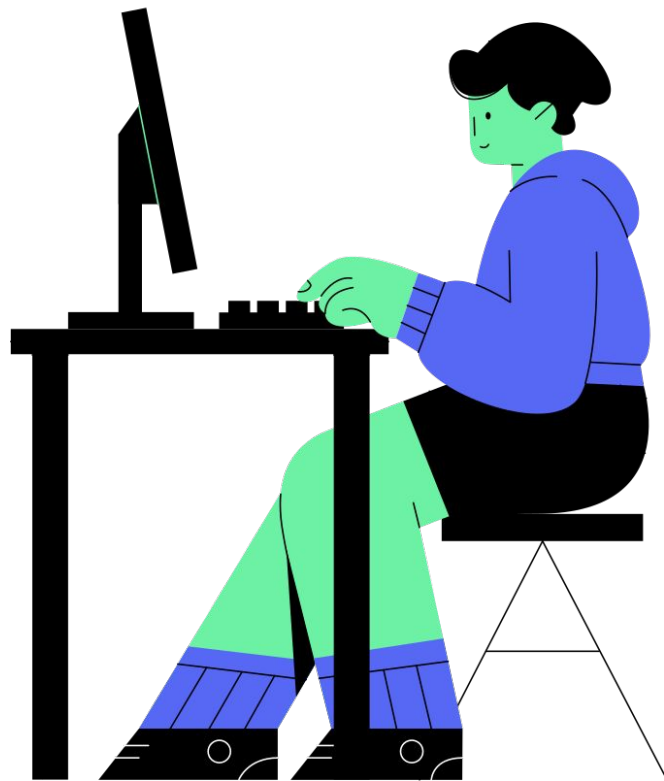


ALT TEXT FOR ALL

How deep learning can improve
accessibility on Twitter

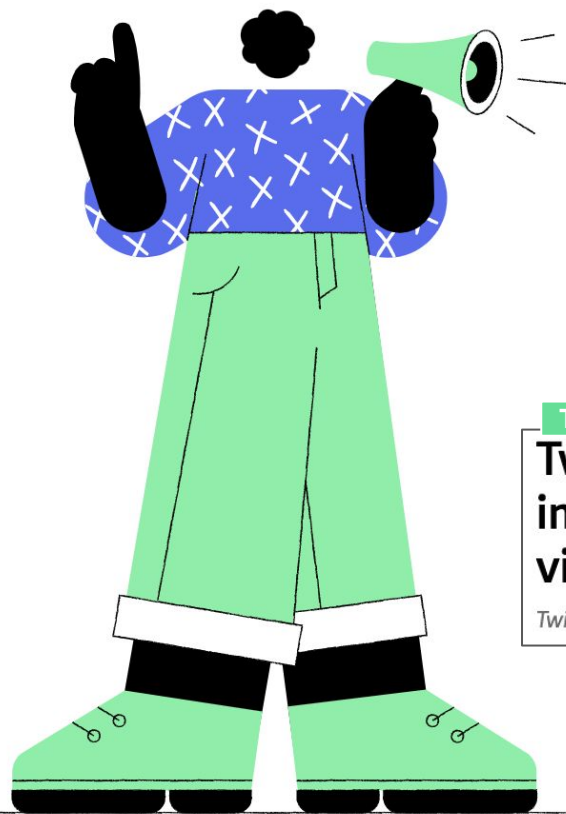


WHAT IS ALT TEXT & WHY DOES IT MATTER?

- Alternative text is a textual description of rich content (e.g. images) on a webpage.
- It is read by screen readers in place of images allowing the content of the image to be accessible to those with visual or certain cognitive disabilities.
- Adding alternative text for images has been referred to as “the first principle of web accessibility.”

**As social media becomes increasingly prevalent and visual,
making rich content accessible on social media is critical.**

Twitter first released alt text support in 2016, and the announcement was met with great enthusiasm.



TechCrunch

Twitter makes its service more accessible to the visually impaired

Digital Trends

You can now add a description to your Twitter pics to help the visually impaired 'see'

The Verge

Twitter now lets users add image descriptions to help the visually impaired

Twitter's taking new steps to improve image accessibility

SocialMediaToday

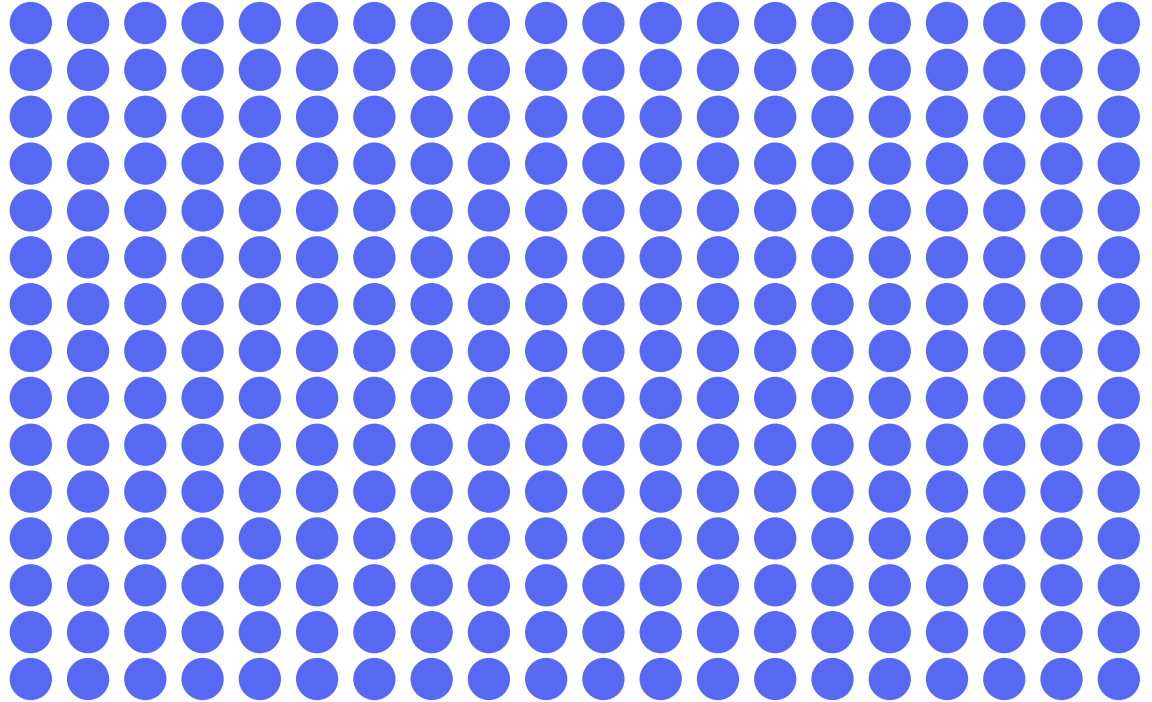
Twitter Adds Alt-Text Image Descriptions to Extend Tweet Accessibility

Vox

Why you should use Twitter's new accessibility feature for blind users — even if you're not blind

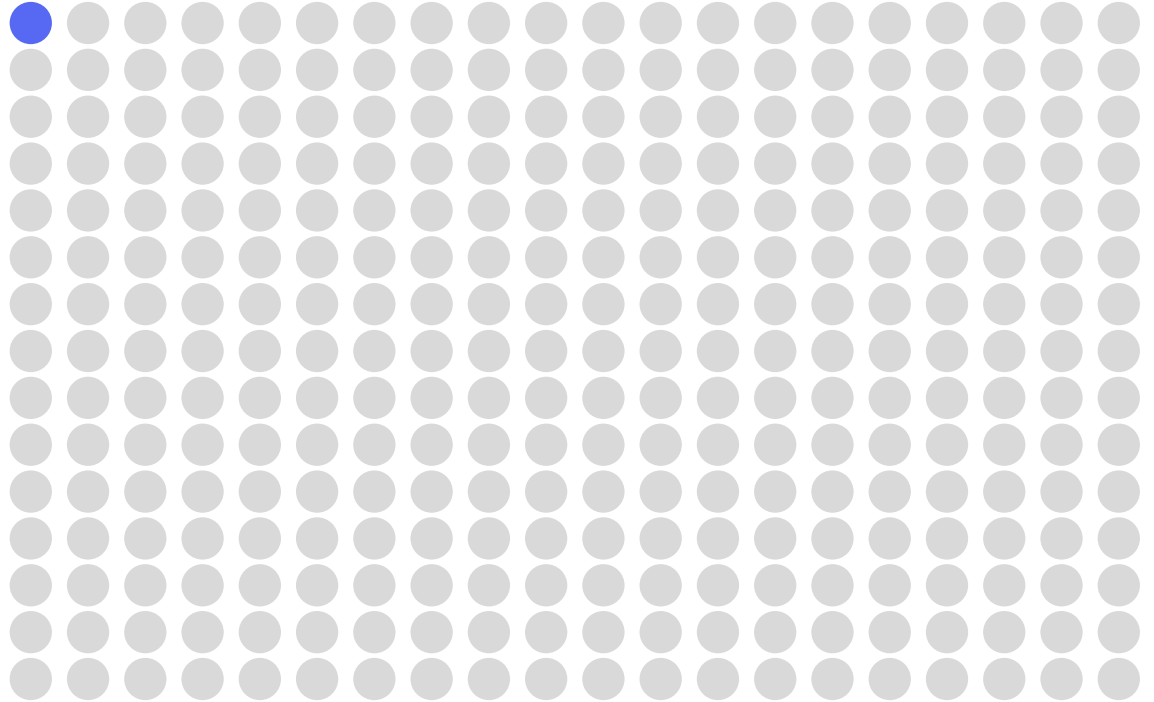
**BUT HAS
ADOPTION
CAUGHT
ON?**

Out of 300 images shared on Twitter, how many would you guess have alt text?



**BUT HAS
ADOPTION
CAUGHT
ON?**

Only 1 in 300 images shared on twitter has
user-provided alt text.



Why aren't twitter users adopting the alt text feature?

Don't
know what
alt text is

Don't
know the
feature
exists

Forget to
add when
sharing
images

Too time
consuming

Uncertain
what to
write

Don't care
about
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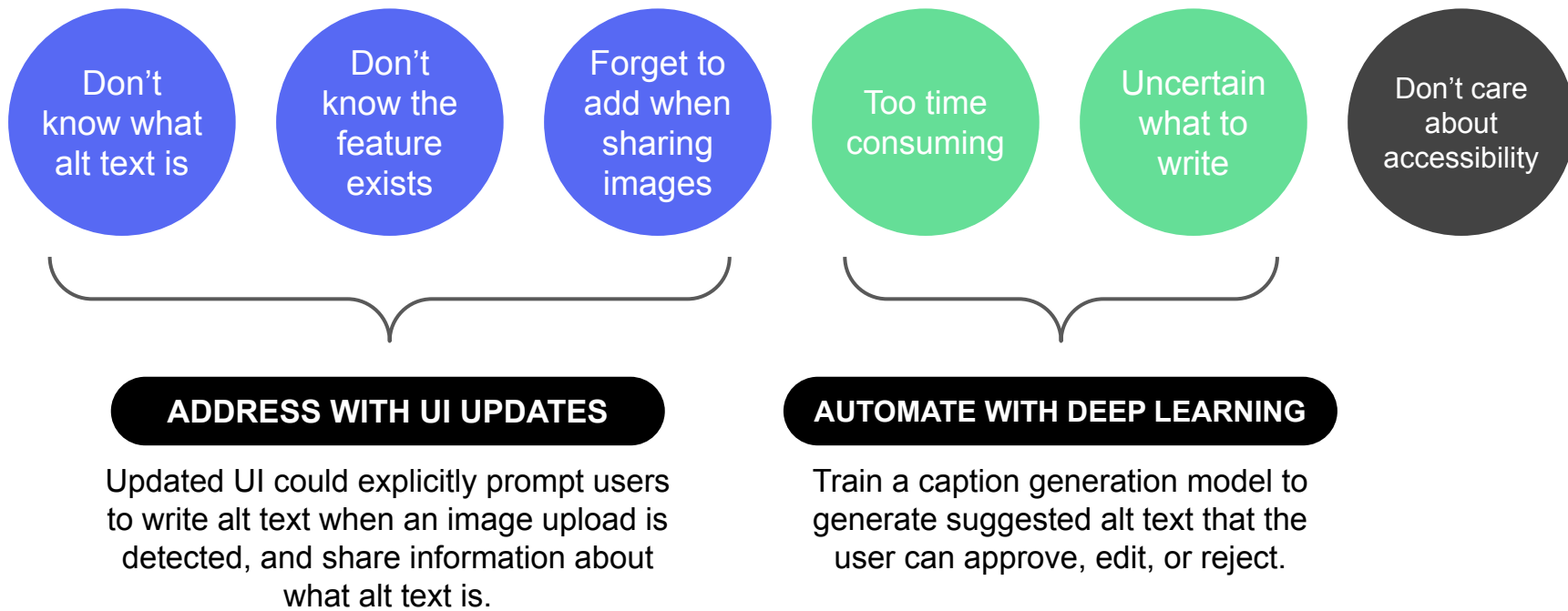
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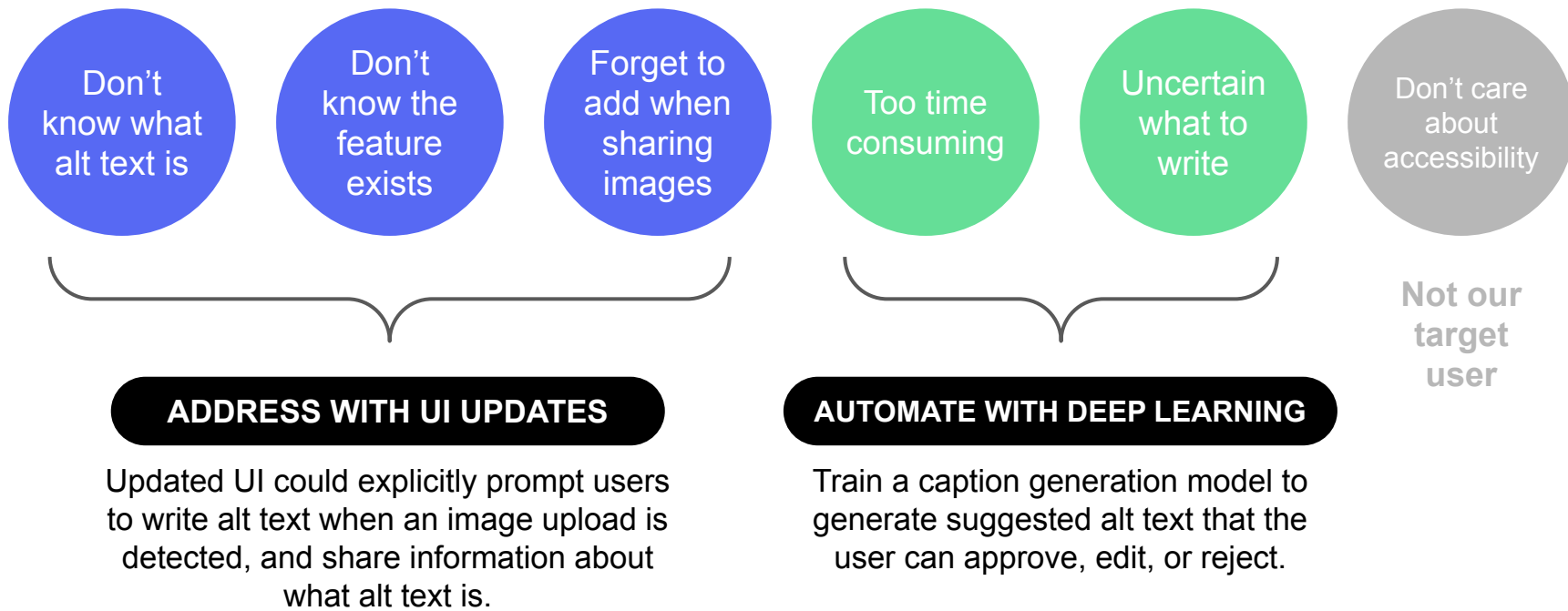
ADDRESS WITH UI UPDATES

Updated UI could explicitly prompt users to write alt text when an image upload is detected, and share information about what alt text is.

Why aren't twitter users adopting the alt text feature?



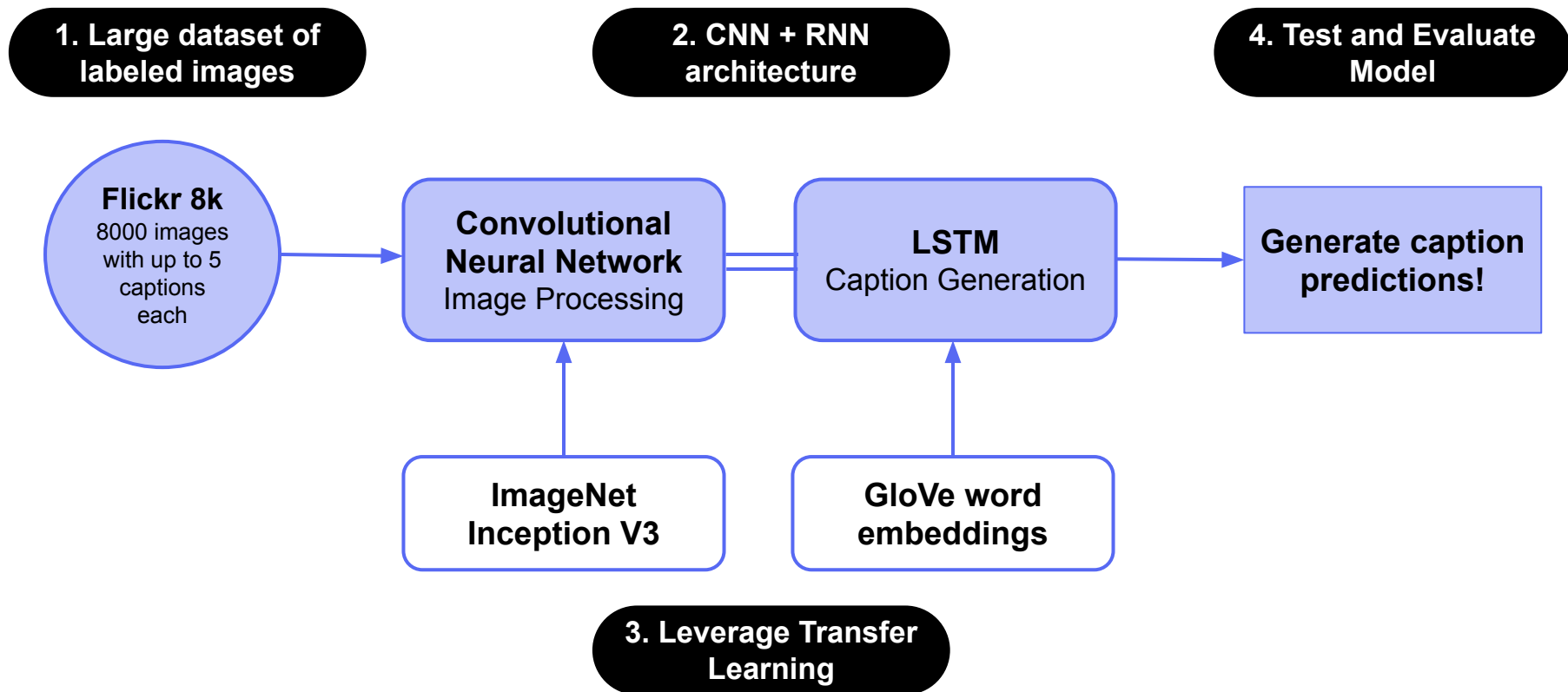
Why aren't twitter users adopting the alt text feature?



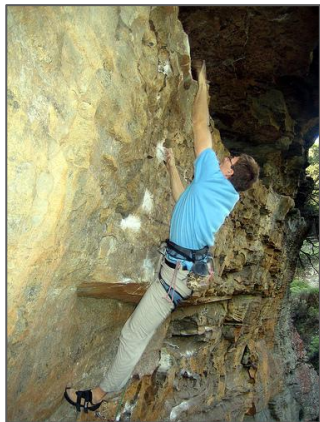
BUILDING AN ALT TEXT GENERATION MODEL



Modeling Workflow



Model Performance on Flickr Test Set



Actual
Caption

man in blue rock
climbing



small white dog is running
across grassy field



man wearing black shirt
standing in front of red brick
wall



two people sit on large
rock near city street

Predicted
Caption

man climbing
rock wall

white dog with brown spots is
running through the grass

man in black shirt and tie is
standing in front of store

man in black shirt and
jeans is walking past
houses

Caption
Rating

GOOD

GOOD

FAIR

POOR

Model Performance on Twitter Images



Actual
Caption

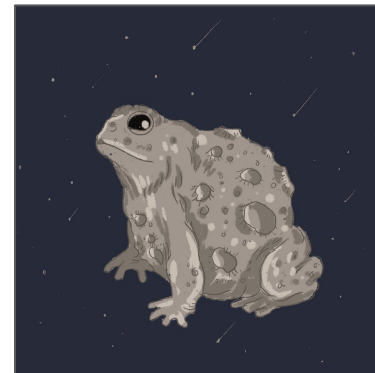
A husky puppy
snuggles with a
kitten.



A sweater with Dolly Parton
dressed as Santa, captioned
"tis the season to be Dolly"



My weird avatar standing by
some mint green virtual armchairs



digital drawing of a toad, its
skin made to look like the
surface of the moon (stylized)
on a starry background photo

Predicted
Caption

two dogs are
playing in the
snow

woman with curly hair is
holding violin and smiling

man in blue shirt is standing in
front of building with his arms
crossed

white dog is playing
with multicolored stuffed
animal

Caption
Rating

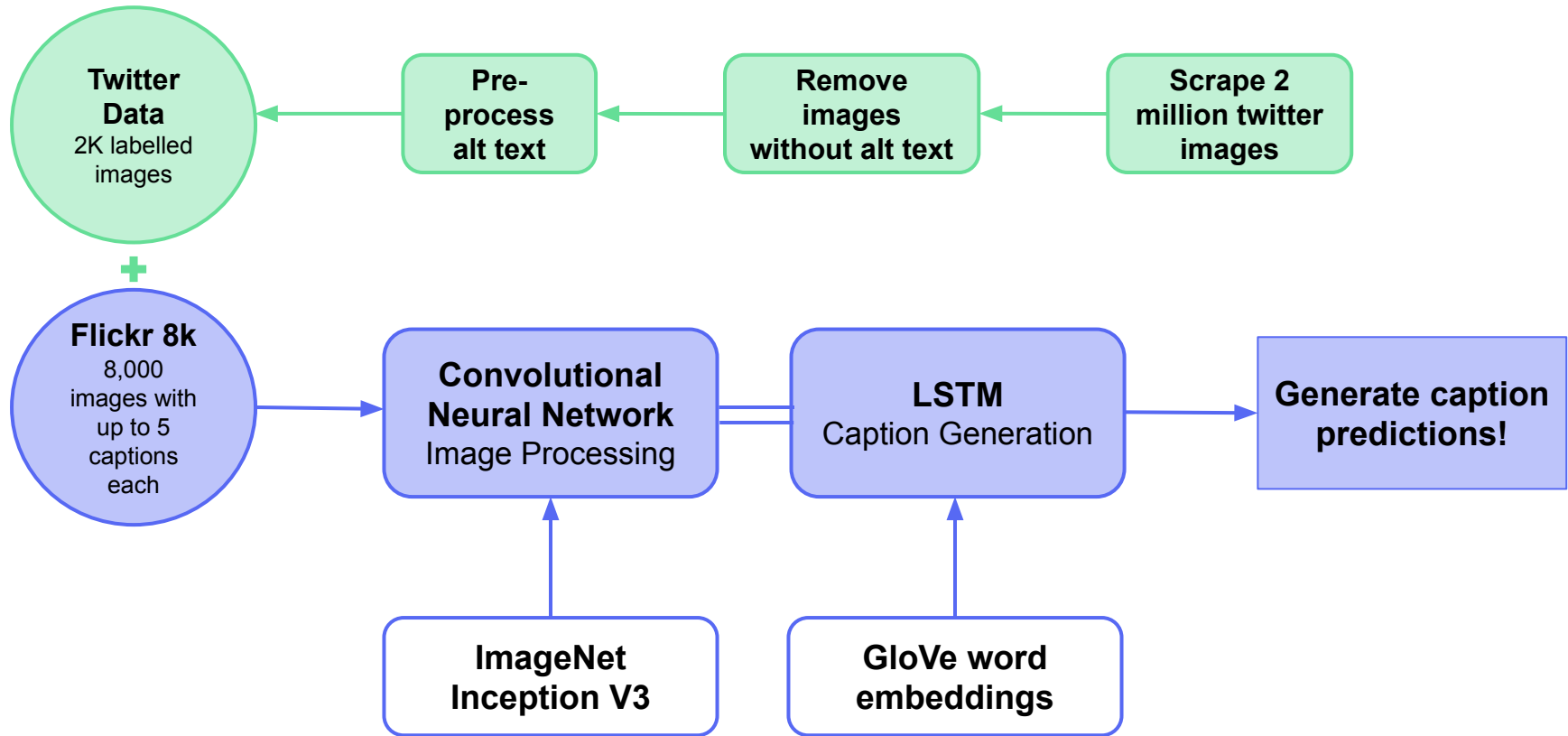
FAIR

POOR

POOR

POOR

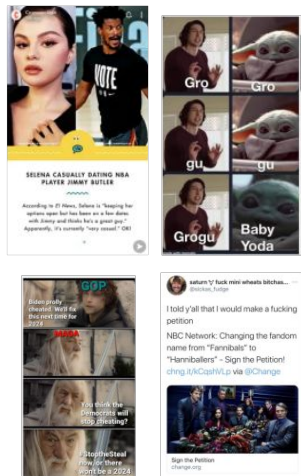
Adding Twitter Data to Training Set



Result: Twitter images too varied to be represented adequately in the small sample.

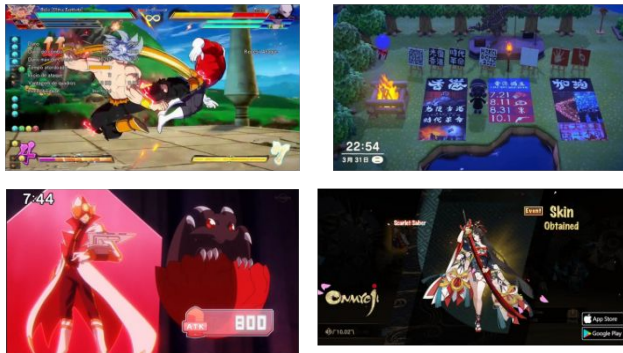
What kinds of non-photographic images are common on Twitter?

Text Screenscaps & Memes



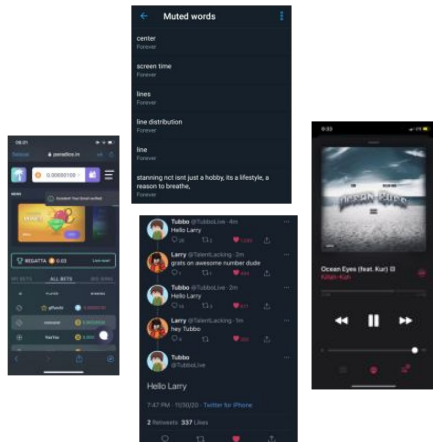
Clusters 16, 19

Computer games



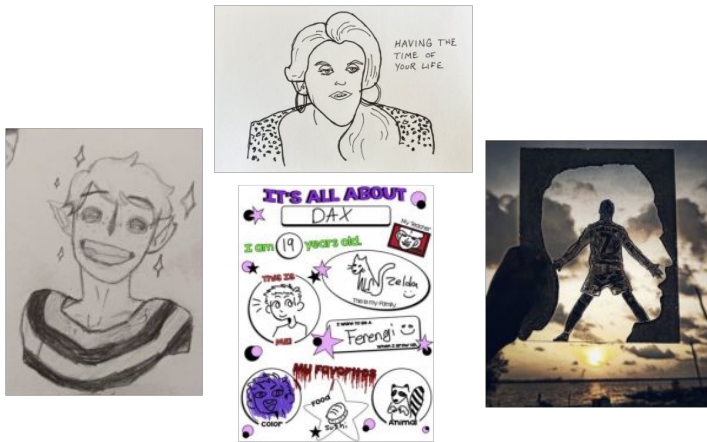
Clusters 9, 12

Dark Mode Screenscaps



Clusters 2, 11

Art

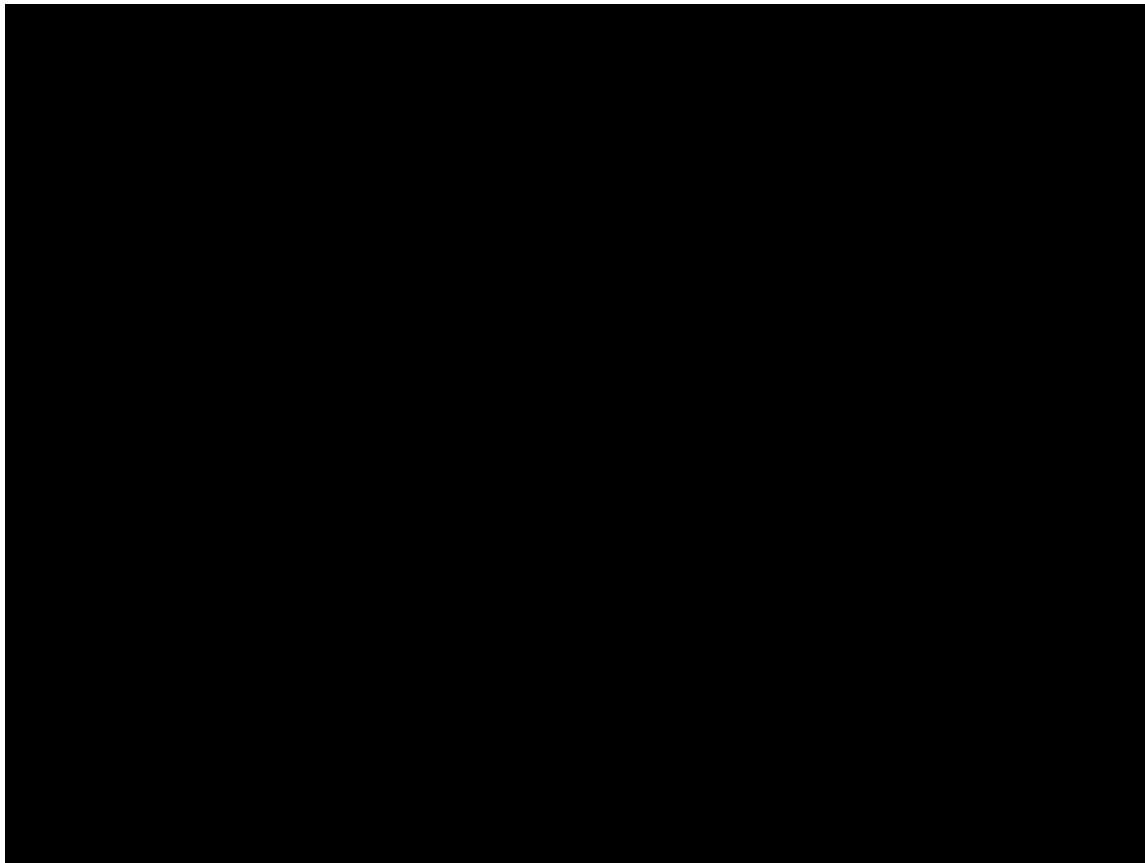


Cluster 7



NUDGING USERS TO ADD ALT TEXT

Proof of Concept: Chrome Browser Extension



CONCLUSIONS

DEEP LEARNING IS MOVING FAST

Image captioning models have made tremendous progress in just the past six years¹ with the growing accessibility of deep learning.

OPPORTUNITY FOR SOCIAL MEDIA PLATFORMS

While creating big datasets for deep learning is typically difficult, social media platforms have massive extant datasets of user-labeled images.

DESIGN NEEDS TO PRIORITIZE ACCESSIBILITY

The most significant barrier to alt text adoption is actually a lack of awareness of the feature. Accessibility features need to be prominent within the user experience.



**THANK
YOU!**

A MODEL IS ONLY AS GOOD AS THE DATA IT LEARNS FROM

Classic Image Caption Datasets

- Flickr datasets: mainly human and animal photographs labelled by MTurk workers
- Microsoft COCO: photographs spanning 91 object categories “easily recognizable by a 4 year old” labelled by MTurk workers

→ **Photographs, expensive to label**

Twitter Images

- A much broader and more diverse domain of images
- Despite low alt text adoption rate, still massive dataset of user-labeled images

→ **Diverse images, freely labeled**

Topic Modeling

- Images of text:
 - Spotify wrapped screenshots (+other screenshots)
 - Book covers
- Image categories:
 - Christmas
 - Selfies
- Was also helpful in identifying “junk” alt text, i.e. auto-generated, not helpful