Peer Review Framework for Predictive Analytics in Humanitarian Response

MODEL REPORT:
Conflict Alert System

ACLED

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OCHA CENTRE FOR HUMANITARIAN DATA

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1. Background

This document summarizes the documentation and findings of the peer review of the global Conflict Alert System (CAST) that has been developed by Armed Conflict Location and Event Data (ACLED). CAST is a global prediction tool that forecasts the number of political violence events that will occur each month, for the next six months, in every country around the world. Specifically, the output of the tool is the predictions of the number of ACLED events such as 'battles', 'explosions/remote violence', and 'violence against civilians' at the country and subnational first administrative division (i.e. province) level, in addition to an overall global forecast.

The review was completed in August 2024.

2. Main Findings and Recommendations

You can find all the documentation regarding the model, its application and the review process at the following links:

- The Model Card describes version 1.0 of the model and was completed in March 2023.
- The Model Evaluation Matrix was completed in September 2023 by an expert in modeling applications in the humanitarian and development sectors.
- The Implementation Plan was completed in November 2023. It summarizes the concrete actions that the model will trigger or inform.
- The Ethical Matrix aims to identify all stakeholders and potential issues regarding the intended use of the model. The Ethical Matrix was completed in February 2024 by Megan McLaughlin, global health and development expert.

A summary of the main findings and recommendations is provided below.

2.1 Technical Review

Below are the key recommendations from the technical review and ACLED's intended response.

Intended Use

While ACLED CAST was not developed for one specific use case, there is a general risk that historical forecast errors and current forecast uncertainties are not clearly highlighted to end users, who may place higher than recommended confidence in forecasted point estimates. ACLED has conducted a full review of accuracy and uncertainty after CAST's initial release and plans to incorporate historical errors alongside each prediction in both the API and Excel file in line with these recommendations.

Model Development and Documentation

ACLED models are trained at the subnational level separately for each country, with temporal weights on historical data set globally. Based on the review, ACLED is testing how training models on country groupings, potentially based on geography, historical conflict patterns, or socioeconomic conditions, might improve results. Temporal weight hypertuning to each country during the cross-validation process will try to approximate optimal weights without optimizing across all administrative units.

Model Evaluation

The outputs of the model are well-explained with accuracy and other performance metrics shared publicly, but the model does not reliably forecast conflict onset or escalation as forecasts are primarily driven by historical conflict data, a weakness common across conflict forecasting models. To potentially address this issue, ACLED is exploring potential additional features to capture political discourse and sentiment at the country level and the input of expert judgment into their modeling pipeline.

Operational Readiness

Because of all of the above issues, care should be taken when applying ACLED CAST forecasts in operational contexts. ACLED walks users through when and where forecasts are likely to be reliable for their particular use case to ensure responsible use of the model.

2.2 Ethical Review

Issues

The following issues were identified as having a high likelihood of occurring.

Inaccuracy

Model inaccuracy, such as false negatives (failing to forecast violent events) or false positives (forecasting violent events that do not materialize) carry risks to users of the forecast and affected populations. Depending on the operationalization of the model, aid may fail to reach populations in a timely fashion in the case of a false negative, or aid may be misallocated to

areas where conflict doesn't occur in the case of a false positive. ACLED should work to ensure end users of the model are clear on its limitations and potential risks prior to operationalization.

Inaction

As the model is not tied to any specific action plan, the risk of inaction based on model outputs is high. It is recommended that the model is implemented alongside other data and analysis to provide a holistic picture for decision making.

Systematic Bias

Only three primary data sets are used to train the model, one of which is collected directly by ACLED. Expanding the source of training data may improve model accuracy, reduce bias, and potentially enable more granular risk analysis.

Stakeholders

Engagement across stakeholders is critical to address the issues above. Working with international and local organizations, senior humanitarian leadership, donors, and any other CAST consumers will ensure ACLED has a clear picture of how CAST is being used by decision makers and an understanding of how to monitor the impact and usefulness of the system.

This same group, particularly those closest to the situation on the ground, can also support identifying and collecting new data that will work to solve many of the technical and ethical recommendations above. ACLED's extensive infrastructure for conflict data collection is uniquely placed to support this. The focus should also extend beyond CAST consumers to affected populations and local communities and leaders themselves to build trust in the model and more localized, timely data sources that can lead to model improvements.

ACLED's Plans

Since the launch of CAST in March 2023, ACLED has conducted 15 live demonstrations and meetings with key stakeholders and users, including with over 40 staff members of the United Nations and 37 staff members of the European Commission. These demonstrations not only highlight the potential uses of CAST, but also expand on its potential limitations and emphasize making use of its Accuracy Metrics section to determine which use cases are appropriate. In addition, they touch on some of the other ACLED products, like Trendfinder and the monthly regional overviews, to demonstrate how CAST should be used in conjunction with the context that these other tools provide, and not necessarily as a stand-alone product. ACLED plans to continue these targeted trainings to make sure the operationalization of the model fits within the ethical concerns brought up by this review.

Feedback

The Centre invites individuals and organizations working in the humanitarian, academic, research and private sector to engage with us on the peer review process. Please send feedback on the Framework to centrehumdata@un.org.