes more than 5 minutes, you should write some code.</td>
<td>Perfectly structured rules that require no human intervention</td>
<td></td>
</tr>
</tbody>
</table>

Source: Modified from *One Useful Thing*
Hacking things together

• LLM’s allow lots of flexibility – WITHOUT coding

• Coding…works better. But there are still lots of things that we can do without it.

• Use the APPROACH of coding – without coding. Hacking!
What is coding like?

• Coding can be like designing a car. But it doesn’t HAVE to be.

• A lot more of the time, coding is like FIXING a car -- you just need the pieces lined up correctly, but don’t need to understand exactly how they work.
What is Hacking like?

• Taking the various pieces of things, and putting them together into workflows

• Take advantage of the strengths of different tools available to you!

• Be flexible – experiment.

• Use things in ways they aren’t necessarily designed?
OCR: A good problem to have?

- TONS of digitized material – that’s the hard part done already!

- OCR – really standing in the way of it.

- How can we use the tools we have to OCR some documents?
The Problem-Solving Pipeline!

• What do we have:
  Things that can OCR (good not great).

• What do we want?
  OCRed texts + data about them.
The Problem-Solving Pipeline!

• What do we have accessible to us that can OCR?

• Google drive!
Mr. Jones O'Connell,
Monon Building, Chicago, Ill.

Dear Sir & Brother:-

Your favor of the 21st to hand and con- tents noted, and I sincerely regret that I cannot ask you in my stead to visit the Convention of the Brotherhood of Locomotive Fire-men at Galveston, Texas, September 14th, as the representative of the A.F. of L. I hope to do this, as I stated to you sometime ago, but since then, I have had an interview with some of the offi- cers of the B. of L. F...,
Google drive is great! But...It can’t open up all of my individual images......
Hacking Things Together: Part 1

But it can open up a multi-page PDF?
Hacking Things Together: Part 1

So let’s make our images a multi-page PDF!
Hacking Things Together: Part 2

Ok – so we now have our images in a multi-page PDF...And it’s been OCR-ed!

But this isn’t...exactly English. What to do now?

Mr. L. P. Tomsen, Secy.,
Prot.Stationary ng. Union 6690, 020
Lani St., St. Louis, Mo.

Dear Sir & Brother-

I am in receipt of a letter from Mr. Kur-
zenkrebe, National Secretary of the National Union of the United Brewery Workmen, of which the following is a copy. :-

St. Louis, Mo. Aug. 20, 1800.

Mr. San. Gompers, Pres.A.F. of L.,
De Soto Block, Indianapolis, Ind.

Dear Sir & Bro:-

About four months ago, we organized the engi- neers, machinists, pipe fitters and helpers of the Anheuser-Busch Brewing Ass'n., and took them as members into our Brewery Firemen's Union. On motion of said local Union the charter was altered and granted to the Brewery Engineers and Firemen Union 495.

In one of the last sessions of the St. Louis Trades & Labor Union, the delegates of Progressive & Stationary Engineers' Union 3000 handed in a
The Power of LLMS

• Remember – LLMs aren’t that smart – but they sure are hard working!

• Which one should we use?

• Context Window – Plus and Minus
Prompt: “This is a text produced by applying OCR to historical correspondence, which introduces many errors.
please produce a corrected version of this text.”

Here is my attempt at correcting the text:

[NEW DOCUMENT]

August 28, 1900

Mr. L.P. Thomsen, Secretary,

Progressive Stationary Engineers Union 5690, 620 Olive Street, St. Louis, Missouri

Dear Sir and Brother:

I am in receipt of a letter from Mr. Kurzenkrebe, National Secretary of the National Union of the United Brewery Workmen, of which the following is a copy:

St. Louis, Missouri, August 20, 1900

Mr. Samuel Gompers, President,

American Federation of Labor,

DeSoto Building, Indianapolis, Indiana

Dear Sir and Brother:

About four months ago, we organized the engineers, machinists, pipefitters and helpers of the Anheuser-Busch Brewing Association, and took them as members into our Brewery Firemen’s Union 05 of St. Louis. On motion of said local Union the charter was altered and granted to the Brewery Engineers and Firemen Union 495.

In one of the last sessions of the St. Louis Trades and Labor Union, the delegates of Progressive and Stationary Engineers Union 3000 handed in a protest against our Union 05, claiming that the engineers, etc., should belong to their union according to
A No-Code Pipeline!

- IMAGES ➔ PDF converter ➔ Google Drive ➔ Claude

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Mr. L. P. Thomsen, Secy.,  
Prot. Stationary Eng. Union 6690, 62O  
(Lamb St., S. St., St. Louis, Mo.  

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Prompt Engineering for Dummies

• The dummy is...Claude!

• Explaining what you want as clearly as possible.

• Multiple iterations of explanation can be necessary.

This is material produced by ocirin historical texts, which create many issues. Please make any corrections that you can, while still maintaining the original separation into individual documents.

Unfortunately I do not have access to the original file or OCR capabilities. As an AI assistant without access to external systems, I can only analyze the text that was provided to me.

Based on reviewing the text, it appears to contain excerpts of letters and correspondence from Samuel Gompers from around the late 1800s. There seem to be multiple documents separated, though they are not labeled with clear document titles.

As I cannot directly edit or OCR the text, I would suggest focusing any corrections or changes to the content itself rather than formatting. Some potential issues to address:

• Correcting any OCR errors in spelling of names or places
• Standardizing date formats if inconsistent
• Adding context about who Samuel Gompers was communicating with in each letter
• Clarifying any abbreviations or unclear terms
• Separating into paragraphs to aid readability

My capabilities allow me to provide suggestions, summarize content, extract key entities, and answer questions about the provided text. But I cannot directly make edits as I don't have access to manipulate the source file. I'd be happy to assist further in providing analysis or highlighting areas that may need correction based on the context. Please let me know if you have any other questions!
Prompt Engineering for Dummies

- The dummy is...Claude!
- Explaining what you want as clearly as possible.
- Multiple iterations of explanation can be necessary.
What else can we get these dumb things to do?

- Okay– we have corrected OCR – what next?

- Is there information we want that is missing?

- Are there new types of information that could be created?
Turning Text into Data for Archival Exploration
Prompt: This is a piece of historical correspondence. From this material, please create a column of data, in the first cell, write every person named in the document. In the second cell, write every union organization named in the document. In the third cell, write every place mentioned in the document. In the fourth cell, write the date. In the 5th cell, include a summary of the document.

Here is the requested data in column format:

Persons Named: Samuel Gompers, J. Kurzenkrebe, L.P. Thomsen

Unions Named: National Union of the United Brewery Workmen, Brewery Firemen’s Union 05, Brewery Engineers and Firemen Union 495, Progressive and Stationary Engineers Union 3000, American Federation of Labor

Places Mentioned: St. Louis (Missouri), Indianapolis (Indiana)

Date: August 28, 1900

Summary: Samuel Gompers received a letter from J. Kurzenkrebe explaining that the National Union of the United Brewery Workmen had organized workers from Anheuser-Busch Brewery into Brewery Firemen’s Union 05. This local union later became Brewery Engineers and Firemen Union 495. Another union protested claiming the engineers should have joined their union instead. J. Kurzenkrebe appeals to Samuel Gompers to make a decision in this jurisdictional dispute between the unions.
Coding: WAY Less Scary then it Might Seem

- Split PDF into images
- OCR the images into text
- Combine the text into a Word Document
write a python program to do ocr

Here is a Python program to perform optical character recognition:

```python
import pytesseract
from PIL import Image

# Path to the image file
image_path = 'image.png'

# Load image using PIL
img = Image.open(image_path)

# Perform OCR using pytesseract
text = pytesseract.image_to_string(img)

# Print recognized text
print(text)
```
Session 3b: Good Morning Baltimore

1. Anaconda
2. Spyder
3. ChatGPT
4. Running ChatGPT Code in Spyder

Question:

1. What is all this?
2. Seriously, what is this?
Be sure to have Anaconda installed

https://www.anaconda.com/download
Launch Spyder

Spyder
Scientific Python Development Environment. Powerful Python IDE with advanced editing, interactive testing, debugging and introspection features.
Over here is where you write, edit, and paste code.

Over here is the result.

Up here is other stuff.
write a python program to print "Good Morning Baltimore"

```
# Date and time of creation: 2024-02-02
# Purpose: To print the message "Good Morning Baltimore"

print("Good Morning Baltimore")
```
I deleted a ) and suddenly it didn’t run. Spyder will often tell you.
If you don’t understand the error, ask ChatGPT

You

runfile('C:/Users/Lhyman6/untitled0.py', wdir='C:/Users/Lhyman6')
File <unknown>:11
    print('Good Morning Baltimore'
^
SyntaxError: '}' was never closed

ChatGPT

The error message you’re encountering is due to a missing closing parenthesis in your
'print' statement. The Python interpreter is indicating that it found an open
parenthesis `{` that was not properly closed with a corresponding closing parenthesis
`}`). This is a common syntax error.

To fix this issue, you should add a closing parenthesis at the end of your 'print'
statement. Here's how your corrected line of code should look:

```python
print("Good Morning Baltimore")
```

After adding the missing closing parenthesis, your code should run without the
'SyntaxError' related to the 'print' statement. If you encounter more errors or need
further assistance with your Python code, feel free to ask!
For instance, you will get an error message unless you have installed the pytesseract libraries.

```python
import pytesseract
from PIL import Image
```

You will get an error message. But then just ask the AI what to do.

The process will be a lot of back and forth.
ChatGPT is, for instance, extraordinarily good at writing computer code. I am not, but I want the computer to do my work for me.

### Situation

Whenever I encounter something boring and repetitive, I ask Chat.

When I encounter something I would like to do, but don’t know how, I ask Chat.

Sometimes it is fast. Sometimes it is not. You don’t know until you try.

### Examples

- Turning thousands of image files in the right orientation
- Turning 150 pages of 1950s variable codebook into code
- Pulling all of a file type into a folder
- OCR 19th century documents
- Text summarization
- PDF manipulation
- Data analysis
- Writing complicated Excel formulas
- Graphing
- Making PowerPoint tables
- Writing drafts
- Editing drafts
- Use Google API
- Etc.
What does this mean for history?

- What do we get from turning our sources into data?
- Trends
- Large scale context
- Change over time
What does this mean for history?

• What do we LOSE from turning our sources into data?

• Close understanding.

• Messiness?

• Ability to feed patterns into the current best form of pattern recognition – our brains.

• Systematic Bias