

Towards Understanding Climate Change Perceptions

A Social Media Dataset

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Contribution

- Insight into climate change communication on Twitter.
- Increased effectiveness of climate change communication, public engagement, and climate change education.
- Challenging image classification datasets comprising real-world climate change images.

ClimateCT

- Images tweeted 01/01/2019 - 12/31/2022 in combination with the hashtag **#climatechange** or the keywords **climate change** or **climatechange**.
- Manual annotations by two independent scholars for over 1,000 images.
- Annotations describe image type, its setting, animals displayed, climate change consequences contained, and climate change related actions.

ClimateTV

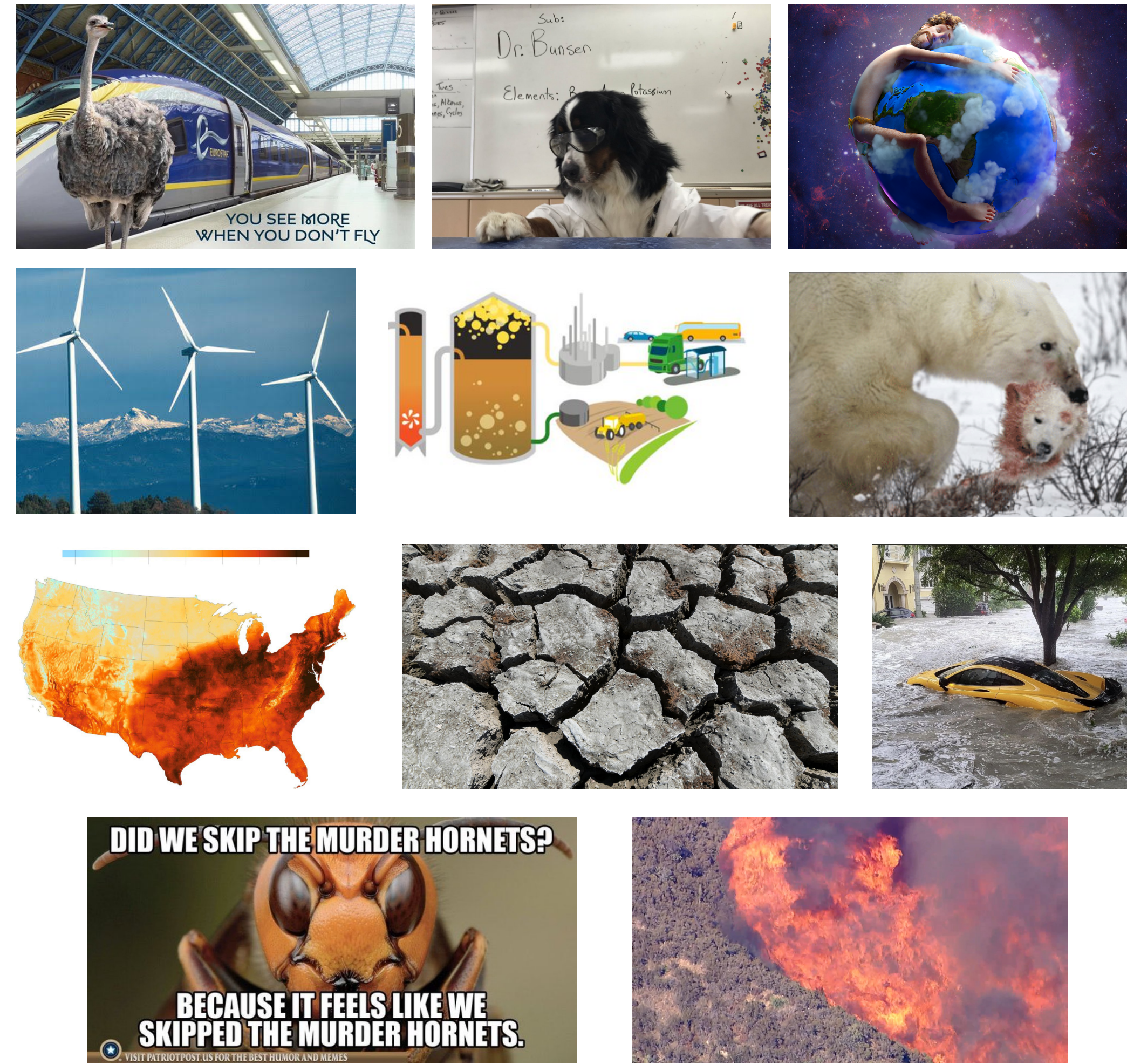
- Images tweeted 01/01/2019 - 12/31/2019 in combination with the hashtag **#climatechange** or the keywords **climate change** or **climatechange**.
- Hashtag-based annotations for 700,000 images based on SONAR embeddings [1].
- Annotations describe image type, its setting, animals displayed, climate change consequences contained, and climate change related actions.

Climate Change Classes

Super-class	Classes
Animals	Pets, Farm animals, Polar bear, Land mammal, Sea mammal, Fish, Amphibian / Reptile, Insects, Birds, Other animals
Climate Action	Protest, Politics, Sustainable energy, Fossil energy, Other climate action
Consequences	Biodiversity loss, Covid / Health, Drought, Floods, Wildfires, Other extreme weather, Melting ice, Sea level rise, Rising temperature, Human rights, Economic consequences, Other consequences
Setting	Residential / Commercial, Industrial, Agricultural, Indoor space, Arctic / Antarctic, Ocean / coastal, Desert, Forest / Jungle, Other nature, Outer space, Other setting
Type	Photo, Photo Collage, Illustration, Meme, Data Visualization, Screenshot, Infographic, Poster / Event invitation, Other type

Table 1: Climate change annotations describing five characteristics of each image.

Examples



Baseline Classification Results

Dataset	ClimateCT	ClimateCT	ClimateTV
Model	CLIP [2]	CoCoOp [3]	CoCoOp [3]
	Acc.	Acc.	Acc.
Total	40.51	71.12	33.06
Biodiversity loss	50.00	77.16	36.76
Covid / general health	0.00	56.68	37.20
Drought	29.17	78.98	23.80
Floods	66.67	86.64	34.68
Wildfires	95.24	83.72	41.78
Other extreme weather	55.33	87.50	17.38
Melting ice	66.67	80.00	61.64
Sea level rise	44.74	66.64	26.78
Rising temperature	64.00	98.00	27.64
Human rights	75.00	88.76	43.14
Economic consequences	50.00	51.44	27.02
Other consequences	15.25	n/a	n/a

Table 2: Climate Change Consequences evaluated using CLIP [2] and CoCoOp [3] on both *ClimateCT* and *ClimateTV* struggle most with abstract classes.

References

[1] Paul-Ambroise Duquenne, Holger Schwenk, and Benoit Sagot. Sonar: Sentence-level multimodal and language-agnostic representations. arXiv preprint arXiv:2308.11466, 2023.

[2] Alec Radford, Jong Wook Kim, Chris Hallacy, Aditya Ramesh, Gabriel Goh, Sandhini Agarwal, Girish Sastry, Amanda Askell, Pamela Mishkin, Jack Clark, Gretchen Krueger, and Ilya Sutskever. Learning transferable visual models from natural language supervision, 2021.

[3] Kaiyang Zhou, Jingkan Yang, Chen Change Loy, and Ziwel Liu. Conditional prompt learning for vision-language models. In IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2022.