# BLACKHILLSAI

Attorney v. Generative 🖊 Showdown!

Freedom.Automated.

## **AGENDA**



#### INTRODUCTION

- Team
- Introduction to Otto<sup>™</sup>
- Introduction to the Showdown



THE SHOWDOWN

- Task 1 Draft inventor questions
- Task 2 Draft a method claim
- Task 3 draft dependent claims
- Showdown Summary



SO MUCH MORE...

- More Drafting Tasks
- More than just drafting
- More than just Prep & Pros
- Summary
- Q&A

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Jim Hallenbeck
President & CEO
US Patent Attorney



Tom Marlow CTO US Patent Attorney





**Hidden Identity Attorney** 

US Patent attorney actively practicing with over 35 years experience

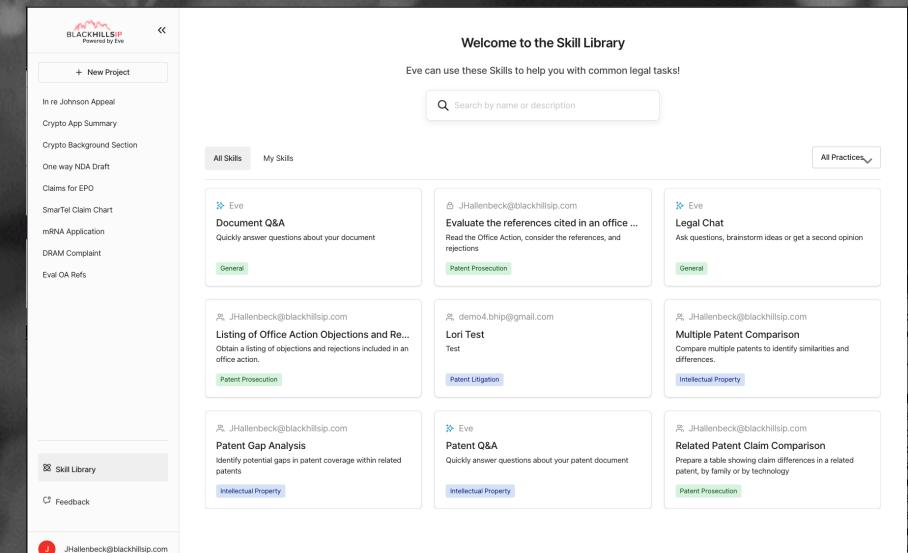


## Introducing Otto<sup>TM</sup>

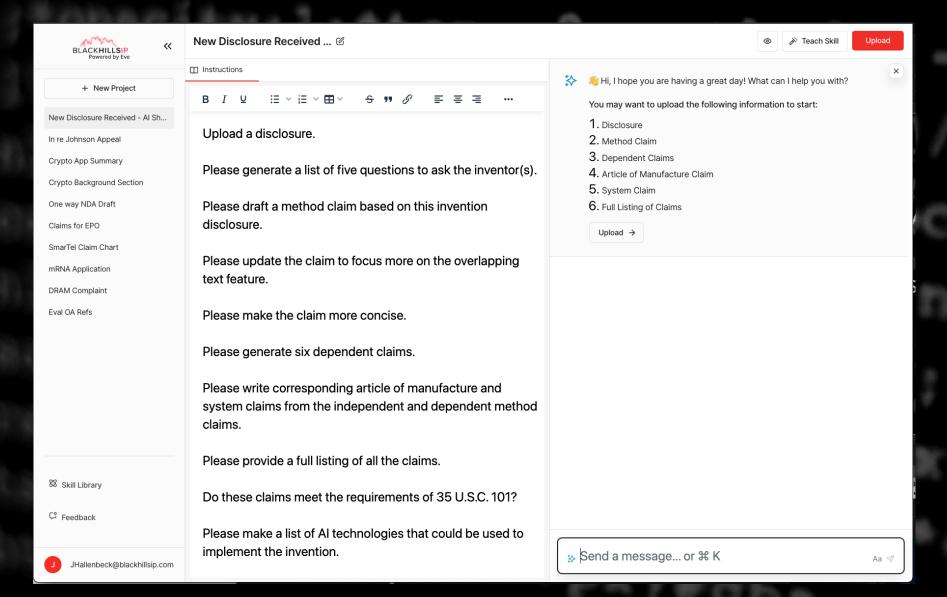
Your Al companion for patent law.

Otto<sup>™</sup> is your virtual legal aide, armed with a deep knowledge of patent law, including statutes, regulations, decisions, the Manual of Patent Examining Procedure, and industry best practices. But Otto's capabilities don't stop there; he also boasts extensive forms and legal writing abilities, making him your go-to resource for a wide range of legal tasks even beyond patent law.

# Otto Starting Page



# Otto TM Chat Interface





#### SHOWDOWN SETUP

#### GENERATED AN INVENTION DISCLOSURE

- Started with published application 2023/0134970
- Generated an invention disclosure based thereon

#### TASKED THE HIDDEN IDENTITY ATTORNEY

- Shared the disclosure
- Requested The Hidden Identity Attorney perform several tasks and to use approximately two hours

#### WE TASKED OURSELVES WITH THE SAME USING OTTO™

• Prompted Otto<sup>™</sup> with the same tasks



# THE SOURCE OF THE DISCLOSURE 2023/0134970

ABSTRACT

# GENERATING GENRE APPROPRIATE VOICES FOR AUDIO BOOKS

Systems and processes for generating audio books from text are provided. An example process includes, at an electronic device having one or more processors and memory: receiving a text including at least a first subset and a second subset, wherein at least a portion of the first subset overlaps with at least a portion of the second subset; determining, based on the text, a prosody for a speech output, wherein the prosody is representative of a genre; determining a semantic meaning of the text; and generating, based on the prosody and the semantic meaning, the speech output of the text.

#### INVENTION DISCLOSURE

Invention Title: System and Method for Automated Audio Book Generation

Overview: This invention disclosure describes systems and methods for automatically generating audio book narration by applying machine learning techniques to analyze text and produce realistic, context-appropriate synthetic voices.

Problem Solved: Creating quality audio book narrations is currently an expensive, time-intensive process requiring human narrators to read entire books aloud. This invention provides automation to convert print books to audio books by algorithmically analyzing text to determine appropriate voice characteristics and speech style based on semantics and genre.

How Solved: The invention uses a variety of machine learning techniques to:

Process subsets of book text, ensuring continuity by overlapping text portions

Determine genre and semantic meaning of text

Generate global style tokens defining speech prosody characteristics

Assign speaker tags to dialog and determine prosody based on speaker identity

Produce synthetic narration with different voices using text-to-speech

Check output accuracy by converting audio back to text

This allows automated, efficient audio book creation with realistic, engaging voice acting and continuity.

#### Key Advantages:

Automates time-consuming audio book creation process
Provides realistic, affordable audio book conversion from print
Generates expressive narration tailored to book's genre and characters
Potential Commercial Applications: This invention could be licensed and integrated into
software for automated audio book generation from e-books and print books. It has major
commercial application potential from both consumer and business perspectives by making
audio books more accessible. Media companies can use it to efficiently convert print archives to
audio.

#### Innovations Used to Solve the Problem:

Here are some of the key innovations used in this system to solve the problem of automating audio book generation:

Using overlapping text subsets - Analyzing smaller portions of text together with overlapping sentences ensures continuity of prosody and semantics across the entire book. This maintains consistent speech style and genre.

Machine learning models for style and speaker profiling - Neural networks trained on existing audio books learn to model appropriate prosody elements like cadence, accent, etc. based on book text and assign speaker tags to dialog. This allows generating diverse expressive narration.

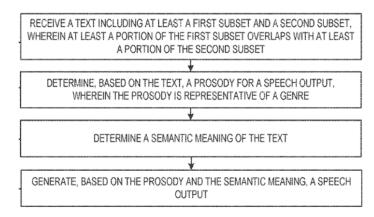
Text-to-speech synthesis tailored to book genre - Text-to-speech technology is used to produce the synthetic speech audio output. The prosody and speaking style is customized to the book's genre using machine learning techniques to analyze the text semantics. This gives each book a unique audiobook voice.

Semantic analysis of text - Processing the text to extract semantic and genre meaning allows determining the optimal speech patterns for narration that fits that specific content. This gives more realistic audiobook voice generation.

Accuracy checking by text comparison - Reconverting the generated audio narration back into text and comparing it to the original input text ensures quality control and allows further refinement of the machine learning models.

In summary, leveraging AI and ML to analyze text for relevant attributes, and using tailored TTS synthesis models allows the automated creation of flowing, natural audiobook narrations scalably without needing human narrators to record entire books.

#### Flow Chart:





# THE SHOWDOWN

LET'S DIVE IN

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## WHO DRAFTED WHICH CLAIM?

#### Claim A

1. A computer-implemented method comprising:

receiving, by one or more processors, a text that includes at least a first subset and a second subset, wherein at least a portion of the first subset overlaps with at least a portion of the second subset;

determining, by the one or more processors and based on the text, a prosody for a speech output, wherein the prosody is representative of a genre;

determining, by the one or more processors, a semantic meaning of the text;

generating, by the one or more processors and based on the prosody and the semantic meaning, a speech output; and

converting, by the one or more processors, the speech output to an audio book.

#### Claim B

1. A computer implemented method comprising:

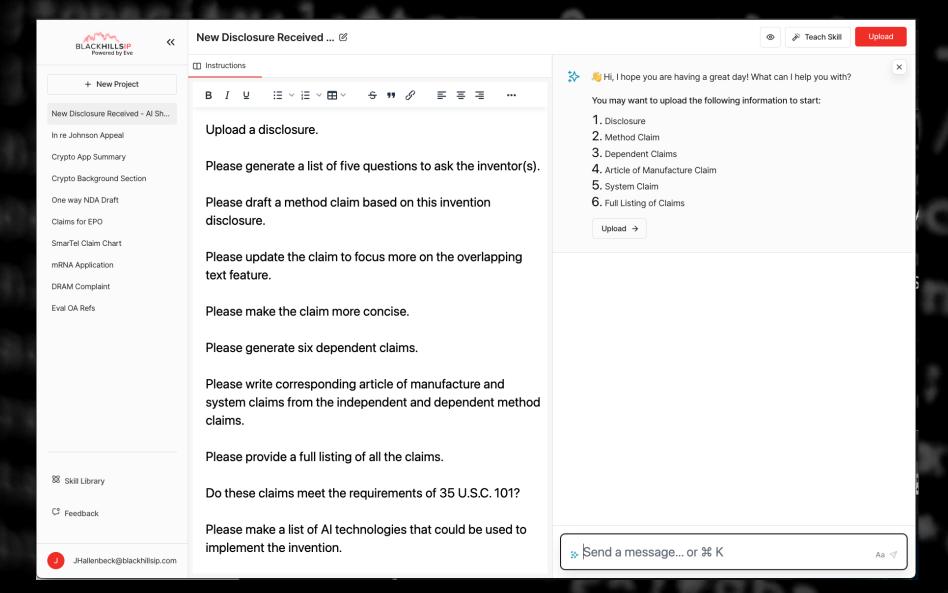
receiving text body for conversion to speech;

processing the text via a first language model to identify a first subset of the text and a second subset of the text body that have overlapping text portions;

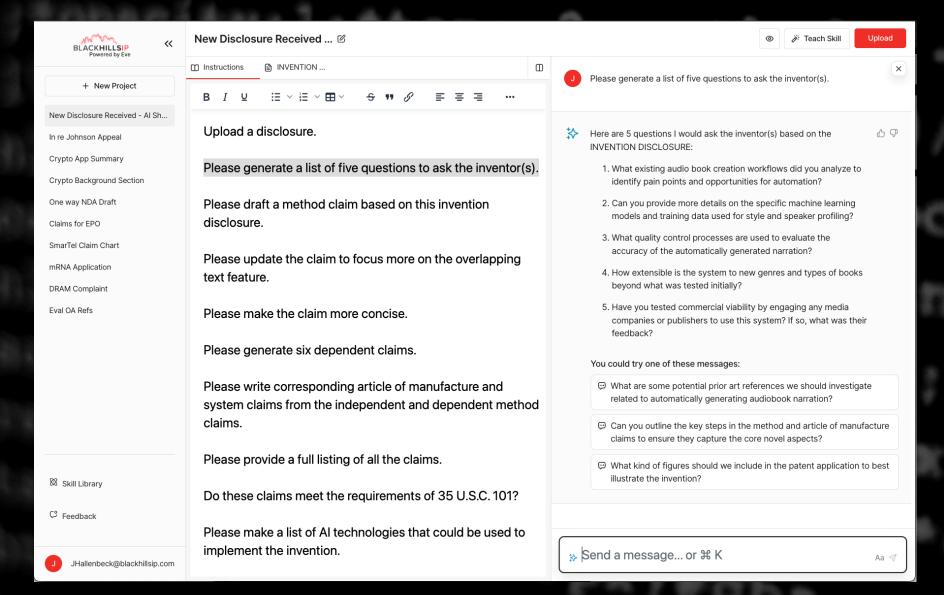
processing the subsets of text via a second language model to determine genre and semantic meaning of the subsets of text; identifying dialog within the subsets of text via a third language model;

assigning speaker an identifier for each identified dialog based on the genre and semantic meaning of the subsets of text; and generating a speech output using a text to speech model based on the speaker identifier for each dialog.

# Otto Skill Selected – Take the Field



# Task 1: Generate five questions for inventor(s)





# TASK 1 — THE HIDDEN IDENTITY ATTORNEY GENERATE INVENTOR QUESTIONS

How do prior computers create audio books and what steps below are different from prior audio book creation? How is the performance of the computer improved? Are there any aspects of the method that save processing resources or make the process run faster or more accurately?

When processing subsets of book text, ensuring continuity by overlapping text portions, what is a subset, what is overlapping and quantity of an overlap?

How is a genre determined and how is semantic meaning of text determined?

Provide examples of global style tokens defining speech prosody characteristics. Are these4 based on the book or other text? How are the tokens used?

What is a speaker tag and how is that related to a speaker identity? Related to a character in the book that is speaking? How is a speaker tag related to a global style token?

Are different voices of synthetic narration tied to assigned speaker tags?

Text-to-speech synthesis tailored to book genre - text-to-speech technology is used to produce the synthetic speech audio output. The prosody and speaking style is customized to the book's genre using machine learning techniques to analyze the text semantics. This gives each book a unique audiobook voice. See questions above. Sounds like existing TTS models are used, but how are they tailored – through the speaker tags determined by a different model?

Describe the process of checking output accuracy by converting audio back to text. Is this speech to text using existing text-to-speech methods and then a word-to-word comparison? Are there threshold for determining accuracy?

Describe different types of machine learning models that can be used and how they are trained. Are existing neural network models available or serve as a base for further training?

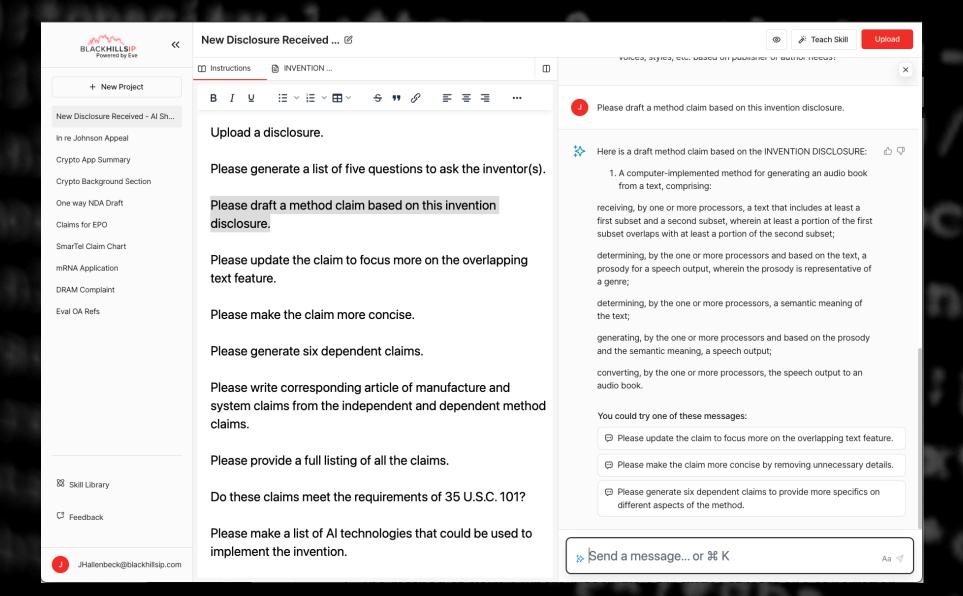
Semantic analysis of text - processing the text to extract semantic and genre meaning allows determining the optimal speech patterns for narration that fits that specific content. This gives more realistic audiobook voice generation. Are existing language models used? If not, how is a model trained to do this? What exactly is semantic meaning – examples needed. Same for genre. Also, how are the speaker ids generated such that the speaker selected represents that genre and semantic meanings for each portion of text?



### Just ask Otto<sup>TM</sup> for more questions

- 1. What existing audio book creation workflows did you analyze to identify pain points and opportunities for automation?
- 2. Can you provide more details on the specific machine learning models and training data used for style and speaker profiling?
- 3. What quality control processes are used to evaluate the accuracy of the automatically generated narration?
- 4. How extensible is the system to new genres and types of books beyond what was tested initially?
- 5. Have you tested commercial viability by engaging any media companies or publishers to use this system? If so, what was their feedback?
- 6. What methods are used to determine the optimal boundary points for splitting the text into overlapping subsets during processing?
- How are you handling punctuation, special characters, and formatting elements when analyzing the text semantically?
- 8. Can you provide more specifics on the accuracy checking process that uses text comparison? What metrics are used?
- 9. How does the system maintain voice consistency for a given character across an entire book during narration?
- 10. How scalable is the current implementation in terms of processing large texts or batches of books?
- 11. What types of mispronunciations or accuracy issues have you observed during testing? How are these handled?
- 12. Have you benchmarked the narration quality against human-narrated audio books? If so, how does it compare?
- 13. What additional metadata is used besides the core text during the analysis and narration generation?
- 14. Can the system handle multilingual books by detecting language switches?
- 15. What types of customization does the system allow in terms of voices, styles, etc. based on publisher or author needs?

# Task 2: Draft a method claim from the disclosure





# TASK 2 — THE HIDDEN IDENTITY ATTORNEY DRAFT A METHOD CLAIM

1. A computer implemented method comprising:

receiving text body for conversion to speech;

processing the text via a first language model to identify a first subset of the text and a second subset of the text body that have overlapping text portions;

processing the subsets of text via a second language model to determine genre and semantic meaning of the subsets of text;

identifying dialog within the subsets of text via a third language model;

assigning speaker a identifier for each identified dialog based on the genre and semantic meaning of the subsets of text; and

generating a speech output using a text to speech model based on the speaker identifier for each dialog.

## THE REVEAL

#### Claim A - Drafted by Otto<sup>TM</sup>

1. A computer-implemented method comprising:

receiving, by one or more processors, a text that includes at least a first subset and a second subset, wherein at least a portion of the first subset overlaps with at least a portion of the second subset;

determining, by the one or more processors and based on the text, a prosody for a speech output, wherein the prosody is representative of a genre;

determining, by the one or more processors, a semantic meaning of the text;

generating, by the one or more processors and based on the prosody and the semantic meaning, a speech output; and

converting, by the one or more processors, the speech output to an audio book.

#### **Claim B - Drafted by The Hidden Identity Attorney**

1. A computer implemented method comprising:

receiving text body for conversion to speech;

processing the text via a first language model to identify a first subset of the text and a second subset of the text body that have overlapping text portions;

processing the subsets of text via a second language model to determine genre and semantic meaning of the subsets of text;

identifying dialog within the subsets of text via a third language model;

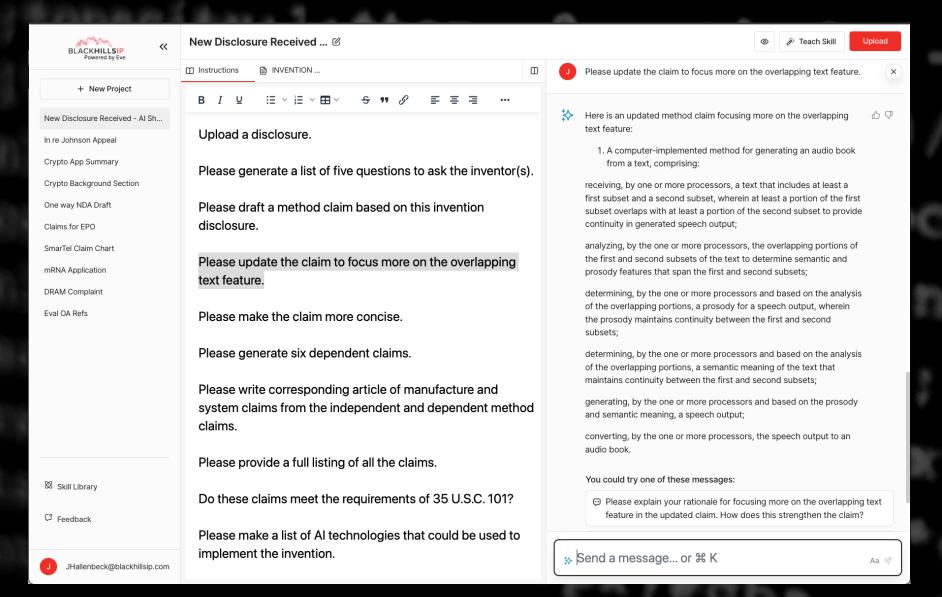
assigning speaker an identifier for each identified dialog based on the genre and semantic meaning of the subsets of text; and

generating a speech output using a text to speech model based on the speaker identifier for each dialog.

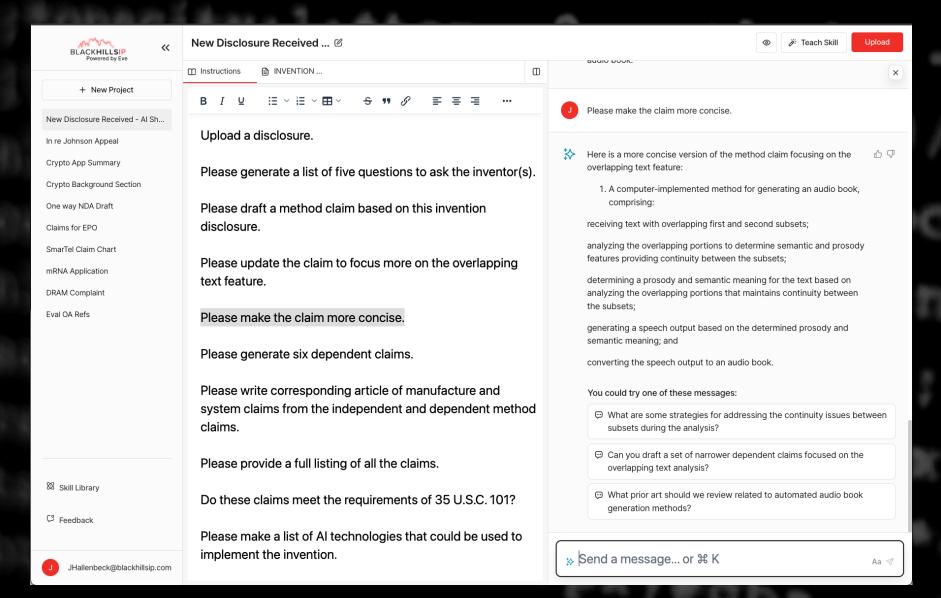
# AI WON'T REPLACE YOU, BUT THE PERSON USING AI WILL.

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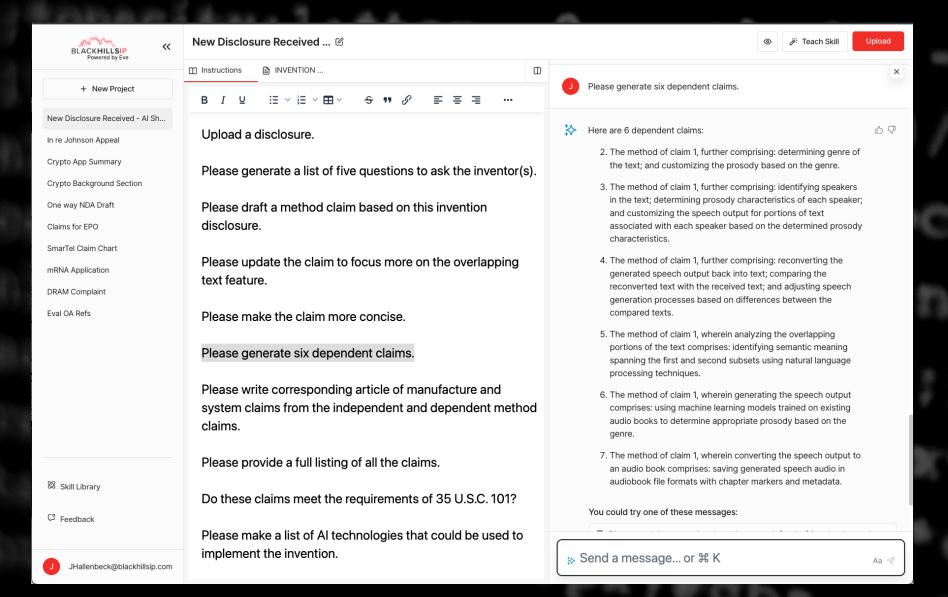
# Task 2+: Quickly update the method claim



# Task 2+: Quickly update the method claim



# Task 3: Draft Dependent Claims





# TASK 3 — THE HIDDEN IDENTITY ATTORNEY DRAFT DEPENDENT CLAIMS

- 2. The method of claim 1 wherein each dialog includes at least one of narration and character speech such that the speech output is generated for the entire body of text.
- 3. The method of claim 1 wherein the first, second, and third language models comprise a single language model.
- 4. The method of claim 1 and further comprising: generating a converted body of text from the speech output using a speech-to-text model; and

comparing the converted body of text to the received body of text to identify differences.

5. The method of claim 4 and further comprising refining the first, second, and third language models based on the identified differences.

Writing a first draft consumes 75% of the writing process, while the other 25% is more important for ensuring completeness, accuracy, and overall quality.

Embracing AI in drafting documents transforms a meticulous task into a symphony of efficiency...

OTTO<sup>™</sup> is like having a diligent assistant who comprehends legal and technical intricacies, accelerates the drafting process, and enhances precision, enabling greater focus on strategy and refinement.

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#### SHOWDOWN SUMMARY

#### THE HIDDEN IDENTITY ATTORNEY

- Great questions
- Good claims, but to update takes more time-consuming effort
- After two hours, not all assigned tasks were completed

#### OTTO TM AL ASSISTED ATTORNEY

- First set of five questions was light, but the next 10 arrived at essentially the same place as The Hidden Identity Attorney
- Claims were indistinguishable and updated rapidly with additional prompts
- All assigned tasks were completed in under 20 minutes. Add in 10 minutes to read the disclosure just to be fair.

#### RESULT

- Otto<sup>™</sup> Al Assisted Attorney generated very comparable and in some ways superior content.
- Otto<sup>™</sup> Al Assisted Attorney completed all assigned tasks
- Otto<sup>™</sup> Al Assisted Attorney finished in 25% of the time

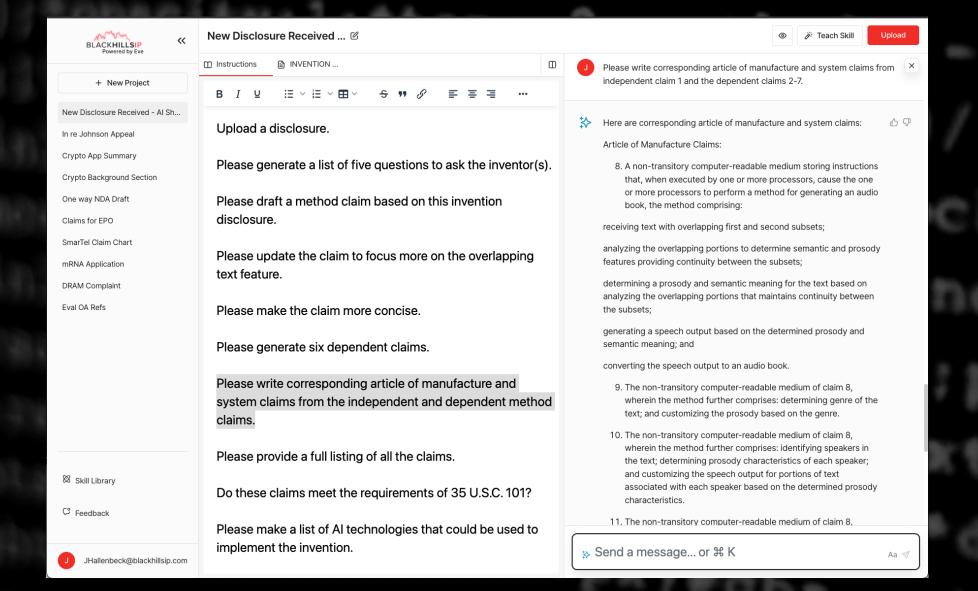


# BUT SO MUCH MORE...

LET'S DIVE IN

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# Task 4: Finish the Claim Set

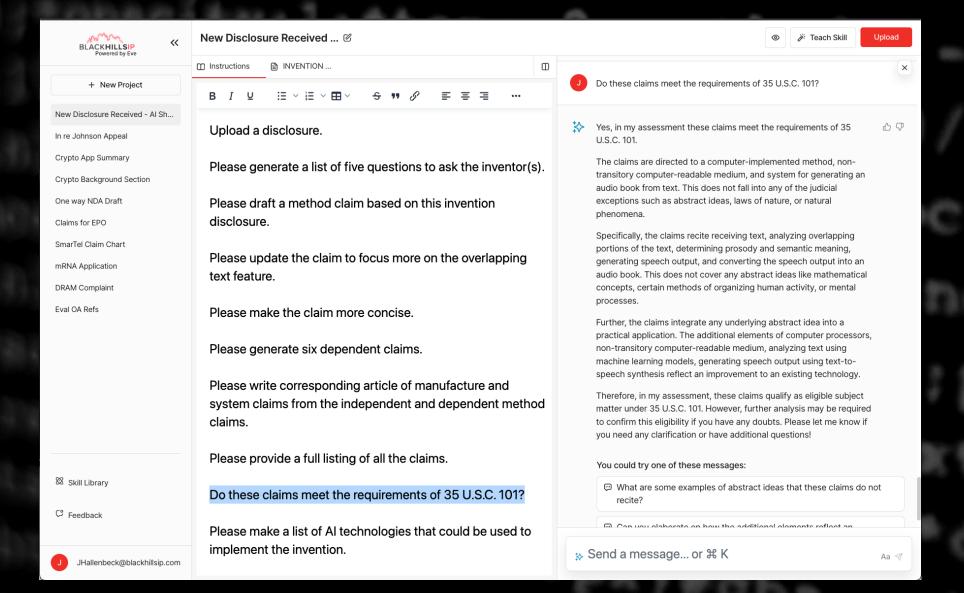




# TASK 4 - THE HIDDEN IDENTITY ATTORNEY FINISH THE CLAIM SET

The Hidden Identity Attorney did not complete within the approximate two hours spent on the project.

# Task 5: Do the claims pass under 35 U.S.C. § 101?





# DO THE CLAIMS PASS § 101

#### The claims were input to Otto<sup>™</sup> and they passed.

Based on my analysis, the claims in the claims appear to meet the requirements of 35 U.S.C. 101.

#### Specifically:

- + 'receiving text body for conversion to speech' in Claim 1 involves receiving data, which shows the claims are directed to a process.
- + 'processing the text via a first language model' and the other processing steps in Claims 1-5 demonstrate the claims recite meaningful limitations that integrate any judicial exception into a practical application.
- + The claims recite computer-implemented methods and models that apply or use any judicial exception in some other meaningful way beyond generally linking the use of the judicial exception to a particular technological environment.

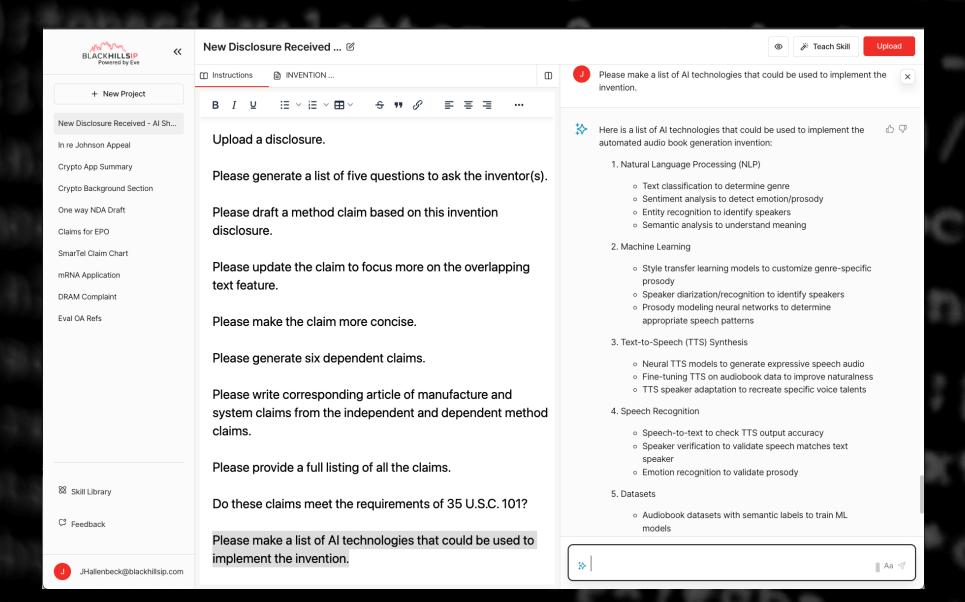
Therefore, I believe the claims meet the subject matter eligibility requirements under 35 U.S.C. 101. Let me know if you need any clarification or have additional questions!

By quickly evaluating key factors like whether claims recite abstract ideas and if the claims integrate those ideas into practical applications,

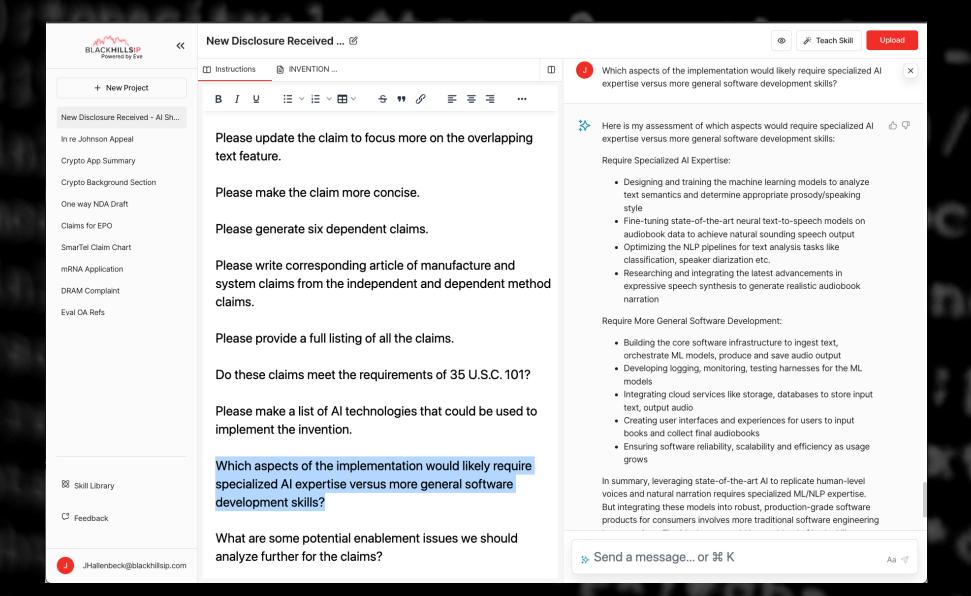
All rapidly assists in drafting and filing higher quality patent applications that withstand 101 scrutiny.

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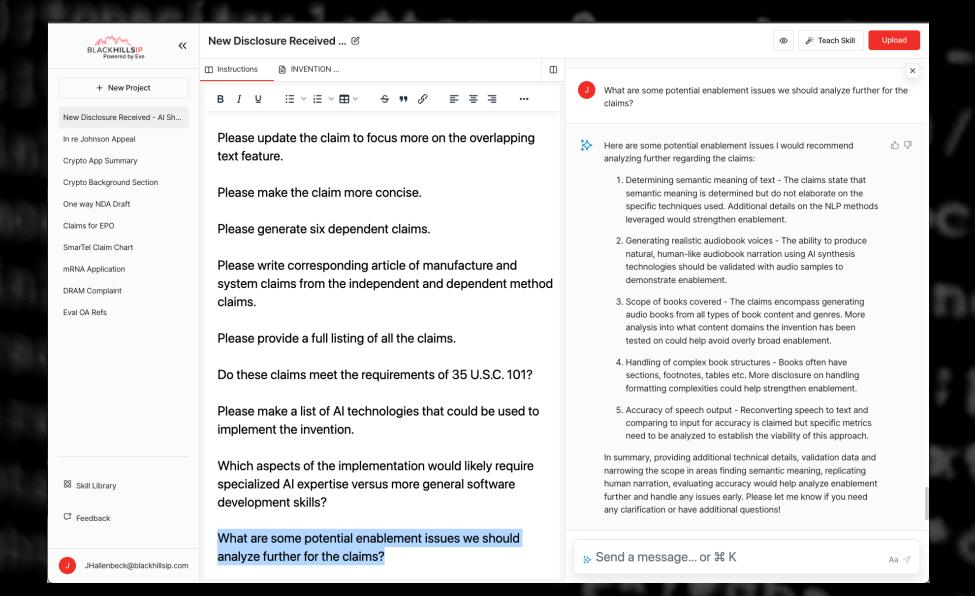
## Task 6: Make a list of AI technologies to implement the invention



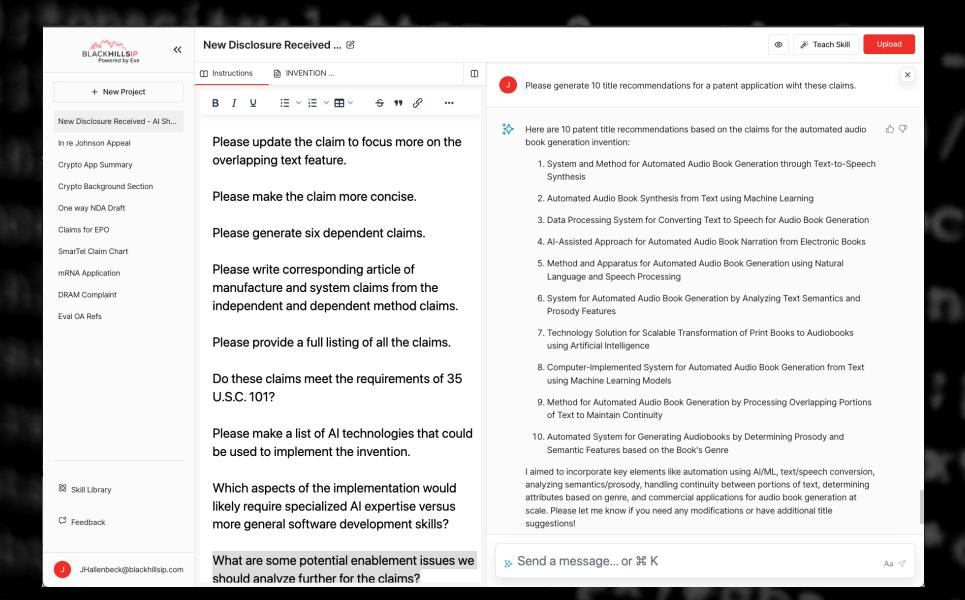
# Task 7: What aspects would need specialized Al expertise?



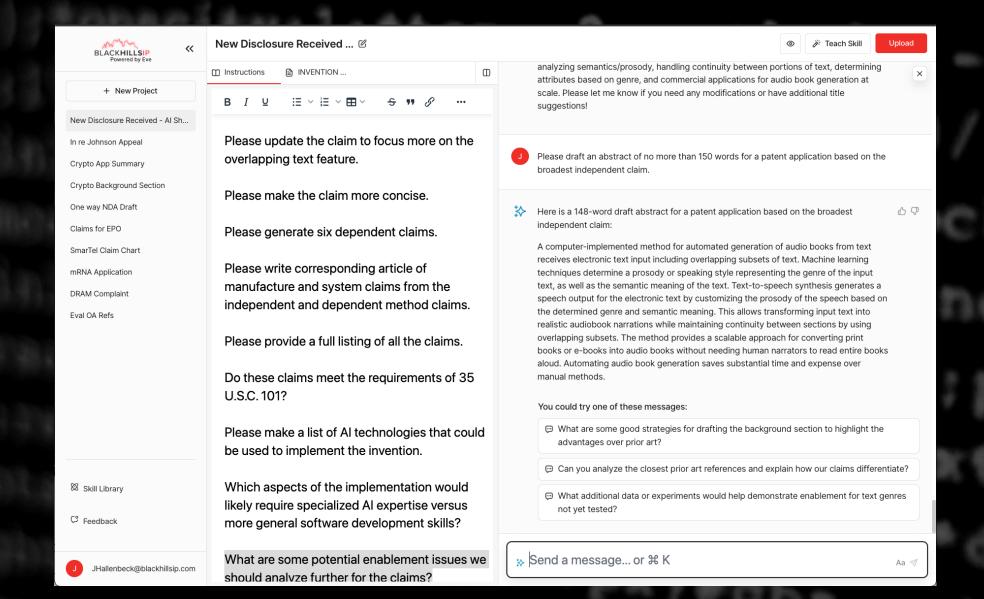
## Task 8: What are some potential enablement issues?



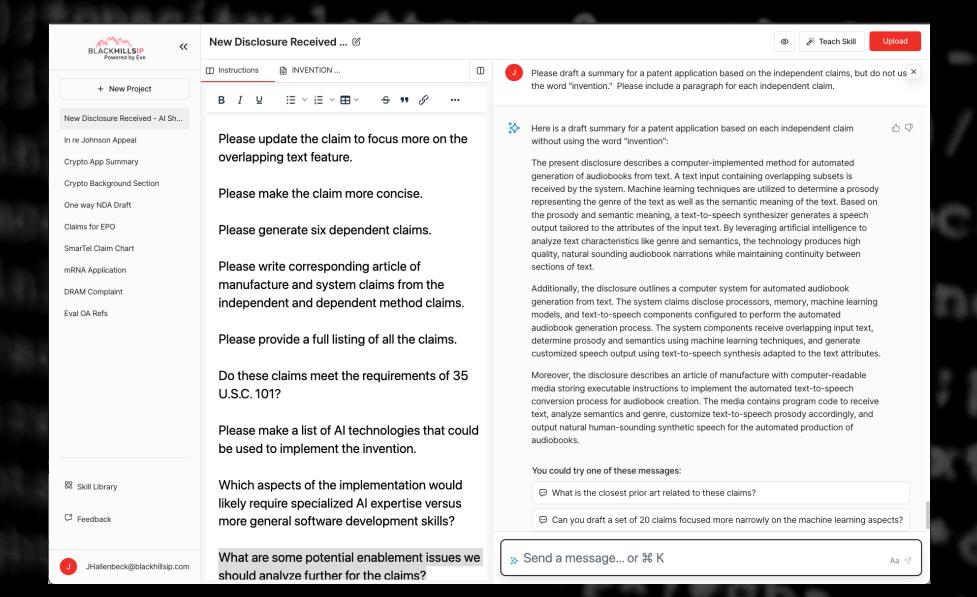
## Task 9: Recommend an application title



## Task 10: Draft an abstract



# Task 11: Draft a summary



# Task 12: Draft a background

Audiobook creation has traditionally relied on human narrators to manually read entire texts aloud to produce audio representations. This requires substantial effort and expense to record quality narration. Some prior approaches have aimed to automate parts of the audiobook generation process, such as using basic text-to-speech methods without customization. However, existing solutions still lack the ability to closely replicate human-level voices, cadences, and expression tailored on a semantic level to the input text being converted.



# WHAT ELSE?

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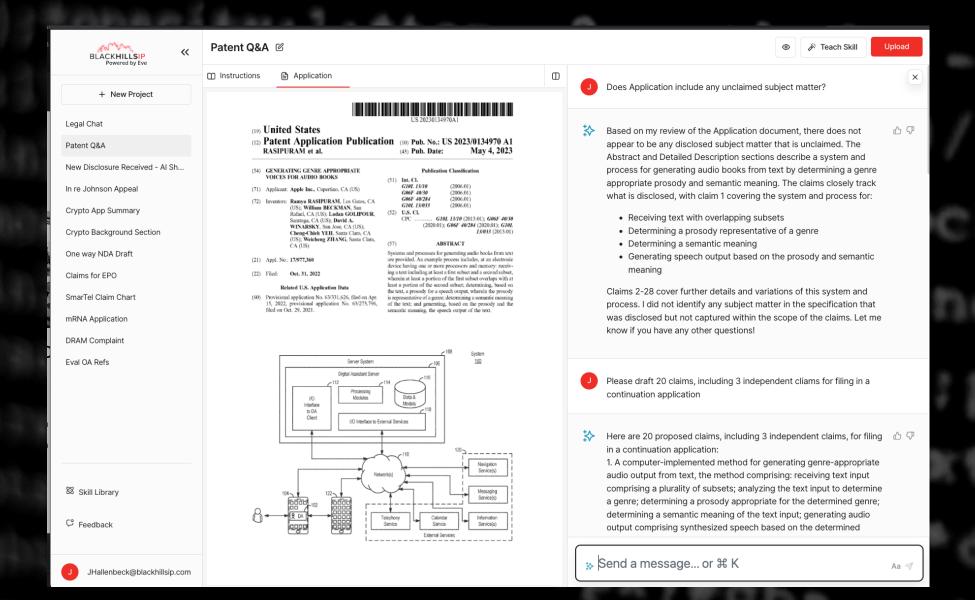
#### HELP EACH OTHER

IMPROVE TEAM-WIDE CONSISTENCY

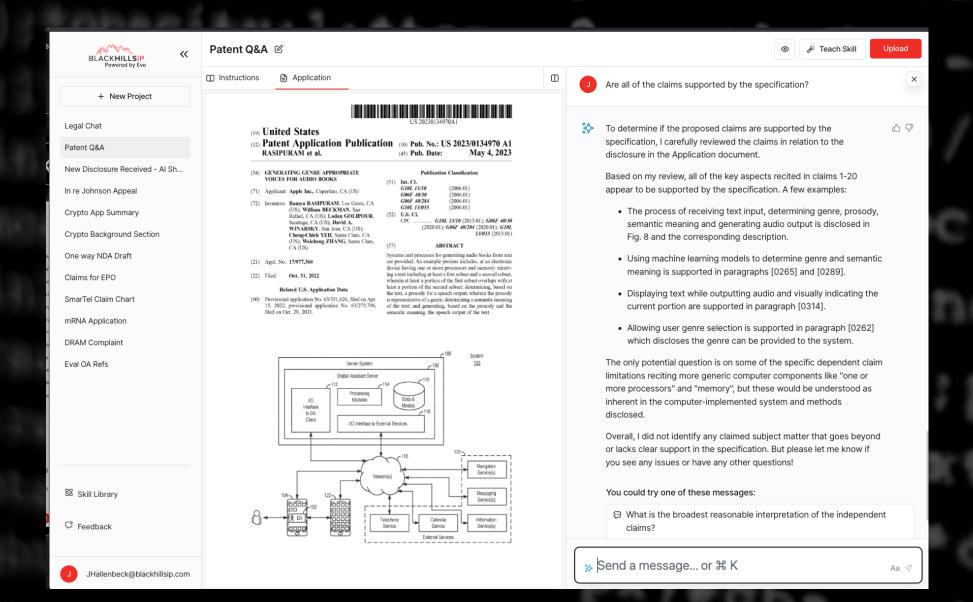
Team-wide work product review for quality, consistency, and errors is time consuming, tedious, and expensive. These factors are compounded by client budgets being relatively flat for 20 years at the same time that many client clients are demanding more.

Teams, individual attorneys, and clients need help in meeting these challenges.

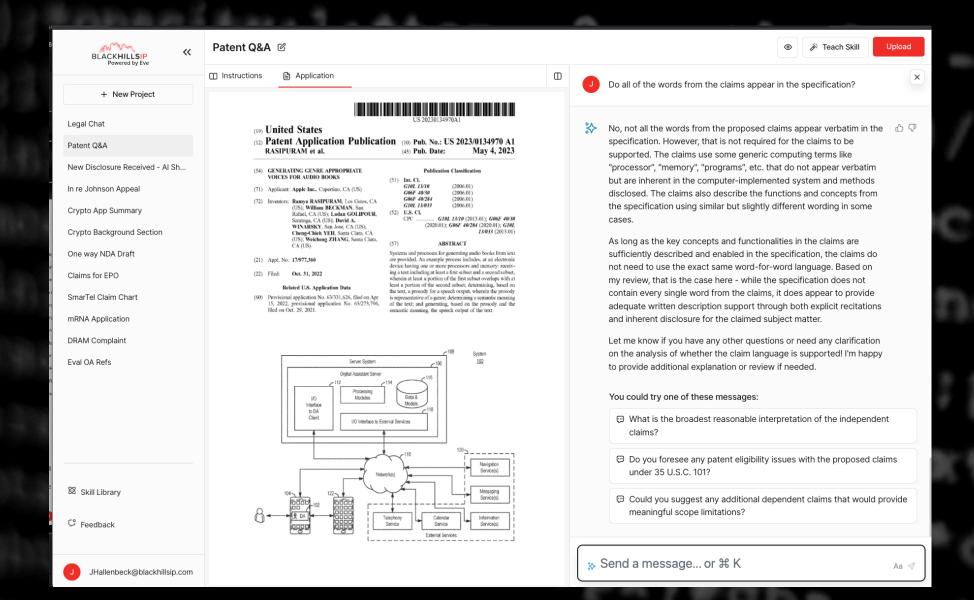
## Task 12: Is there unclaimed subject matter?



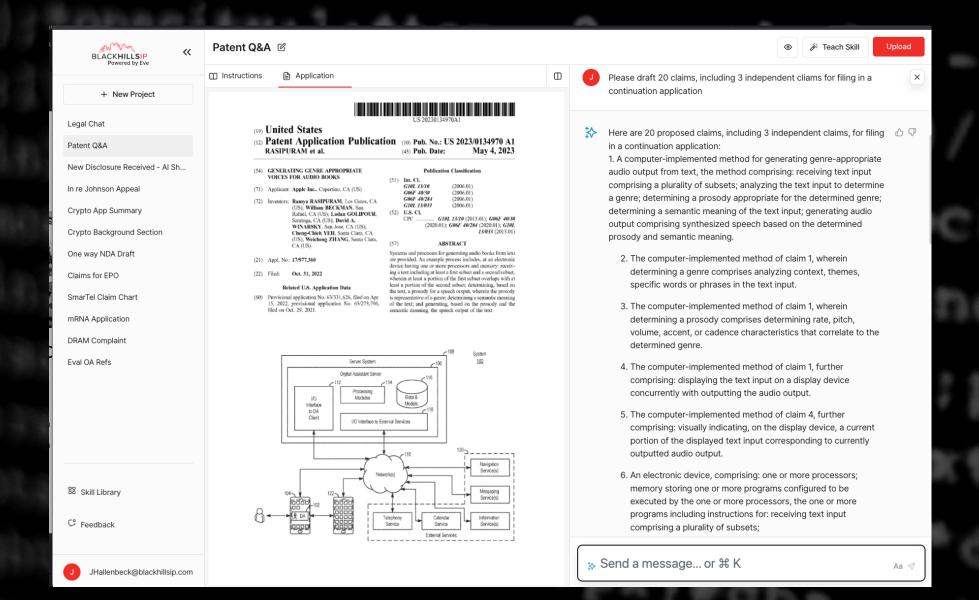
## Task 13: Are the claims supported by the specification?



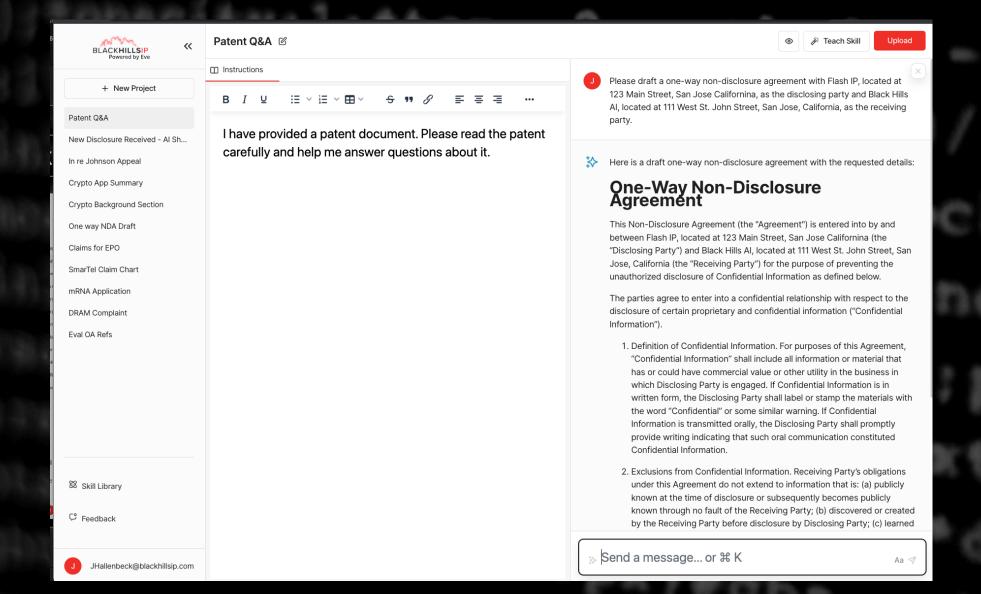
# Task 14: Do all of the words in the claims appear in the app?



## Task 15: Draft claims for a continuation application



# Task 16: Draft a one-way non-disclosure agreement

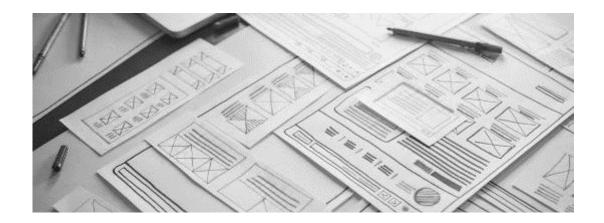


# SUMMARY & QUESTIONS





- The Hidden Identity Attorney does well, but falls short
- Otto<sup>™</sup> assisted attorney prevails with at least equal drafting in 25% of the time
- Otto<sup>™</sup> assisted attorney also QC'ed The Hidden Identity Attorney's work, scrolled Cyber Monday sales, and drank too much coffee



#### **BUSINESS PRIORITIES**

- Increase productivity while improving quality
- Decrease time on first draft while increasing time available for ensuring completeness, accuracy, and overall quality
- Experienced attorneys are likely to see the greatest gains because they have a keen sense and a seasoned eye well suited for prompting, updating, and editing output



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