

GPT as Proto-Editor: Automating Some Document Editing Tasks

SCAN Brownbag Seminar

By JOHN VAHEDI, 8/8/23



Overview of Topics

Background

- Pubs Process
- Sponsor Needs
- Suggested Method

GPT Proto-Editor

- Exploring Finetuning
 - Prompt Engineering
 - Framework for parameters
 - GPT 3.5 vs 4
- Behaviors and Results

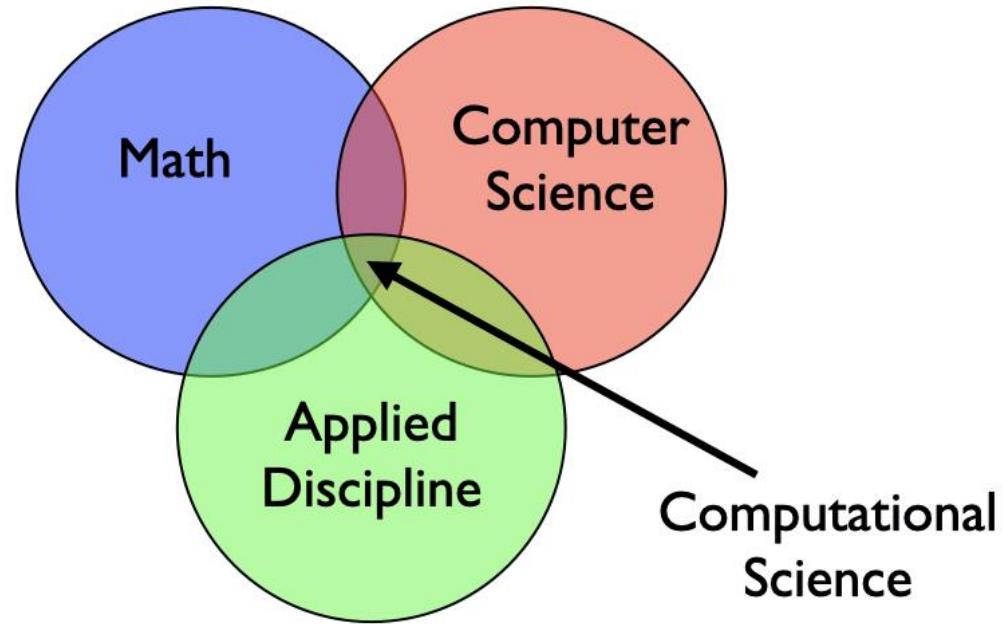
GPT as Future Research Tool

- Conclusion on findings
 - Next Steps
- Future Proposal Method
 - Reproducibility in Randomness

A Little About Me:



JOHN VAHEDI
Technical Analyst III



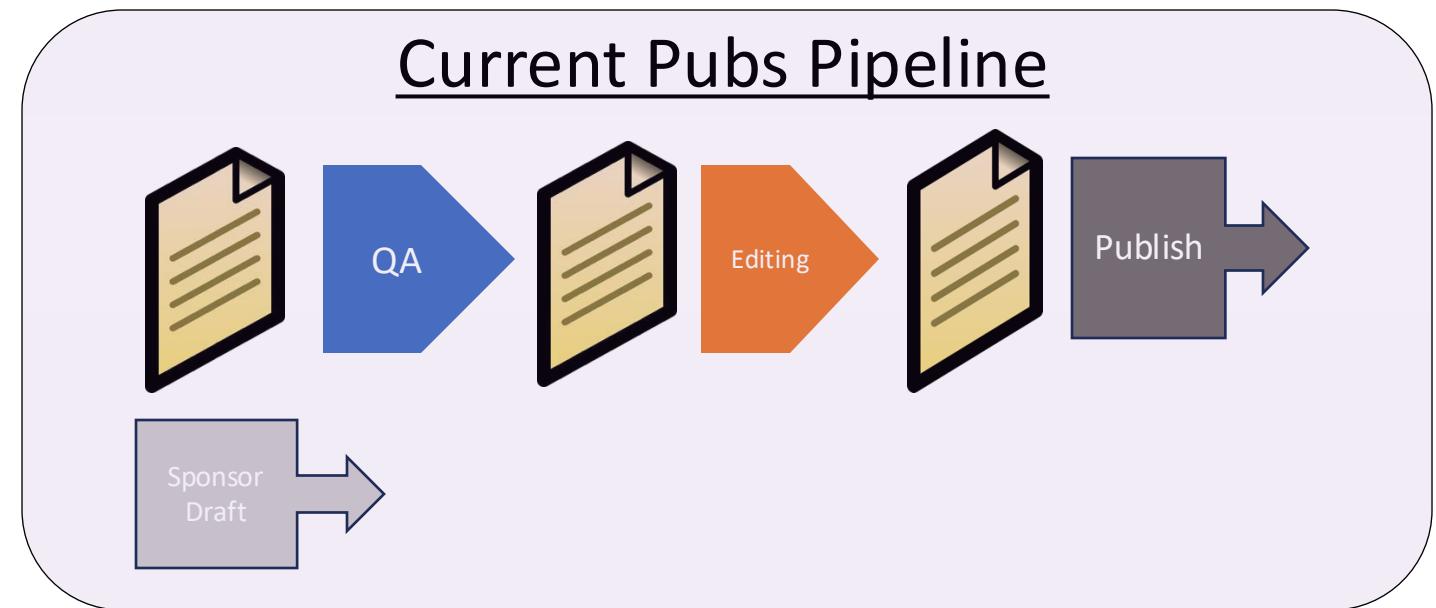
Relevant Work:

- Coding Transformers
- Simulations

Background:

- Educational Technology
- Applied Mathematics
- Scientific Computing

Background



“...recommendation is to offer more streamlined production options for all of our publications to greatly speed up the publication process.”

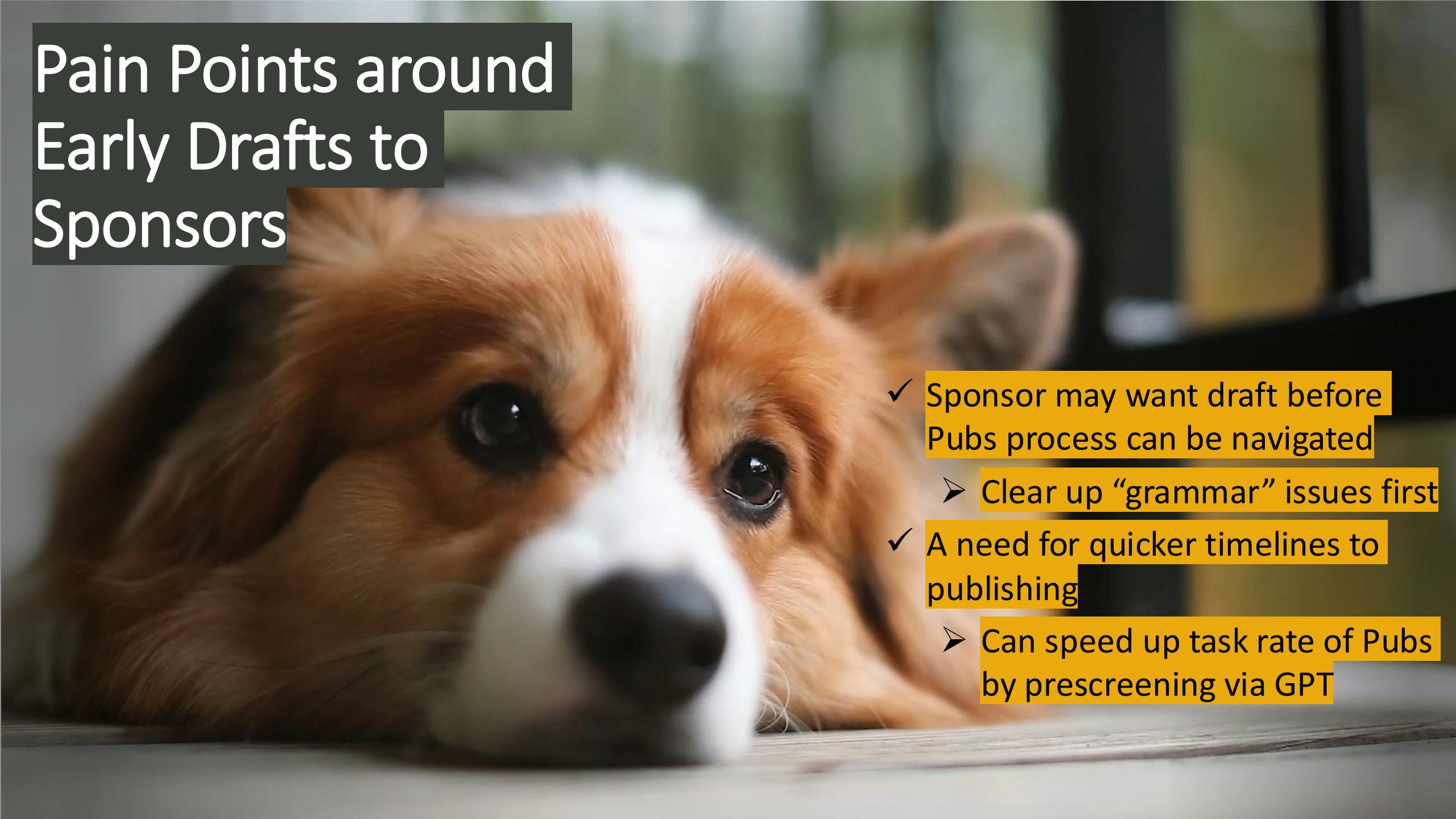
-Jason Matheny [\[source\]](#)

Grammarly will, at the choice and written request of Customer, delete any Customer Data in its possession within a commercially reasonable time...

--Grammarly [\[source\]](#)

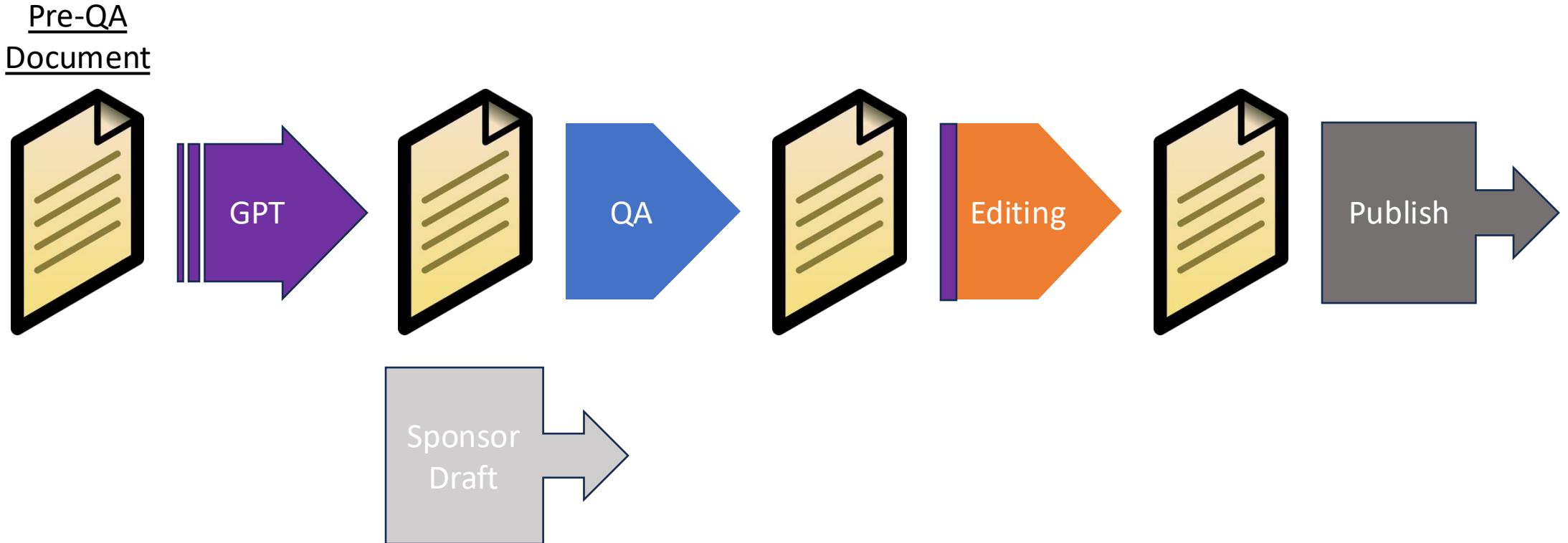
[Data Protection Matrix](#)

Pain Points around Early Drafts to Sponsors

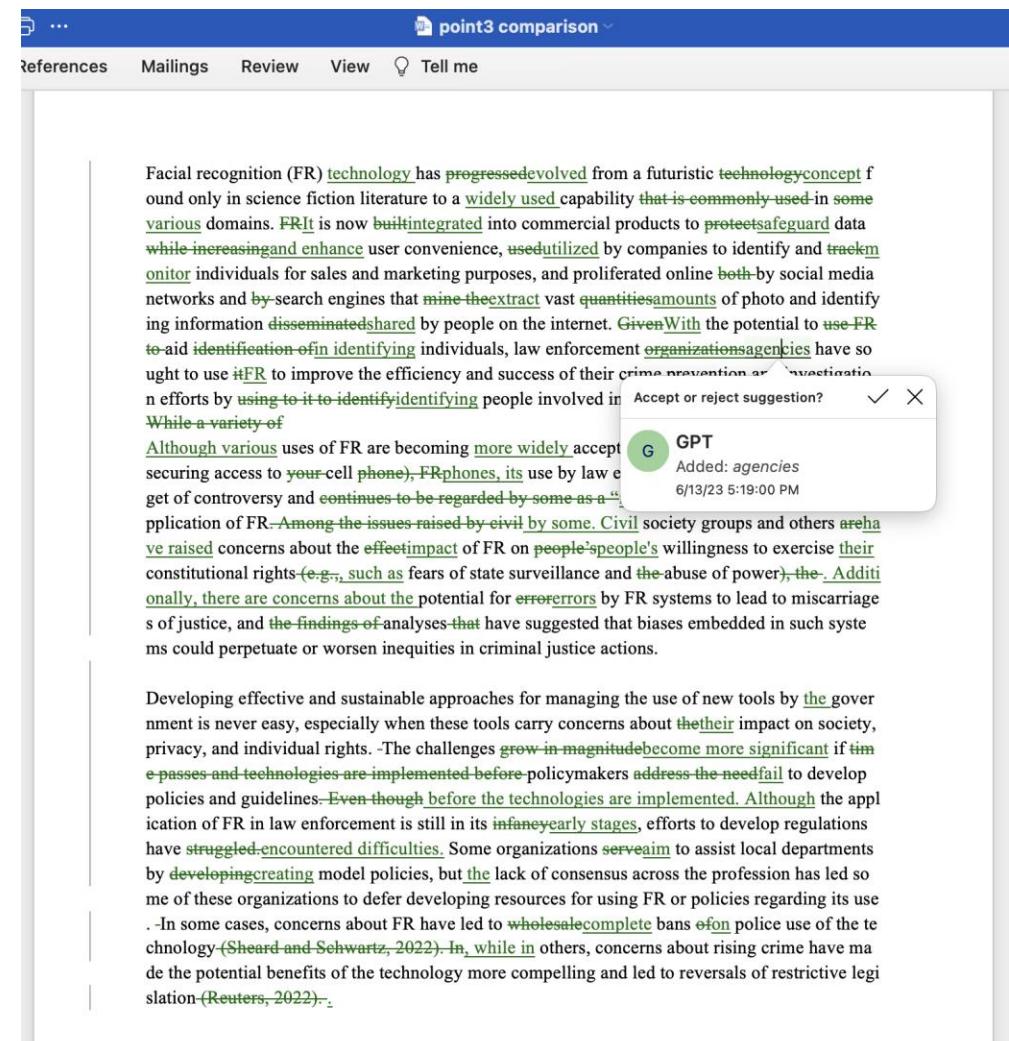
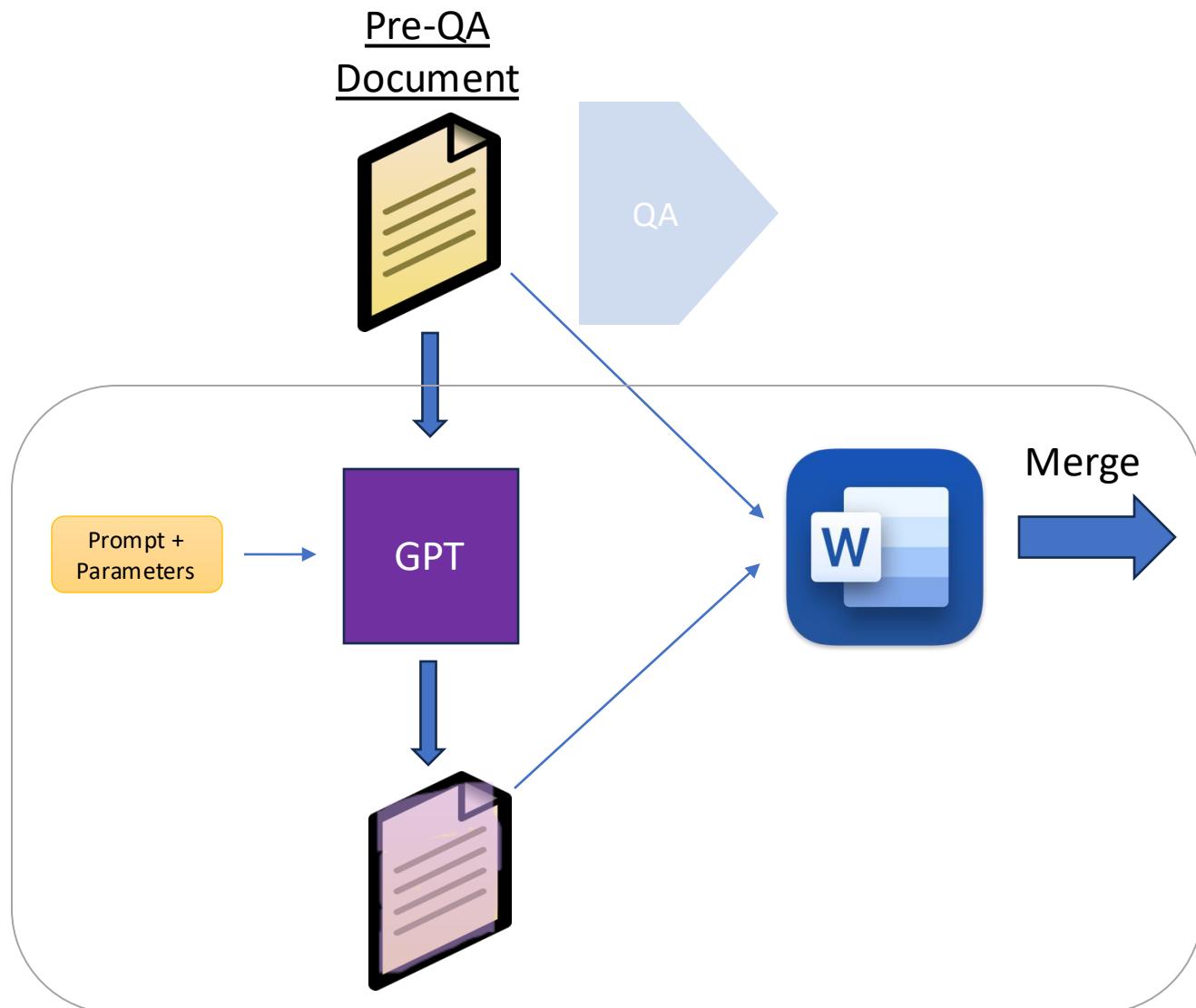
- 
- ✓ Sponsor may want draft before Pubs process can be navigated
 - Clear up “grammar” issues first
 - ✓ A need for quicker timelines to publishing
 - Can speed up task rate of Pubs by prescreening via GPT

Possible Alternative Pubs Pipeline

A simplified example...



GPT Method Implemented in Early Review



GPT as Part of Early Review Process

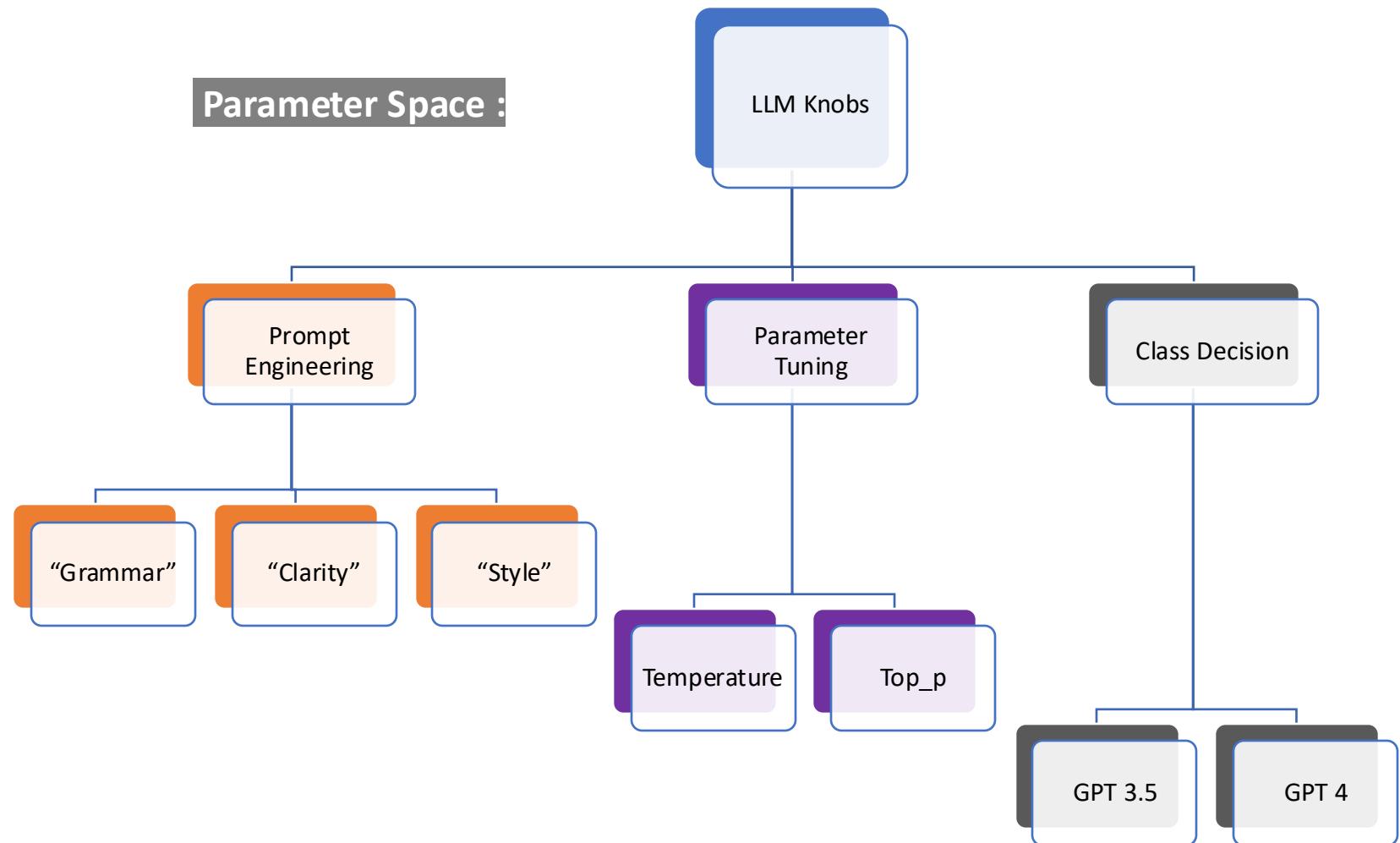
Viable?

1. Quality of “Edits”

2. Number of “Edits”

If so, then how?

GPT as Proto-Editor



Support?
Feedback?

Reach out to istservicedesk@rand.org
Contact jbartle@rand.org

Example Prompts:

```
1 request = 'Can you edit the following for grammatical errors?'
2 answer = gptRespond(request + '\n' + prompt2, 0.2, 1)
3 print(answer)
```

Facial recognition (FR) technology has evolved from a futuristic concept found only in science fiction literature to a widely used capability in various domains. FR is now integrated into commercial products to safeguard data while enhancing user convenience, utilized by companies to identify and monitor individuals for sales and marketing purposes, and proliferated online by social media networks and search engines that extract vast amounts of photo and identifying information shared by people on the internet. With the potential to aid in identifying individuals law enforcement organizations have sought to use FR to improve the efficiency and success of their crime prevention and investigation effort by identifying people involved in criminal behavior.

Although various uses of FR are becoming more commonly accepted, such as securing access to cell phones, its use by law enforcement remains a

‘Can you edit the following for grammatical errors?’

‘I am a researcher writing for publication. Can you edit the following for grammatical errors and clarity?’

‘Can you edit the following for grammatical errors and clarity?’

#Mention bad prompts

‘Can you review the following for grammar mistakes?’

‘Can you review the following for possible edits?’

Rungs of Possible Edits



Original RAND Research Editor

Chapter 1 . Introduction: The Use of Facial Recognition by Law Enforcement

Facial recognition (FR) has progressed from a futuristic technology found only in science fiction literature to a capability that is commonly used in some domains. FR is now built into commercial products to protect data while increasing user convenience, used-employed by companies to identify and track individuals for sales and marketing purposes, and proliferated online both by social media networks and by search engines that mine the vast quantities of photos and identifying information disseminated by people on the internet. Given the potential to-useof FR to aid in-the identification of individuals, law enforcement organizations have soughtpursued to use #FR to improve the efficiency and success of their crime prevention and investigation efforts by using it to identify people involved in criminal behavior.

While Although a variety of uses of FR are becoming accepted more commonly (e.g., securing access to your smartcell-phone), FR use by law enforcement remains a frequent target of controversy and continues to be regarded by some as a "high-risk" application of FR. Among the issues raised by civil society groups and others are concerns about the effect of FR on people's willingness to exercise constitutional rights (e.g., because of fears of state surveillance and the abuse of power), the potential for error-by FR systems' errors to lead to miscarriages of justice, and the findings of analyses that have suggested that biases embedded in such systems could perpetuate or worsen inequities in criminal justice actions.

Developing effective and sustainable approaches for managing the use of new tools by government is never easy, especially when these tools carry concerns about the impact on society, privacy, and individual rights (American Civil Liberties Union of Massachusetts, undated).¹ The challenges grow in magnitude if time passes and technologies are implemented before policymakers address the need to develop policies and guidelines. Even though the application of FR in law enforcement is still in its infancy, efforts to develop regulations have struggled. Some organizations serve to assist local departments by developing model policies, but lack of consensus across the profession has led some of these organizations to defer developing resources or policies for using FR-or policies regarding its use.² In some cases, concerns about FR have led to wholesale bans of police use of the technology (Sheard and Schwartz, 2022). In others, concerns about rising crime have made the potential benefits of the technology more compelling and led to reversals of restrictive legislation (Reuters, 2022).

Comparison of Editors

With Default Parameters

Words 369

Corrections 57

Similarity of text is 85%

■ Removed
■ Added

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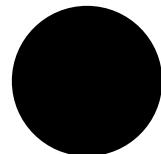
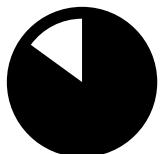
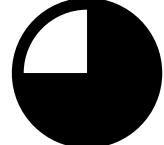
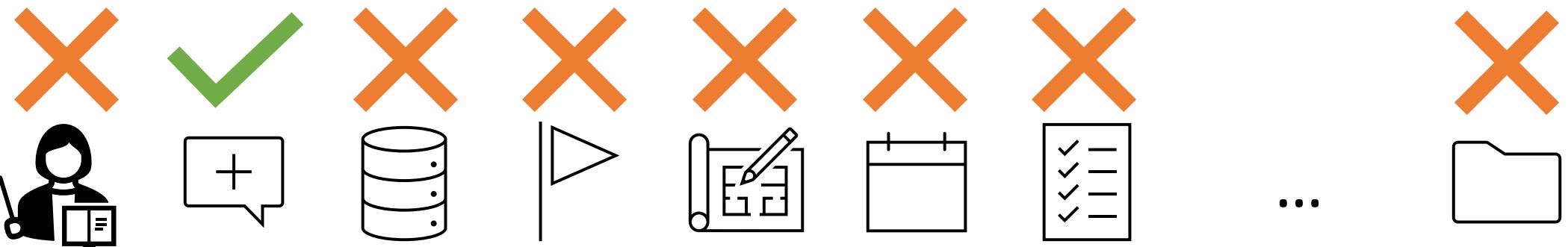
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Observations on Quality

- Often did capture some good edits:
 - Reworded awkward WC/phrasing
 - Mirrored some human edits (inconsistent)
 - Caught missed edits
- Could be a bit busy/aggressive
- Weird Behaviors:
 - Removing citations (sometimes)
 - Combining paragraphs (randomly)
- Simplifications may alter meaning (rare)
- Can not execute high-level edits

Framework for Parameter Action

Parameters Documentation



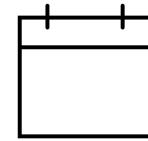
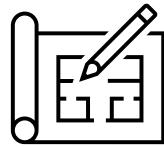
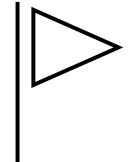
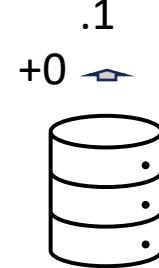
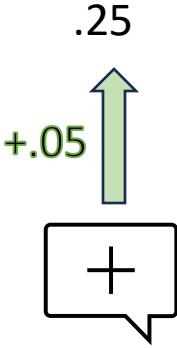
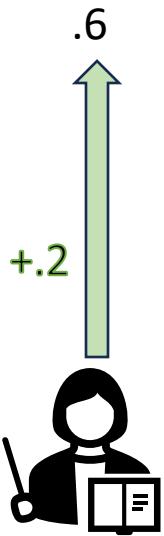
Framework for Parameter Action (1)

Temperature

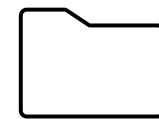
$0 < T < 2$, Default = 1

[SoftMax Sandbox](#)

$$P_i = \text{softmax}(y_i/T) = \frac{\exp(y_i/T)}{\sum_j \exp(y_j/T)}$$



...



Probability: .4

.2

.1

.06

-.01
.05

.04

-.02
.02

.03

-.025
.005

.03

-.025
.005

.01

-.001

Temperature Effects on “Edit” Results

Low end example

Temp = .20

■ Removed ■ Added

Words 395

Corrections 10

Similarity of text is 97%

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While a variety of uses of FR are becoming accepted more commonly accepted (e.g., securing access to your cell phone), FR use by law enforcement remains a frequent target of controversy and continues to be regarded by some as a “high risk” “high-risk” application of FR. Among the issues raised by civil society groups and others are concerns about the effect of FR on people’s willingness to exercise constitutional rights (e.g., fears of state surveillance and the abuse of power), the potential for error by FR systems to lead to miscarriages of justice, and the findings of analyses that have suggested that biases embedded in such systems could perpetuate or worsen inequities in criminal justice actions.

Developing effective and sustainable approaches for managing the use of new tools by the government is never easy, especially when these tools carry concerns about the impact on society, privacy, and individual rights. The challenges grow in magnitude if time passes and technologies are implemented before policymakers address the need to develop policies and guidelines. Even though the application of FR in law enforcement is still in its infancy, efforts to develop regulations have struggled. Some organizations serve to assist local departments by developing model policies, but the lack of consensus across the profession has led some of these organizations to defer developing resources for using FR or policies regarding its use. In some cases, concerns about FR have led to wholesale bans of police use of the technology (Sheard and Schwartz, 2022). In others, concerns about rising crime have made the potential benefits of the technology more compelling and led to reversals of restrictive legislation (Reuters, 2022).

High end example

Temp = .60

■ Removed ■ Added

Words 351

Corrections 50

Similarity of text is 86%

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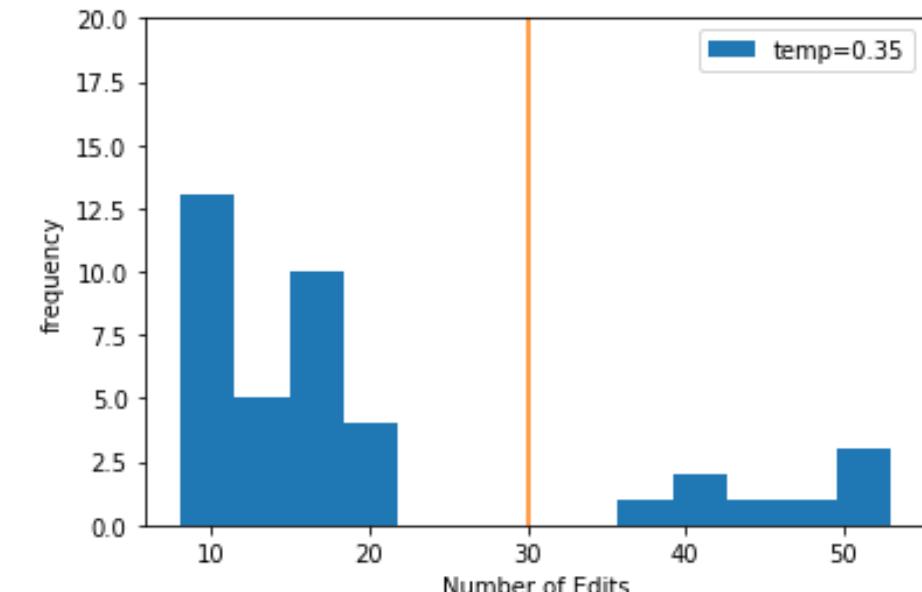
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become more significant when policymakers address the need fail to develop policies and guidelines. Even though guidelines before technologies are implemented. Although the application of FR in law enforcement is still in its infancy, efforts to develop regulations have struggled. faced difficulties. Some organizations serve to assist local departments by developing model policies, but a lack of consensus across the profession has led some of these organizations to defer developing resources for using FR or policies regarding its use. In some cases, concerns about FR have led to wholesale bans of on police use of the technology (Sheard and Schwartz, 2022). In technology, while in others, concerns about rising crime have made the potential benefits of the technology more compelling and led to reversals of restrictive legislation (Reuters, 2022).legislation.

Temperature Effects on “Edit” Results

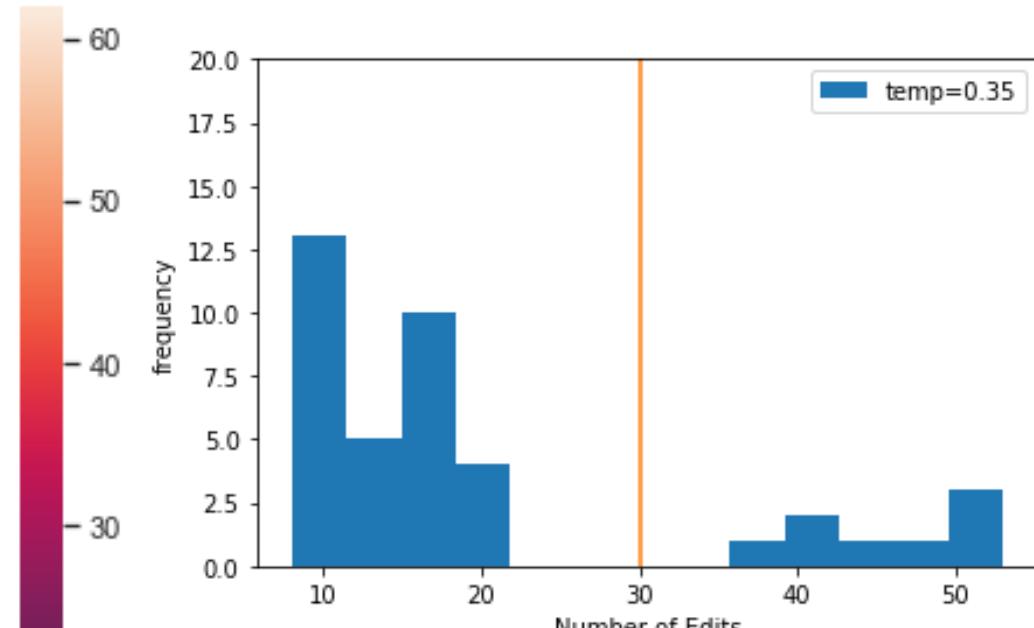
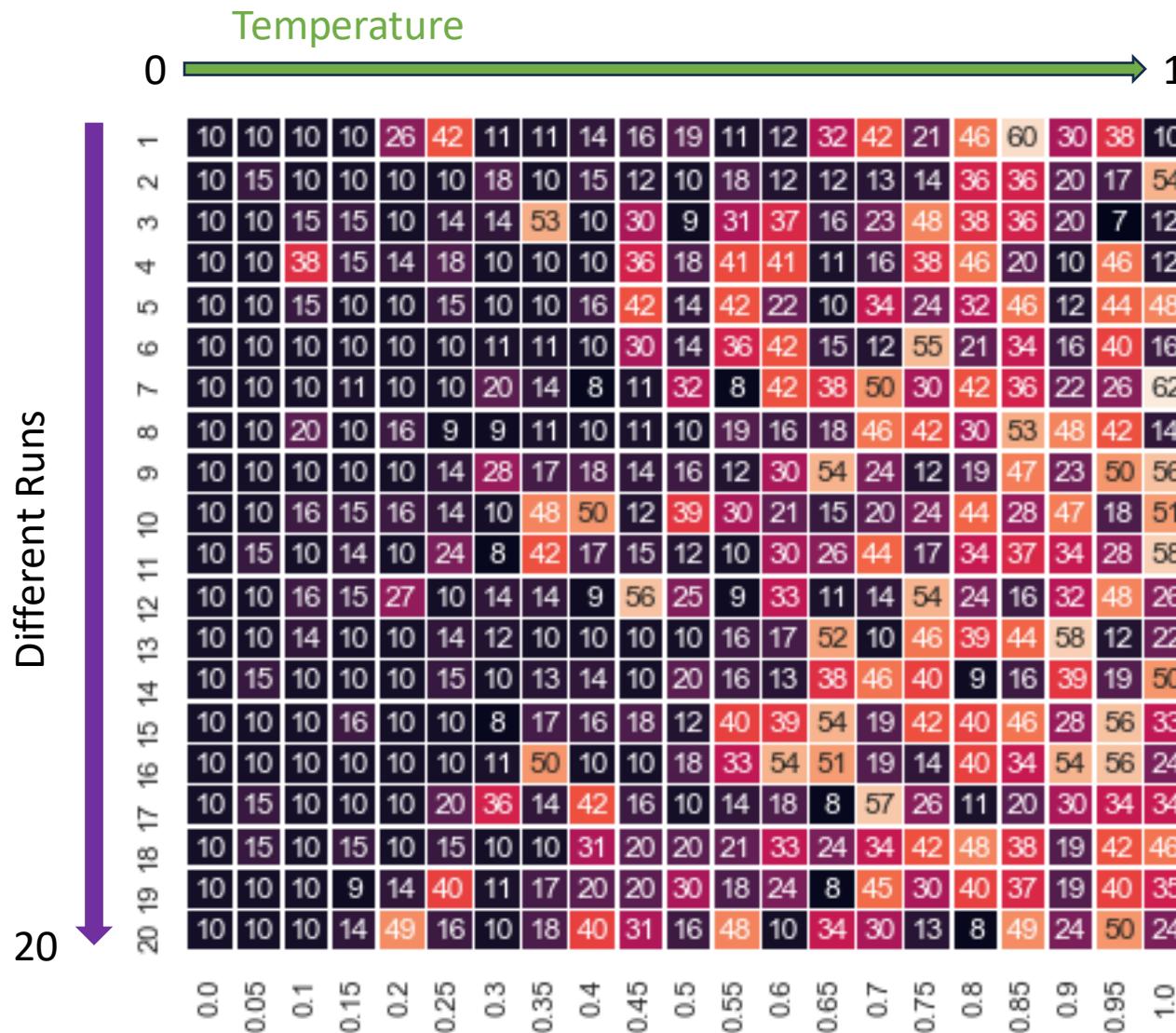
Notice stochasticity & bifurcation of middle ground

Temp = .35

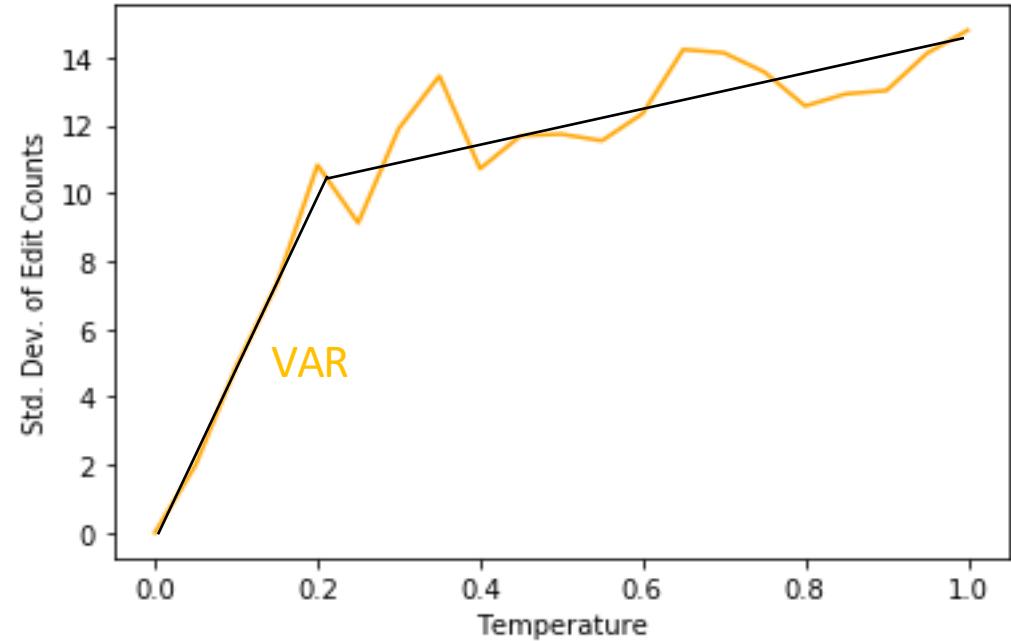
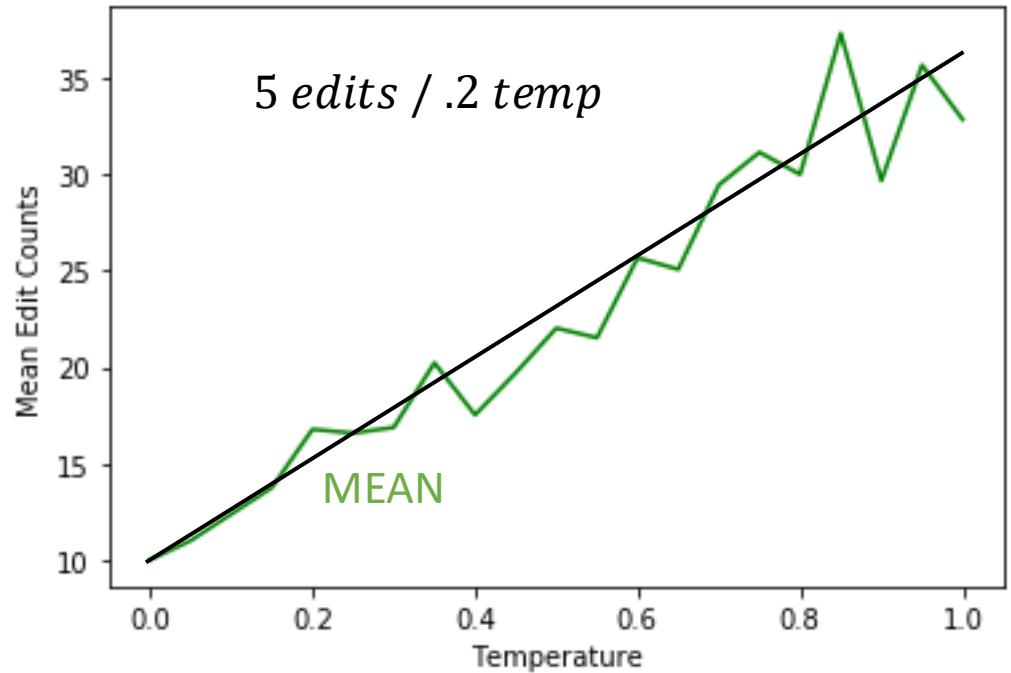


Temperature Effects on “Edit” Results

Stochasticity & bifurcation of middle ground



Temperature Effect on Change/“Edit” Counts



Coefficient of Variation:
(temp > .1)
Max @ .30 ~ 70%
Min @ .85 ~ 35%

Framework for Parameter Action (2)

Occam's Razor

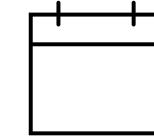
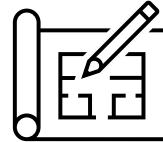
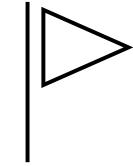
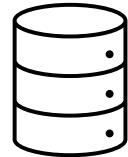


Framework for Parameter Action (2)

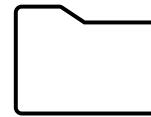
Weakly Follows Occam's Razor Principle

"Occam's razor is the problem-solving principle that recommends searching for explanations constructed with the smallest possible set of elements." -[Wikipedia](#)

~Simple/Small “Edits”



...



~Busy/Big “Edits”



Probability: .4

.2

.1

.06

.04

.03

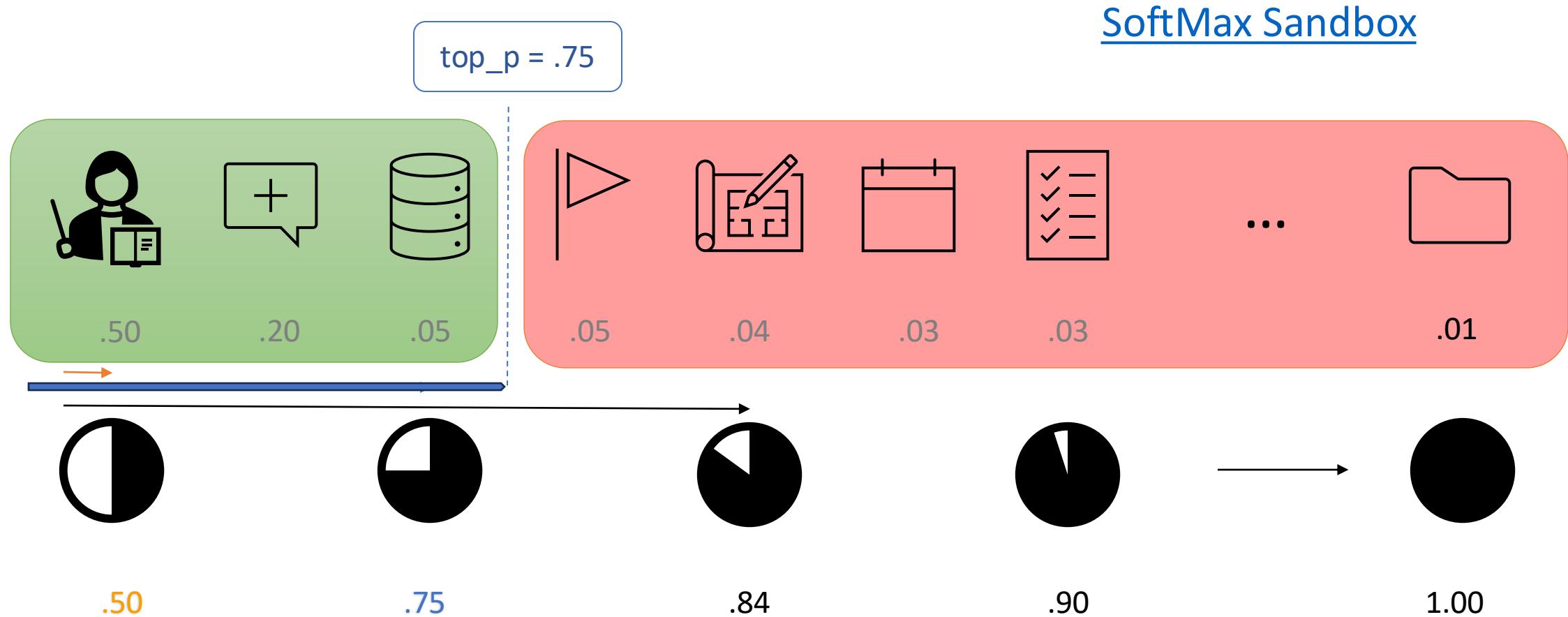
.03

Probability  “Edit” Size

Framework for Parameter Action (3)

Top_p (synonymous with “top percent”)

$0 < \text{Top}_p < 1$, Default = 1



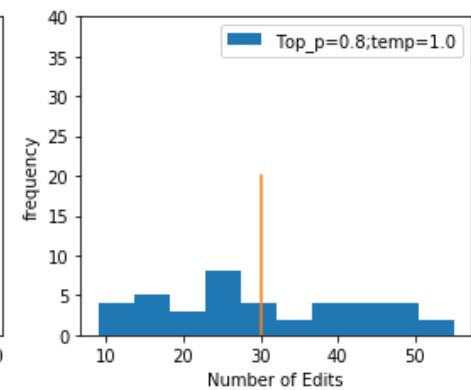
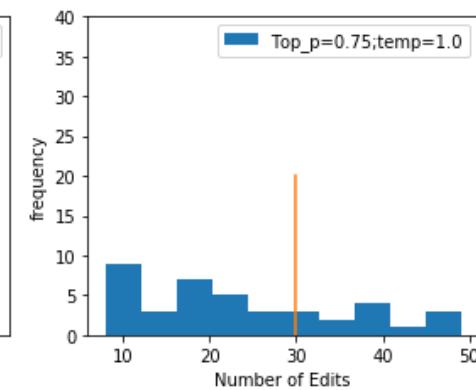
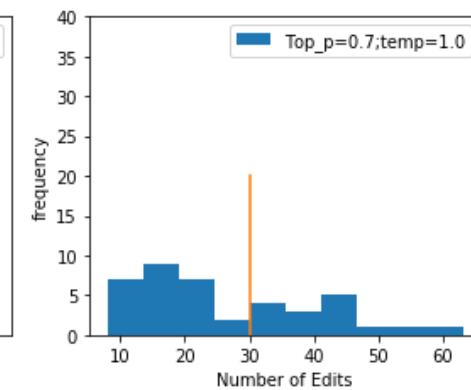
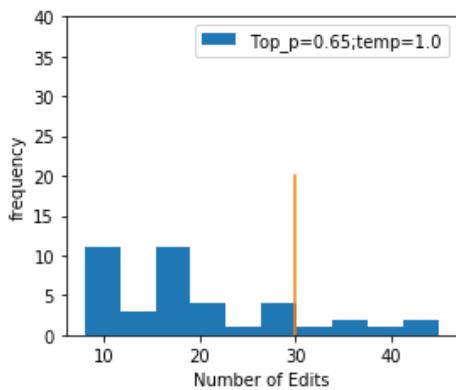
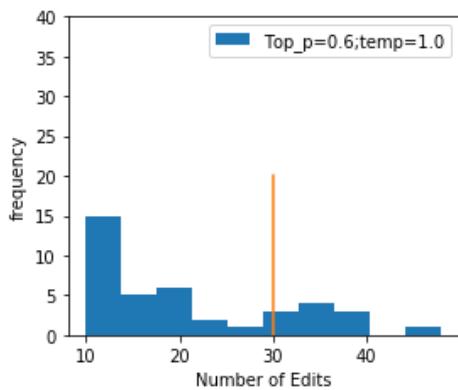
Top_p effects on results

Does not resolve prior issues

Action alike to temperature
- Expect similar behaviors

Heavy “Edits”/Revisions thrown away
- As Top_p decreases

- Sensitive to changes at higher values



Comment on Holistic Effects

Does not resolve bifurcation issue generally

Words 361
Corrections 32
Similarity of text is 91%

Temp = 2.0, Top_p = .70

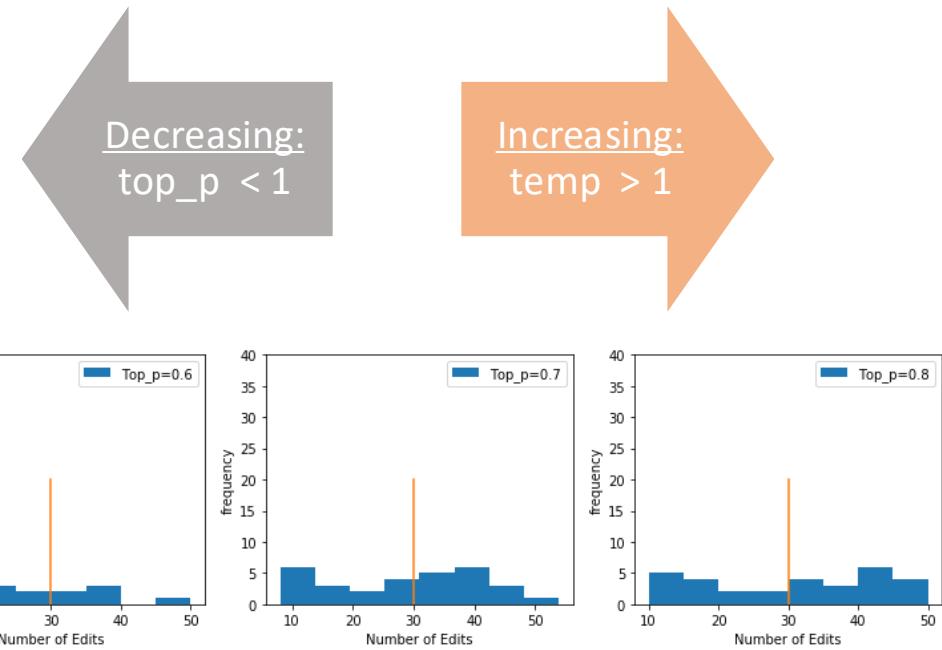
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Facial recognition (FR) technology has progressed advanced from a futuristic technology concept found only in science fiction literature to a widely used capability that is commonly used in some domains. FR is now built integrated into commercial products to protect data while increasing and increase user convenience, used by companies to identify and track individuals for sales and marketing purposes, and proliferated widely available online both by through social media networks and by search engines that mine the vast quantities of photo and identifying information disseminated by people on the internet. Given information. With the potential to use FR to aid identification of individuals, law enforcement organizations have sought to use it FR to improve the efficiency and success of their crime prevention and investigation efforts by using to it to identify identifying people involved in criminal behavior.

While a variety of Although various uses of FR are becoming accepted more commonly (e.g., accepted, such as securing access to your cell phone), phones, FR use by law enforcement remains a frequent target of controversy and continues to be regarded by some as a "high-risk" "high-risk" application of FR. Among the issues raised by civil Civil society groups and others are have raised concerns about the effect of FR on people's people's willingness to exercise constitutional rights (e.g., rights, such as fears of state surveillance and the abuse of power), the power. Additionally, potential for error errors by FR systems to could lead to miscarriages of justice, and the findings of analyses that have suggested that biases embedded in such systems could perpetuate or worsen inequities in criminal justice actions.

Developing effective and sustainable approaches for managing the use of new tools by government is never easy, especially when these tools carry concerns about the impact on society, privacy, and individual rights. The challenges grow in magnitude if time passes and technologies are implemented before policymakers address the need to develop policies and guidelines. Even though the application of FR in law enforcement is still in its infancy, efforts to develop regulations have struggled. Some organizations serve to assist local departments by developing model policies, but lack of consensus across the profession has led some of these organizations to defer developing resources for using FR or policies regarding its use. In some cases, concerns about FR have led to wholesale bans of police use of the technology (Sheard and Schwartz, 2022). In technology, while in others, concerns about rising crime have made the potential benefits of the technology more compelling and led to reversals of restrictive legislation (Reuters, 2022).legislation.

Did find some promising results:



Coefficient of Variation:
top_p = .70 ~ 25%

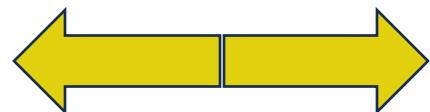
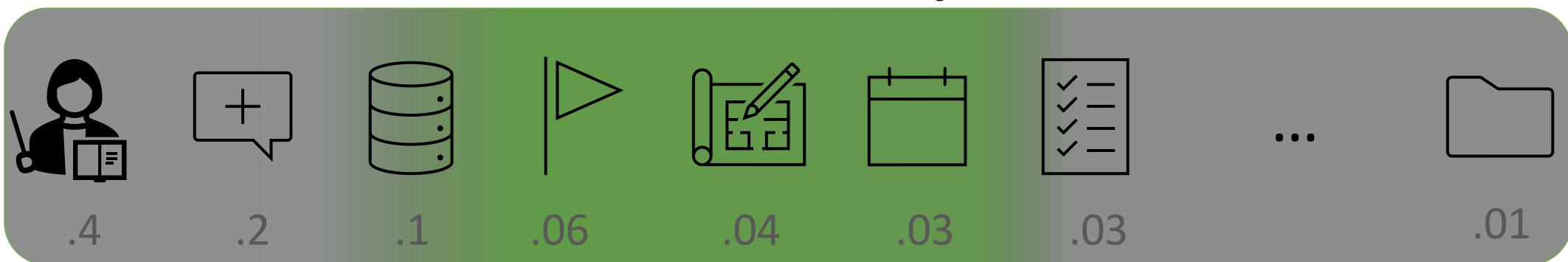
[SoftMax](#)
[Sandbox](#)

Framework for Parameter Action (4)

Window Seeking

System: Temp | Top_c | (Logit_bias)

↓
↓
Window



“Occam’s Window”

GPT 3.5 vs GPT 4

Class choice may not be an effective differentiator

Note: does not solve bifurcation/jump issue

Words 322
Corrections 48
Similarity of text is 85%

GPT 3.5 Turbo

■ Removed ■ Added

Facial recognition (FR) technology has progressed evolved from a futuristic technology found only concept in science fiction literature to a widely used capability that is commonly used in some various domains. FR is now built integrated into commercial products to protect safeguard data while increasing and enhance user convenience, used by companies convenience. Companies also use it to identify and track individuals for sales and marketing purposes, and proliferated online both by while social media networks and by search engines that mine the vast quantities amounts of photo and identifying information disseminated by people on the internet. Given the potential to use FR to aid identification of individuals, law online. Law enforcement organizations agencies have also sought to use it leverage FR to improve the efficiency and success of their crime prevention and investigation efforts by using to it to identify identifying people involved in criminal behavior.

While a variety of uses the use of FR are becoming accepted more commonly (e.g., for securing access to your cell phone), FR personal devices is becoming more accepted, its use by law enforcement remains a frequent target of controversy controversial topic and continues to be regarded by some as is considered a "high risk" "high-risk" application of FR. Among the issues raised FR by civil some. Civil society groups and others are have raised concerns about the effect impact of FR on people's willingness to exercise people's constitutional rights (e.g., fears of state surveillance and the abuse of power), rights, the potential for error by FR systems to lead leading to miscarriages of justice, and the findings of analyses that have suggested possibility that biases embedded in such systems could perpetuate or worsen inequities in criminal justice actions.

Developing effective and sustainable approaches for managing the use of new tools by the government is never easy, especially when these tools carry concerns about the their impact on society, privacy, and individual rights. The challenges grow in magnitude become more significant if time passes and technologies are implemented before policymakers address the need to develop policies and guidelines. Even though Although the application of FR in law enforcement is still in its infancy, early stages, efforts to develop regulations have struggled. faced difficulties. Some organizations serve have developed model policies to assist local departments by developing model policies, departments, but a lack of consensus across the profession has led some of these organizations to defer developing resources for using FR or policies regarding its use. In some cases, concerns about FR have led to wholesale bans of on police use of the technology (Sheard and Schwartz, 2022). In technology, while in others, concerns about rising crime have made the potential benefits of the technology more compelling and led to reversals of restrictive legislation (Reuters, 2022).legislation.

Words 330
Corrections 61
Similarity of text is 82%

GPT 4

■ Removed ■ Added

Facial recognition (FR) technology has progressed evolved from being a futuristic technology found only concept in science fiction literature to a widely used capability that is commonly used in some various domains. FR is now built integrated into commercial products to protect enhance data while increasing security and user convenience, used utilized by companies to identify and track individuals for sales and marketing purposes, and proliferated prevalent online both by through social media networks and by search engines that mine the collect vast quantities amounts of photo and identifying information disseminated shared by people on the internet. Given the potential to use FR to aid identification of individuals, law Law enforcement organizations agencies have also sought to use it FR to improve the efficiency and success of their crime prevention and investigation efforts by using to it to identify people identifying individuals involved in criminal behavior.

While a variety of Although some uses of FR are becoming accepted more commonly (e.g., widely accepted, such as securing access to your cell phone), FR phones, its use by law enforcement remains a frequent target of controversy controversial topic and continues to be regarded by some as is considered a "high risk" "high risk" application of FR. Among the issues raised FR by civil some. Civil society groups and others are have raised concerns about the effect impact of FR on people's people's willingness to exercise their constitutional rights (e.g., fears of state surveillance and the abuse of power), rights, the potential for error errors by FR systems to lead to miscarriages of justice, and the findings of analyses that have suggested possibility that biases embedded in such systems could perpetuate or worsen exacerbate inequities in criminal justice actions.

Developing effective and sustainable approaches for managing the use of new tools by the government is never easy, especially particularly when these tools carry raise concerns about the their impact on society, privacy, and individual rights. The challenges grow in magnitude if time passes and are even greater when technologies are implemented before policymakers address the need to develop policies and guidelines. Even though Despite being in its early stages of application of FR in law enforcement is still in its infancy, enforcement, efforts to develop regulations for FR have struggled. faced difficulties. Some organizations serve have developed model policies to assist local departments by developing model policies, departments, but a lack of consensus across the profession has led some of these organizations to defer developing resources for using FR or policies regarding its FR's use. In some cases, concerns about FR have led to wholesale complete bans of on police use of the technology (Sheard and Schwartz, 2022). In technology, while in others, concerns about rising crime have made the potential benefits of the technology more compelling and led to reversals of restrictive legislation (Reuters, 2022).legislation.

GPT in Future Research

Use of Proto-Editor

Partially Viable given Expectation

Three options:

- I. Ask it to do very little
- II. Run it multiple times until you accept the “right” amount of edits
- III. Burden the researcher with abundance of “self-edit” suggestions
 - ❖ Important not to waste researchers time either with overediting and rejecting sample edits
 - ❖ Catches proofreading errors missed by editor’s first pass
 - ❖ Can be spun up locally and securely to handle still sensitive documents as well

Proof of Concept Product:
Gitlab



Next Steps:

- Long Documents
- Checklist of use cases and with Parameter tuning
 - Apply RAND Style Guide
- High Level Broad Commenting
- Reason Parse
- Rating Revisions
- Complex not “one-shot” changes
 - Langchain

Research questions may utilize answers via LLM in future

What can you expect?



Lack of Reproducibility

- Solution is NOT to reduce temperature
 - Results are not just, “less creative”
 - Critical function/ability is lost
 - Underperforms
 - Notice it reduced # of edits
- Reproducibility possible even with stochasticity
 - Simulation Science Script [Example](#)
 - No such implementation in GPT API
 - Possible reasons lacking?



Possible Workarounds

- Identify metric or system of metrics
 - Find Resulting Distribution
 - Our example was “# of edits”
 - Make Binary Bins
 - GPT itself to determine state
 - Embedding Distance
- Dating the use of the LLM

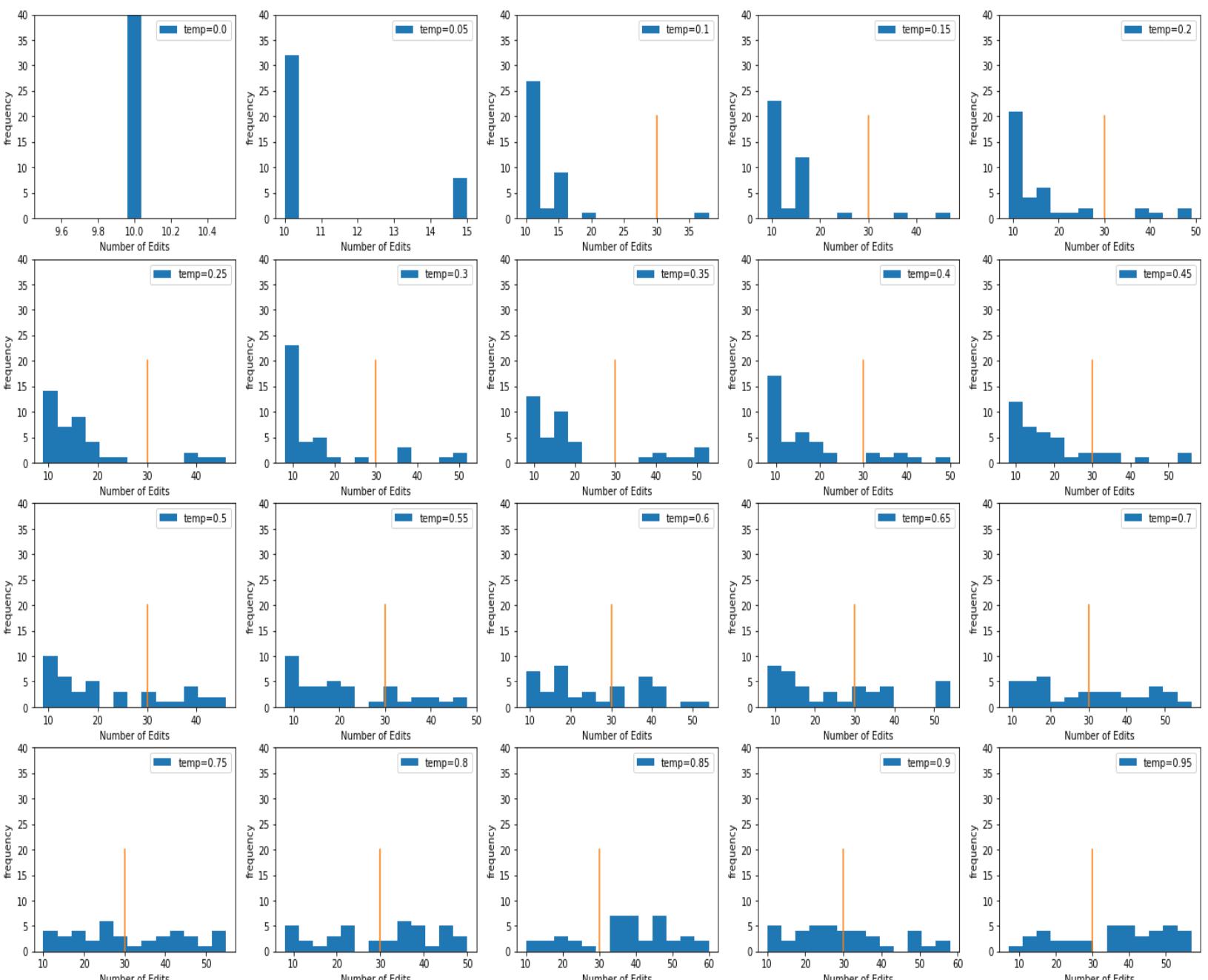
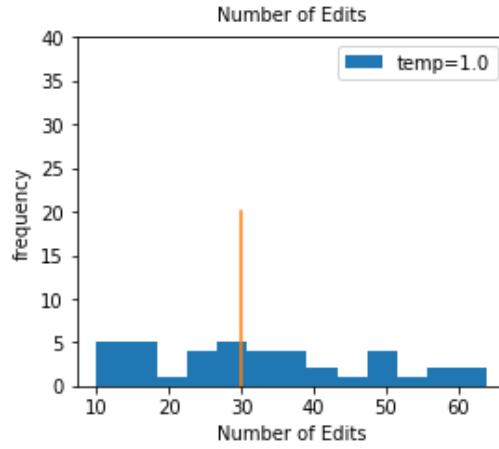
Appendix

Method:

- Scripted in Python
 - 40x runs for simulations
 - Package for docs: [Aspose](#)
 - (non-MacOS)
 - Online doc tool: [gotranscript](#)
 - Sample Code / Functions: [Gitlab](#)

of “Edit” Counts over temperature

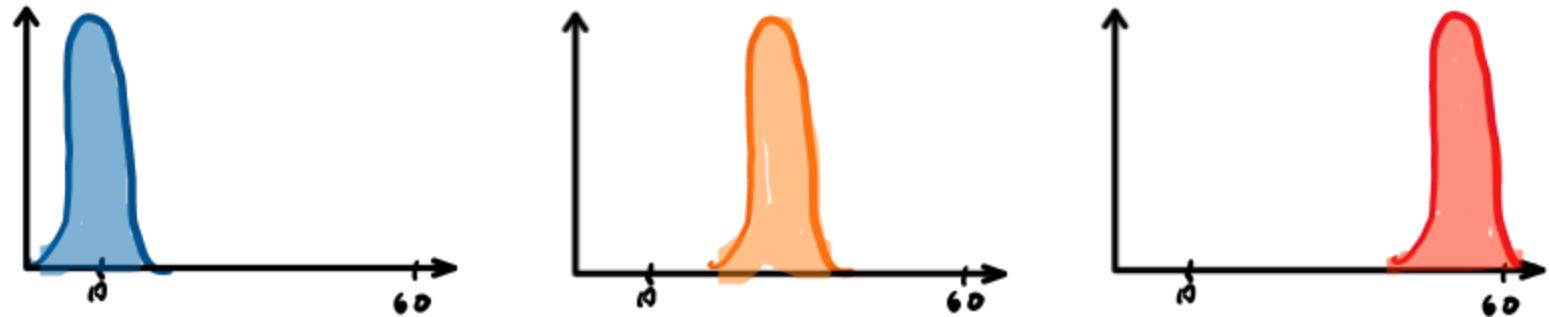
Default



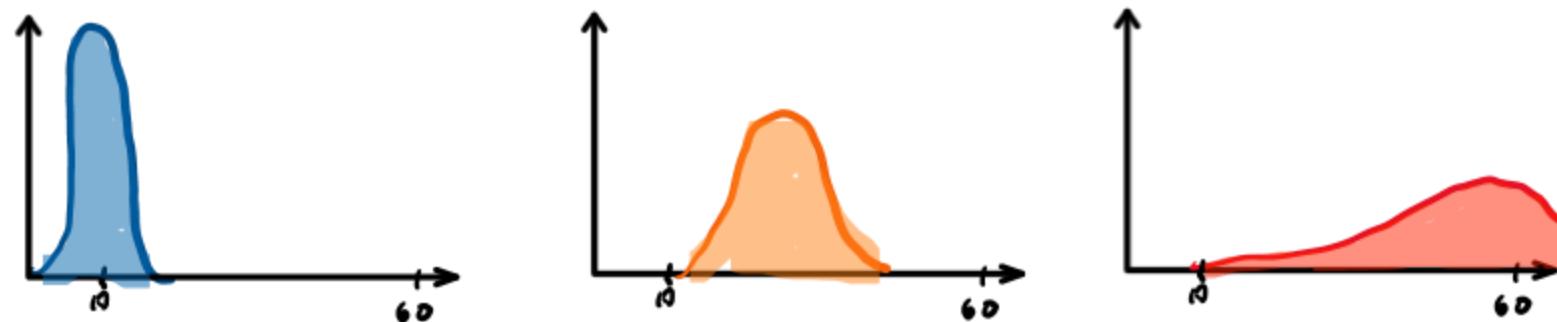
What we...

People prompt, AI... laughs

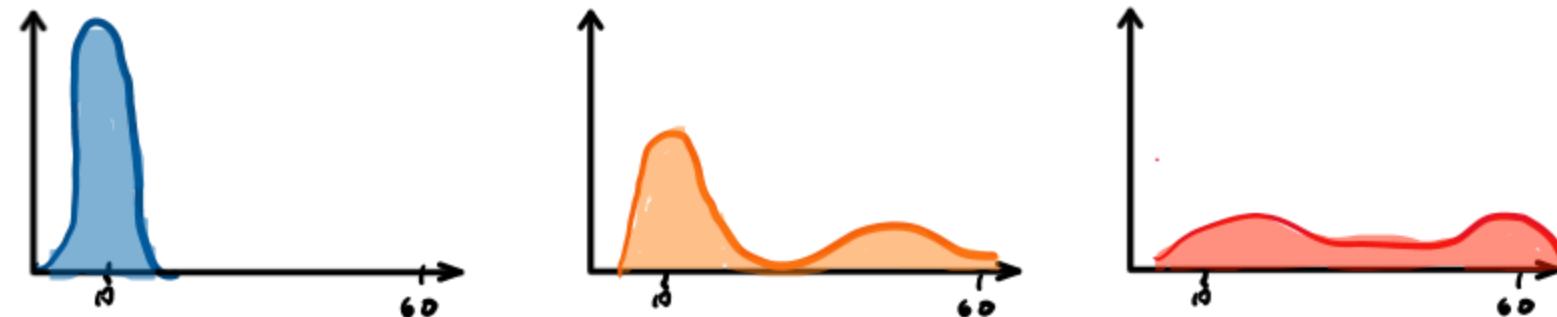
hoped would happen:



thought might happen:



Is actually happening:



Temperature:

0

.35

1



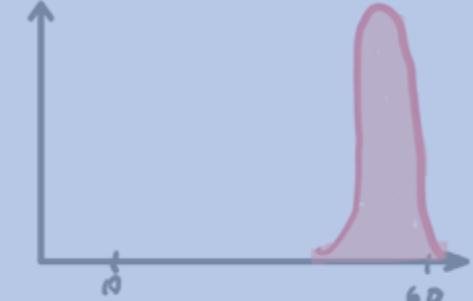
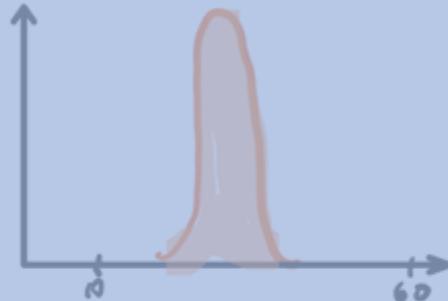
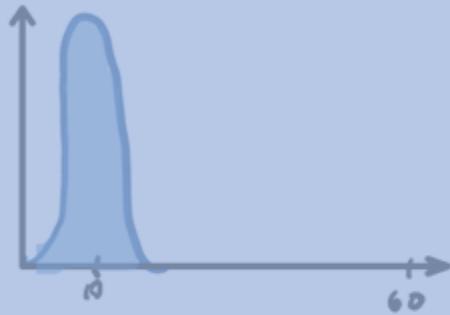
we...

People prompt, AI... laughs

RAND
CORPORATION

would

happen:



thought might

happen:

Thoughts? Questions?

Thank you!

Is actually

happening:

Reach out: vahedi@rand.org ; x5991

GPT help? Reach out: istservicedesk@rand.org