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# Visual analytical approaches to evaluating uncertainty and bias in crowdsourced crisis information

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To what degree are uncertainty and bias found in public collections of incident reports gathered during crisis events?

How are the incident reports gathered?

Report incident  
Heterogeneous sources

Review incident reports  
Approve and validate

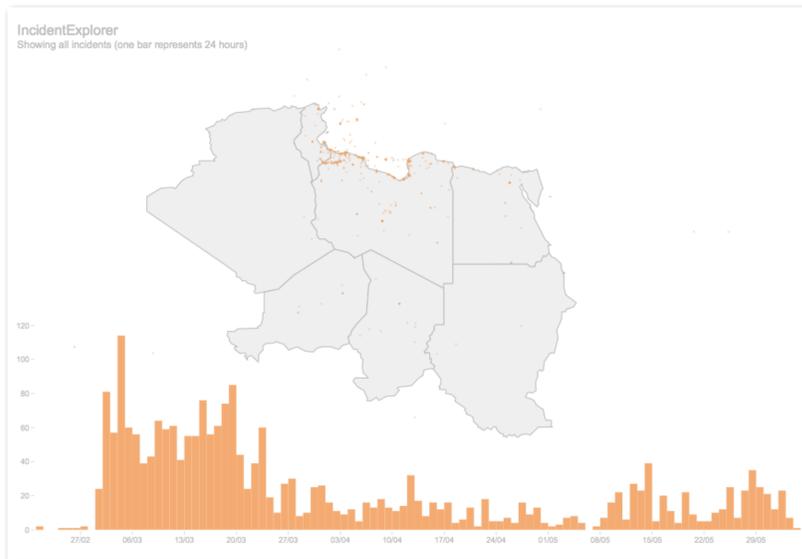
Publish incident reports  
Spatial, temporal, and thematic attributes

Uncertainty [1]  
Accuracy/error  
Precision  
Completeness  
Lineage  
Consistency  
Currency  
Subjectivity  
Interrelatedness  
Credibility

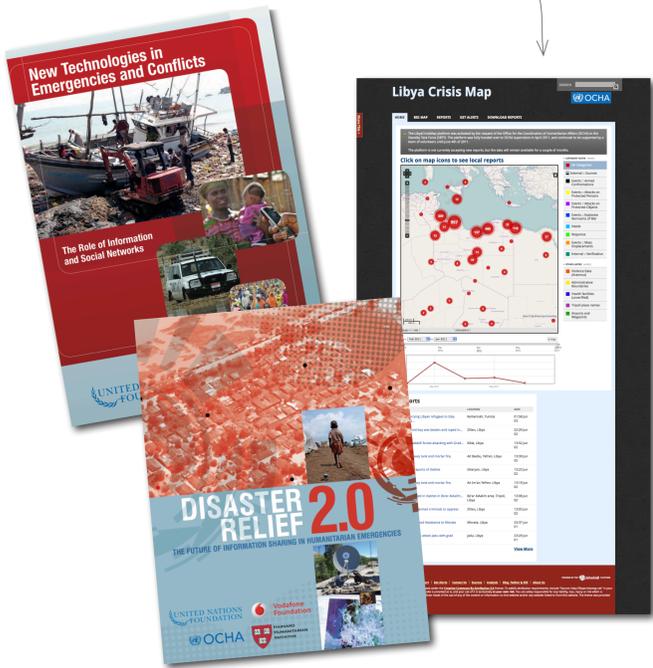
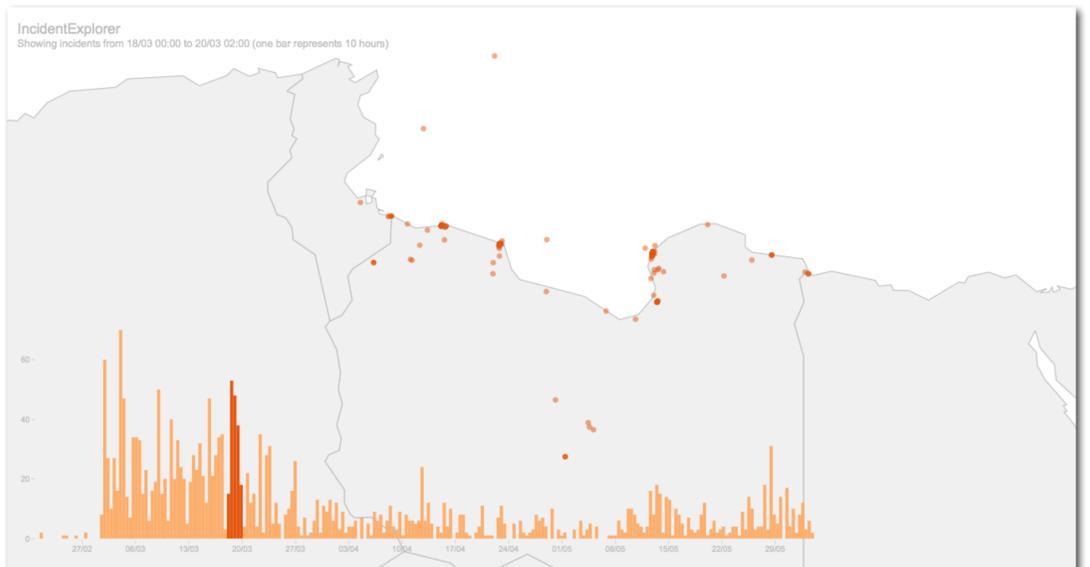
The current research focus

Bias [2]  
Systematic error

Well researched, and supported by platforms such as Ushahidi



What happens next?



**Hypothesis 1**  
There is systematic variation in the spatial accuracy of coordinate pairs in space and time.

Geocode location strings.  
Determine associated uncertainty.  
Compare to coordinate pairs.

**Hypothesis 2**  
Coordinate pairs cluster around systematic points.

Density-based and distance-based point pattern analysis.  
Investigate spatial statistical analysis?

**Hypothesis 3**  
There is systematic variation in the spatial precision of location strings in time.

Classify location strings by relative spatial precision.  
Explore scale dependencies?

## References

[1] A. M. MacEachren et al., "Visualizing Geospatial Information Uncertainty: What We Know and What We Need to Know," *Cartography and Geographic Information Science*, vol. 32, no. 3, pp. 139-160, 2005.

[2] H. Veregin, "Data quality parameters," in *Geographical Information Systems, Principles and Technical Issues*, 2nd ed., vol. 1, P. A. Longley, M. F. Goodchild, D. J. Maguire, and D. W. Rhind, Eds. Chichester, United Kingdom: John Wiley and Sons, 1999, pp. 177-189.

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