Explain Like I'm Not a Scientist

An exploration of (not so) scientific communication

Who's ever heard that…

- taking ibuprofen makes covid worse?
- vaccines have mercury in them (or at least used to)?
- gay men's brains look more like straight women's brains than like straight men's brains?

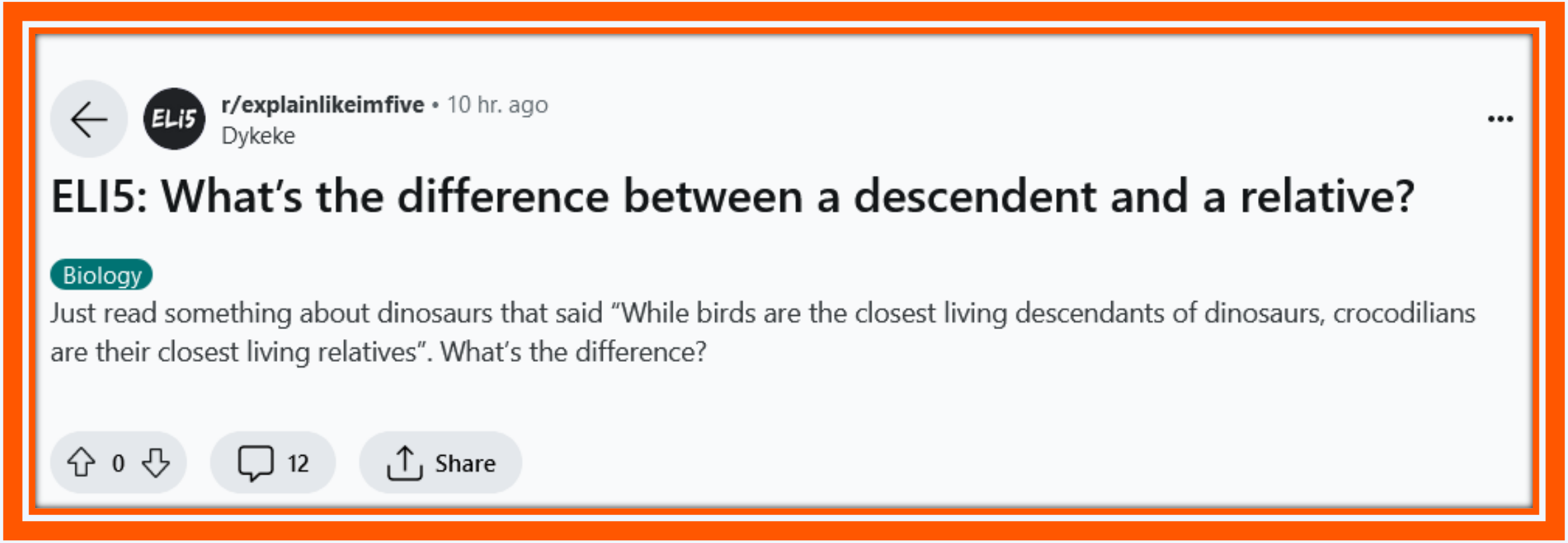
Definition of Scientific Communication

- Presentation of information (in the current project, online)…
- Purporting to provide education or advice based on scientific knowledge (theories, findings, etc.)…
- To a listener (or reader) who is less knowledgeable about the topic
- From a speaker (or writer) whom the listener perceives to be more knowledgeable about the topic.

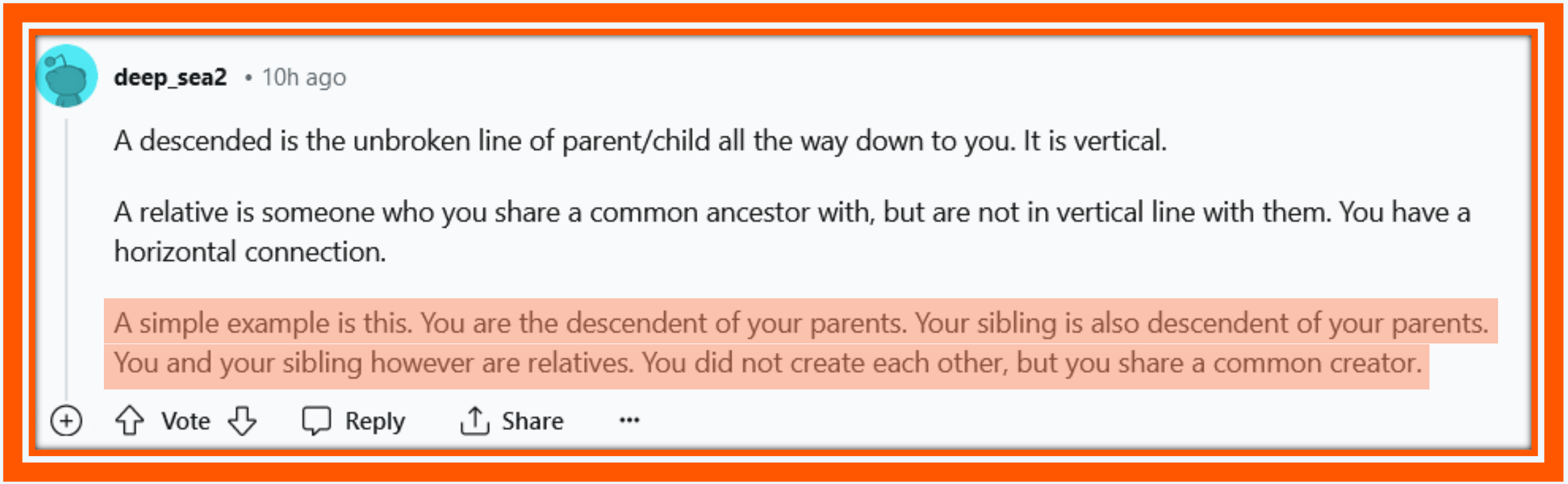
Problem Statement

- Scientific communication is really hard, but also really important. Improving it would serve everyone.
- I aim to establish that r/explainlikeim5 and r/AskPhysics are good models of scientific communication, and that r/explainlikeim5 can offer insight into doing it well.
- Success condition:
  - classify 80% or more of the documents correctly
  - Minimize variance

Example Scientific ELI 5 Post



Example Scientific ELI 5 Comment



deep_sea2 • 10h ago

A descended is the unbroken line of parent/child all the way down to you. It is vertical.

A relative is someone who you share a common ancestor with, but are not in vertical line with them. You have a horizontal connection.

A simple example is this. You are the descendent of your parents. Your sibling is also descendent of your parents. You and your sibling however are relatives. You did not create each other, but you share a common creator.

Vote Reply Share ...

Example AskPhysics Post

r/AskPhysics • 18 hr. ago
heavybootsoflead

Where spacetime is expanding, the increasing acceleration increases gravity. How does gravity “increase” if it is “constant”?

I know nothing about physics. When I heard that gravity is equal to acceleration I thought of the time I was told the universe was expanding and accelerating. So, that would make gravity accelerate. I can’t picture how the state of gravity could increase and yet be a “constant.”

I apologize if this is a dumb question, I am just curious to know more.

Example AskPhysics Comment (Partial)

You probably heard people talking about the gravitational constant, which is a quantity in Newtonian gravity and general relativity that sets a scale for the effects of gravity. For instance, in Newtonian gravity, the magnitude of the force of gravitational attraction between two point bodies—one with mass M and one with mass m—is GMm/r^2, where G is the gravitational constant, and r is the distance between the bodies. The effects of gravity themselves are not constant (as you would see if you were in deep space), but G is constant.

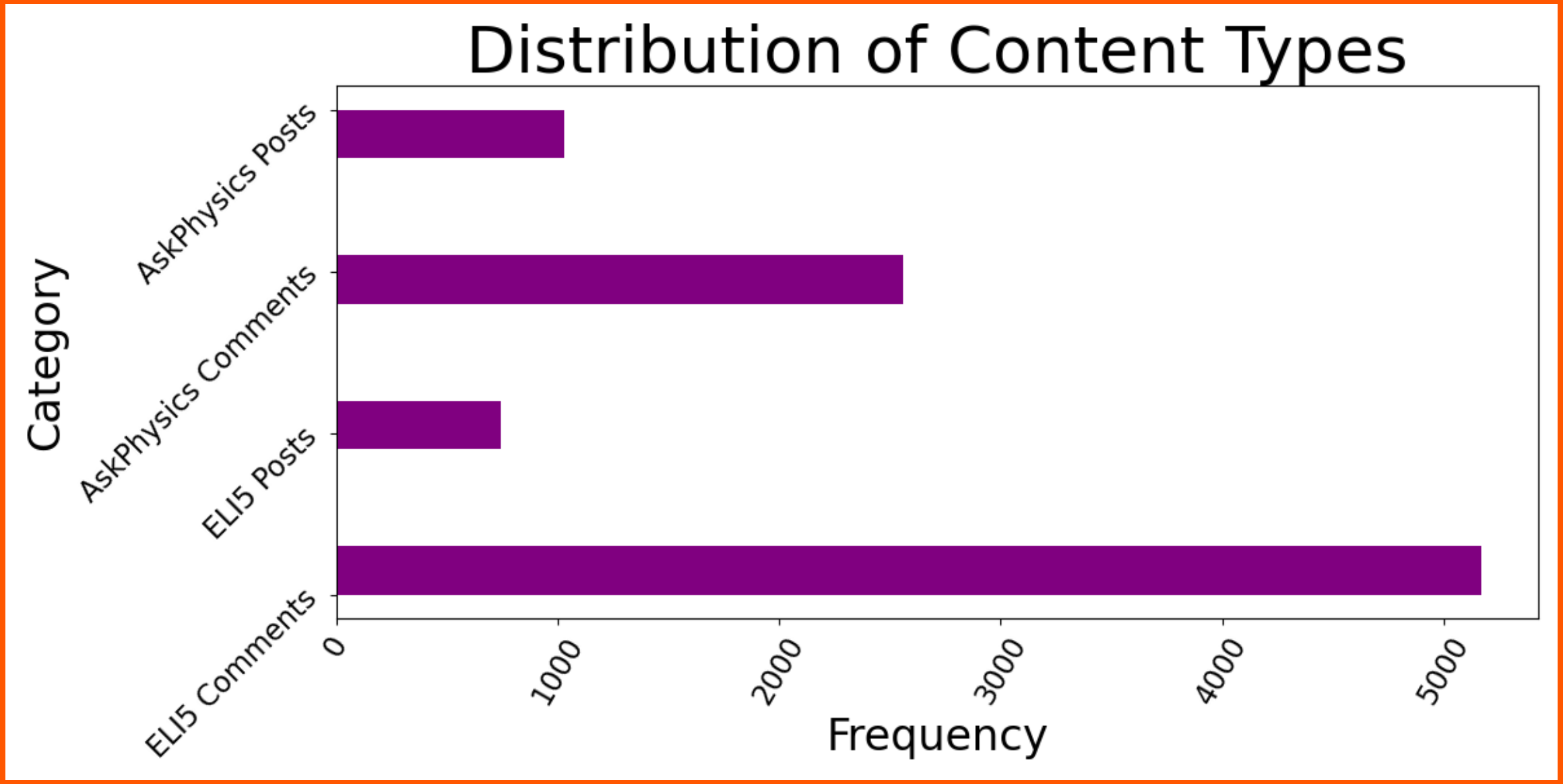
[...]

> I apologize if this is a dumb question

There is no need to apologize, and I would not call the question "dumb." There is absolutely nothing stupid about seeking clarifications about your understanding of physics.

Method

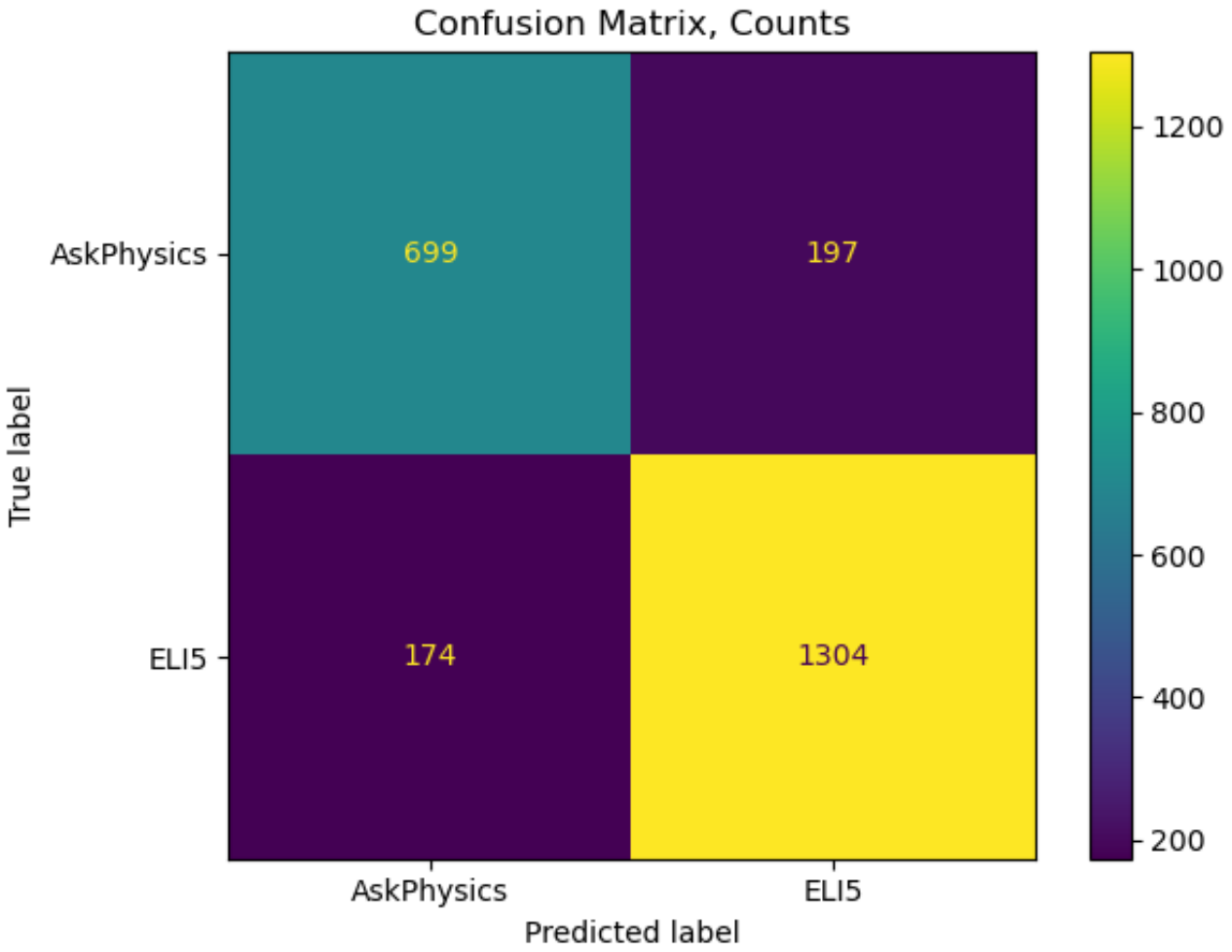
- Apparatus: Reddit API, Python, relevant modules
- Scrape text from r/explainlikeimfive and r/AskPhysics
  - Titles, posts, and comments
  - Subreddits chosen for their applicability and activity
- Data cleaning, feature engineering
- Classification modeling based on word frequencies
  - Logistic regression, Multinomial naïve Bayes

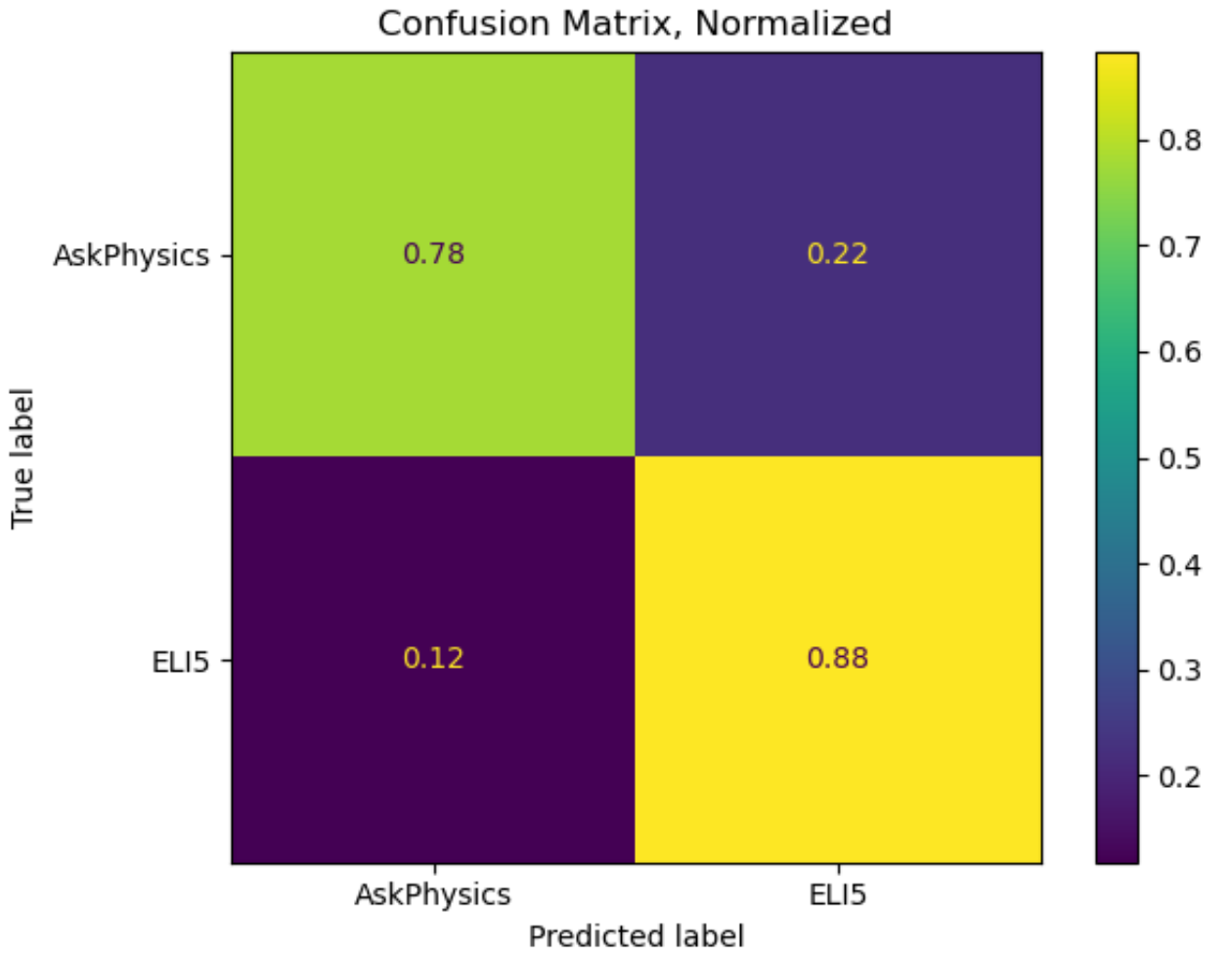

Distribution of Content Types
Category
AskPhysics Posts
AskPhysics Comments
ELI5 Posts
ELI5 Comments
0
1000
2000
3000
4000
5000
Frequency

Results

- Bayes won the first round of gridsearching.
  - Correctly classified 84% of observations.
  - Generalized well to unseen data. (variance < 0.0006)
  - Used 1000 features: individual words appearing in more than 2 documents but less than 75%.
- The second round of gridsearching modestly improved accuracy, but also increased variance.
- I adopted the first Bayes model.

Confusion Matrices





Conclusion

- bleg

Recommendations

Now

Future

Thank you!

I will now take questions.