

THE ROLE OF ANALYTICS IN DEFENCE ANALYSIS

SARAH ESLER DSTL

The Defence Special Interest Group held a workshop to explore how the Defence O.R. community could exploit any opportunities provided by the categories of Analytics: Descriptive, Predictive, Prescriptive.

The emergence of Analytics has drawn interest from the Defence O.R. community which, for seventy years, has evolved to support changing military requirements. The OR Society's Defence Special Interest Group met on April 10th 2013 at the BAE Systems campus, Farnborough, to discuss what Analytics and Big Data means for Defence O.R. Discussion was primed by two keynote speakers. Jonathan Batson (UK Advanced Analytics and Optimisation Leader, IBM Business Consulting) spoke on IBM's use of Analytics in several industries and Tom McCutcheon (Dstl Fellow) presented on Analytics in open source research. While many factors associated with Big Data are common to O.R., some may apply specifically to Defence O.R. The meeting generally acknowledged overlaps between Big Data, Analytics and O.R., with most commonality between Advanced Analytics and O.R. Several issues emerged in syndicate sessions.

In addition to the '4 Vs' of Volume, Variety, Velocity and Veracity often associated with Big Data, 'Validity' may be a 'V' worth consideration. Validity highlights the need for valid application of models and techniques to a dataset, but also prompts consideration of how valid a dataset is if used to answer specific questions. Validity demonstrates co-dependence between O.R. and Big Data Analytics. O.R. can benefit from Analytics and visualisation techniques to examine datasets in new ways, but Analytics requires O.R.'s problem structuring methods to ensure appropriate questions are asked of data.

Human understanding of context is vital in decision-making. Big Data approaches could be used for areas of routine Defence decision-making, such as automated re-ordering of spare parts by computers monitoring usage of spares from a stockpile. It is hard to imagine automated decision-making applied to combat

decisions. There are parallels to medical decision-making, for example routine re-ordering of supplies versus professionals who diagnose and treat patients. The participants felt that causality is determined by human understanding. Analytics and O.R. demonstrate effects; human interpretation is needed to understand causes of observed trends.

In Defence, data availability is an issue. Some datasets are sensitive and protected; some can be small; analysts may not know that some exist. Defence has many data sources, but these are often in locations geographically and organisationally separate from analysts. This can limit data exploitation.

Businesses often deal with Big Data from sources including loyalty cards and social media which continuously update. Companies who react to such data immediately measure effects and dynamically review their strategies. Effects of Defence decisions may not appear for years - too late to reverse any negative aspects.

As in the early days of Defence O.R., Analytics illustrates the need for multidisciplinary teams to address Big Data questions. Defence employs O.R. professionals, experienced in decision-support, who increasingly work closely with technologists, social scientists and psychologists to gain full understanding of problems. Here lie similarities to systems engineering approaches.

The meeting concluded that the Defence community should start with identifying small case studies to demonstrate where Analytics approaches have proved useful before implementing these approaches. Lessons from successes and failures can improve understanding of Big Data and future exploitation studies.

<OR>

**MAKE SURE YOUR CONTACT DETAILS ARE
UP-TO-DATE**

Contact Carol Smith

carol.smith@theorsociety.com

or go online to www.theorsociety.com

log on and click 'My Contact Details'