

INVESTIGATING INFORMATION DYNAMICS FROM EVENTS IN THE AFGHAN WAR 2004-2009

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In this work we analyze a war log in Afghanistan, made public after the Wikileaks case, in order to find dependencies among war events occurring in several regions of the middle-east country, using novel approaches for the computation of information transfer and storage in dynamical systems that we recently implemented.

The dataset contains the coordinates (latitude and longitude) and the day of each war event reported in Afghanistan between February 2004 and December 2009, and is described in [1].

The first processing that we performed was a neural network based clustering, in which we employed self organizing maps to cluster these events in 25 regions. Then for each region we obtained a time series of the number of events occurring each day.

The following step was to find directed interactions among these regions, looking at the dynamics of the war events. A first measure that we applied was the partially conditioned Granger causality, as in [2], to find the influence of the dynamics of each region on the dynamics of each other region, conditioned to the presence of the others.

Then we applied the information decomposition described in [3]. In this case we decomposed the information for each variable in stored and transferred information. This latter was further decomposed in information from the selected candidate driver, and information from the rest of the system.

The result is a complex network of interactions open to both dynamical and geopolitical interpretations, that we will be happy to share with you.

[1] A. Zammit-Mangion et al. PNAS **109**, 12414 (2012).

[2] S. Stramaglia et al. New Journal of Physics **16**, 105003 (2014).

[3] L. Faes et al. New Journal of Physics **16**, 105005 (2014).