



What kind of ‘world order’? An artificial neural networks approach to intensive data mining



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ABSTRACT

In this paper, we present an innovative data processing architecture, the Activation & Competition System (ACS), and show how this methodology allows us to reconstruct in detail some aspects of the fine grained structure of global relationships in the world order perspective, on the basis of a minimal dataset only consisting of the values of five publicly available indicators for 2007 for the 118 countries for which they are jointly available. ACS seems in particular to qualify as a valuable tool for the analysis of inter-country patterns of conflict and alliances, which may prove of special interest in the current situation of global strategic uncertainty in international relations.

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1. Introduction

The global scenario of today is more complex than ever. For the first time in its whole history, the US have recently been involved at the same time in three different war theaters in three different countries (Kurth, 2010), in the company of most other major Western nations, and the geography of conflict has been further escalating since then. The economic and cultural leadership of the West is openly challenged by once emerging countries which, despite what it was boldly claimed not long ago by influential thinkers such as Fukuyama (1992), far from adopting the market democracy ideology as their socio-organizational paradigm, are on the contrary deploying alternative ones, based on their own traditions and schemes of thought. Global networks of alliances and hostilities are becomingly increasingly blurred and deeply layered. In this multi-polar world with its ‘multiple modernities’ (Casanova, 2011), hard to predict discontinuities (van Notten et al., 2005), and collapsed decision-making timing (Comes et al., 2014), the famous and controversial thesis of Huntington (1996) that we are facing a ‘clash of civilizations’ is often read by non-Westerners as a conceptual shorthand, as a reflex of the West’s hard-to-die attitude of thinking that any global narrative that challenges their own is, ipso facto, an oppositional one (Yije, 2010) – and thus ultimately as an instrumental

theoretical construct which has been shaped up to serve specific ideological purposes (Adib-Moghaddam, 2008), and which may be possibly supported only from a Western perspective serving Western interests (Fox, 2001). A common basis for a true dialogue in terms of cultural values is indispensable for future peaceful coexistence (Anthony, 2010), as the persistence of oppositional narratives on the Western side naturally paves the way to dialectic, and often armed counterparts (Aydin and Özen, 2010). Issues of cultural and value diversity at the global scale cannot be eluded any longer, and how they are tackled largely influences actual as well as future scenarios. A clear example of a much debated contribution in this vein is Sørensen (2006), who considers the current world order as transitional, with open-ended future developments whose unfolding basically depends on whether or not less privileged countries and populations will be given a possibility to take part in it more actively, and on fairer terms.

The crucial role of value and cultural systems in this context is that they act as filters that allow a specific cataloging, reading and interpretation of events according to a coherent, meaningful structure, whose inclusionary vs. exclusionary implications in terms of intercultural dialogue largely depend on their testimonials, and on the social support they manage to gather (Levine, 2011). Different systems may imply mutually incoherent and even oppositional renditions of the same events, and possibly feed ‘toxic narratives’ based on stereotypical attributions about the ‘other’ (Ringmar, 2006), and support prolonged, disruptive conflict, especially when combined with situations of poverty, fear and exclusion of either party (Sen, 2008). The approach of Democratic

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Peace Theory (Rummel, 1975–1981; Doyle, 2011; Huth and Allee, 2002) highlights the role of shared democratic values in curbing the escalation and violence of conflict, and in establishing a solid basis for peace. Although the theory has been at the center of lively debate and controversy (Henderson, 2002; Rosato, 2003), and although claims of reverse causality from peace to democracy have been equally supported (James et al., 1999), the role of democratic values and institutions in the construction of a more peaceful world order is hard to deny (Cederman, 2001; Gleditsch, 2002).

In this paper, we develop a methodologically innovative approach, in the spirit of the methodological proposal of Beck et al. (2000), who point out that the complexity of the world order can only be addressed through an entirely novel computational approach with respect to traditional statistical tools. To this purpose, we introduce an innovative artificial neural network tool, the Activation and Competition System (ACS) developed by Buscema (2014), Buscema et al. (2013), Buscema and Sacco (2013), and we apply it to the analysis of the structure of global alliances and conflicts in terms of relative differences in cultural and value orientations that may be publicly observed and measured. The main purpose of this paper is therefore to illustrate how the use of an innovative tool may generate, on the basis of publicly available information, valuable insights that improve our understanding of global world order patterns.

More specifically, as our source of public data we consider a set of socio-cultural indicators linked to market democracy and in particular to Popper's notion of an 'open society'. Unlike conventional approaches, that put forward a specific research question drawn from theoretical discussion and test it empirically, we propose here a perspective for generating research questions through a new way of interrogating data. The current structure of the world order is driven by so many multidimensional relationships between variables that aspiring to discern it through simple conceptual schemes à la Huntington proves to be untenable. Reasoning in terms of socio-political 'blocks' may be a useful simplification for the media, but scientific analyses require counter-intuitive stages of extrapolation where data are not simply addressed as a way to falsify hypotheses, but are interrogated as a filter to open up new ways of looking at reality, in a fully systemic perspective (Saritas and Nugroho, 2012).

In this paper, our empirical benchmark builds, as anticipated, upon the notion of open society orientation in the Popper (1945) sense, and our data interrogation concerns an investigation of how countries' relative, multi-dimensional attitudes toward open society allow us to reconstruct the networks of global alliances and hostilities. We measure open society orientation in terms of five publicly accessible indicators of common use. Our computational approach allows us to show how, once filtered in terms of open society orientations, global alliance networks from the vantage points of different countries have intrinsically different properties depending on countries' relative socio-cultural profiles, in a way that lends support to a (properly qualified) Democratic Peace perspective. In this respect, it may be stimulating to read our results in relation to those of Ward et al. (2007), who still make use of more traditional statistical techniques. From the perspective of relatively open societies, which maintain an articulated attitude toward inter-cultural relationships, the structure of global alliances and hostilities is a complex, nuanced one, where the role of non-allied but apparently non-hostile countries is crucial in strategic terms. Conversely, for non-open societies, which tend to define inter-cultural relations strictly in terms of conformity/non-conformity to their own value and cultural orientations, the global structure has a binary character: non-allies are just enemies, and very little mediation between the two fields turns out to be possible. It is this basic feature that, in our opinion, sheds some light upon why democratic societies are more effective in managing conflict through non-violent channels: they have at their disposal a larger relational menu of possibilities, which allows a more fine-tuned modulation of diplomatic and negotiation strategies to tackle and to solve disputes (Beriker, 2009), and a more stable basis for multilateral alliances (Pilster, 2011).

We think that the new analytical tools presented in this paper can be useful in developing new approaches to understand the complex socio-political dynamics of the world order, and to debunk ideological, oversimplified narratives such as the 'clash of civilizations' one, that finds, with few exceptions (such as Charron, 2010), little empirical support once put to test (Mostafa and Al-Hamdi, 2007; Ellis, 2010). We thus aim at contributing to a new approach to rigorous, evidence-based scenario analysis for public decisions in the many fields where such issues matter (Volkery and Ribeiro, 2009), from conflict resolution to international cooperation and intercultural dialogue, and so on.

Although the paper's main focus is the presentation of a new data mining tool, we think that the best way to appreciate its analytical value added is to present at first the problem and the data that we will use to put it at work, and gradually work out the technical aspects, first in terms of basic intuitions and then in its full-fledged formulation, as the argument develops. Therefore, the remainder of the paper is organized as follows. In Section 2 we carry out a brief partial review of research on world order and global alliances, arguing that this literature needs some fresh analytical insight to overcome ideological narratives such as the clash of civilizations one. In Section 3, we discuss issues of data availability and data mining for the analysis of the structure of the world order, and present our own database and methodology. Section 4 presents the ACS tool. In Section 5, we introduce our main results and discuss them. Section 6 concludes.

2. Alliances, conflict, polarization: the grammar of the world order

The clash of civilizations theory is not the most compelling way to analytically tackle world order issues (Chiot, 2001; Henderson and Tucker, 2001). Nevertheless, it has affirmed itself as a political myth, that is, a self-fulfilling prophecy which, rather than having an explanatory value, becomes an overarching narrative with major appeal to media and ideological commentators (Bottici and Challand, 2006; Bantimaroudis and Kampanellou, 2007), and a social phenomenon in itself (Welch, 1997) – and thus, turns out to be, according to cases, what the relevant actors make of it (Houghton, 2009) to influence the political agenda (Aisha, 2003), rather than a logical construct with precise empirical correlatives and solid scientific ambitions (Henningsen, 2014).

On the other hand, a certainly important aspect of Huntington's thesis is that it has sparked a vast literature which, in order to put the thesis at test, has significantly revamped interest toward the role of interacting civilizations in determining the structure of the world order (Russett et al., 2000), the usefulness of clear-cut statistical hypothesis testing (Chiozza, 2002; Tuscisny, 2004), and the socio-anthropological foundations of inter-cultural conflict (Senghaas, 1998), among others. The literature on world order emphasizes the role of a constellation of factors, which are difficult to be reunited in a compact, simple theoretical statement about the causes of alliance formation, polarization, and conflict. Among the factors leading to alliance formation, we find an intent to stabilize an otherwise potentially chaotic global arena (Saperstein, 1992) through boundedly rational strategies of domination and counter-domination (Faber, 1990), which may possibly lead to sophisticated forms of multi-spatial meta-governance (Jessop, 2012). Alliance formation may moreover be responsive to specific governance factors, such as sharing security costs as a response to increasing internal social demands (Kimball, 2010), or to specific strategic needs such as sending public, costly signals of intentions of military cooperation (Warren, 2010).

The literature agrees on the idea that the logic of alliance formation is multilateral, and that alliances themselves have to be assessed as a whole in terms of minimum winning coalition solutions to strategic interaction problems (Fordham and Poast, 2014), that their dynamics is affected by cultural factors and value systems that impinge upon key aspects of alliance conduct such as sensitivity to discrepancy detection, shaping attributions, and prompting reactions (Kumar and Nti, 2004),

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