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Start with project background

- The annual average number of extreme weather events has more than doubled globally since 1980.
- These events can have devastating impacts on communities around the globe, but the diversity of people's experiences of them are difficult to capture and communicate.
- Thus, it is imperative to develop and refine approaches for responding to extreme weather events that draw upon all available tools.

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- Our team at DSSG Solve for Good is working in partnership with the International Water Management Institute towards a shared goal in mind - to better understand the impacts of extreme weather events using a data-driven approach.

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- Identify and better understand the experiences and needs of vulnerable communities affected by natural disasters using social media.
- Through our goal we hope to be able to derive actionable insights and supplement on-the-ground efforts and help inform critical decision- and policy-making processes.

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Walk through the timeline

- For the initial phase, we focus on a recent extreme weather event - Cyclone Amphan, which affected 18 million people in May 2020.
- On 18th May, India Meteorological Department issued a warning suggesting Cyclone Amphan may rapidly intensify into a Super Cyclone. Consequently, around 700,000 people were evacuated in Bengal and Odisha.
- On May 20th, Amphan made landfall in West Bengal with wind speeds gusting up to 250 km/h. Amphan was the first super cyclone to form in the Bay of Bengal since 1999.
- Amphan was the most damaging storm in the history of the Indian Ocean, claiming over 100 lives, causing over \$13 billion in damages and affecting 18 million people along the way.
- On 22nd May, Prime Minister Narendra Modi conducted an aerial survey over Kolkata and announced a relief package worth \$200 million. Over 40 National Disaster Response Force teams were deployed to assist with the relief efforts.

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- Following every disaster, there are stories - some *known* and some *unknown*!
- We aim to address the question: Given large volumes of social media content, is it possible to identify unmet needs of people affected by Cyclone Amphan?
- Following that, we aim to characterize people's personal experiences and answer the questions: Who and what is shaping the dominant narratives and who is being marginalized?

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We extracted around 470 thousand tweets through the official Twitter API. We targeted tweets from May 1st, 2020 to June 15th, 2020, covering the build-up through the aftermath of Cyclone Amphan. We targeted posts mainly in English, Odia, Hindi and Bengali, although some tweets in other languages were extracted as well. We did some basic preprocessing on the tweets, such as translating them. Finally, we captured the sentiment of each tweet.

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Among other analyses, we carried out a point of view analysis, which was critical to understand through the first person who was affected by cyclone Amphan. More importantly, we are designing this analysis to be applied to any catastrophe.

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Although this is still a work in progress, we're having some promising results. We were already able to identify distinct user communities and their influencers based on speech type and some of the most dominant topics. We also found interesting sentiment variations according to the topic. For example, "housing", "farm", "complaint" and "poverty" are some of the topics with the most negative mean sentiment score. When we took the negative tweets associated with the label "housing", we found a number of tweets associated with Kolkata, in India, referring to destroyed homes, poor housing conditions and repairment delays.

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We are now at the stage of tuning our models and combining these analyses. Once we do so, we expect to be able to paint a better picture of the needs and experiences related to cyclone Amphan and make this work transferrable for future natural disasters. We are focusing on empowering any public or non-profit organization with the ability to quickly understand who the influential users are, identify the most affected communities and finally

identify, prioritize and locate calls for help as well as home damage and destruction. These results will allow organizations to anticipate needs assessments and develop early warning systems to respond faster to a given catastrophe to assist on the ground efforts and attend to needs of the affected individuals.

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Thank you, and see you soon! If you're interested in more details, be sure to check out the preprint we recently released on [arXiv](#).