High Quality Data and Cheaper Compute Enables AI
From Basic Statistics to Deep Learning Automated Knowledge Discovery

- **Statistical Models** (Regression, Power Law, Periodicity)
- **Mechanistic Models** (Logistics, Spreading, Tipping Points, Chaos)
- **Learning Models** (Random Forest, SVM, Deep Learning)

Geospatial, Contextual, Longitudinal Data

High Performance Computing: Cheap and Online

Rapid Emerging Crisis: New States and Transient Armed Groups

GUARD - Global Urban Analytics for Resilient Defence (2017-21) – Prof. Weisi Guo, Prof. Mark Briers, Sir Alan Wilson
AI and Deep Learning Models
Works well for regressive events, not for emerging conflicts

Read more at: “Retool AI to Forecast and Limit Wars,” W. Guo, K. Gleditsch, A. Wilson, Nature, 562, 2018
Our Work Towards Integrating Models
Connects Machine Learning, Statistics, with Logical Models

a) Multi-layer networks (interactions across domains) with nonlinear dynamics (behaviour)

- Settlemen (Node)
  - Inter-stable
dynamics

- Inter-domain relationship (e.g. social cohesion)
- Intra-domain relationship (e.g. strength of political alliance)

- External Perturbations (e.g. climate change)

Changes in one Domain → Cascade Effects in Generative Model → Conflict Risk → Causal Factors Interrogation

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04/06/2020
The Alan Turing Institute
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