The Bayesian Paradigm and *e*-Democracy

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Outline

Democracy is the basis of modern Western society. Its basis in freedom, fairness and equity has been cherished and fought for over the centuries. Now the growth of the Internet and pervasive telecommunications is promising an era of electronic democracy, *e-democracy* for short. Most democracies are *procedural*: there are procedures for electing representatives which are accepted as democratic; the elected representatives then take the decisions on behalf of society. But the Internet may offer a way forward towards a much more *substantive, direct* implementation of democratic ideals. It is now possible for the public to be involved in societal decision making in much more direct ways. We discuss how the Bayesian paradigm might support such direct *e*-democracies and the hurdles that will need to be overcome if this support is to be achieved.

The Bayesian Paradigm is essentially a prescription for rational decision behaviour of an *individual*. Yet most serious decisions in our society are made by *groups* of individuals. Indeed,\ when we consider democratic systems we are concerned with the decision making processes of a large groups of individuals, possibly all adult members of a society. Ones first thought is to look to the axiomatic base of the Bayesian subjective expected utility model and extend this to apply to groups of rational individuals; but this is fraught with difficulties. Arrow's Impossibility Theorem and its many extensions tell us that this route leads to paradox and impossibility (French and Rios Insua 2000): see also my paper 'Implications of Arrow Theorem for *e*-Democracy' at this conference. We shall first briefly discuss several approaches (attempts?) to address this seeming incompatibility between individual rationality, democratic principles and, indeed, several other ethical demands that we might make of group decision making such as honesty. We shall conclude that to the concept of rational group decision making is ill formed and instead we should consider groups as a social process which translate individual decisions into an implemented decision for which the group is jointly responsible and accountable.

How might the Bayesian paradigm be used to support this social process? It must acknowledge and address the perceptions, skills, philosophies and understandings of those supported: not everyone sees the world in the way that an analyst might model it. For this reason, group decision support must draw upon recent work in understanding different mental models of the world, behavioural decision studies and, above all, the development of effective communication between the many different individuals in a society. Taking this ideas into the context of *e*-democracy will lead us to consider matters of human-computer interfaces.

Suggested Reading

French and Rios Insua (2000) provide a recent survey of the Bayesian approach to group decision making: an earlier but longer discussion may be found in French (1986). A recent special issue of the *Journal of Multi-Criteria Decision Analysis* discusses many of the issues relating to the use of decision analytic ideas in substantive democracy (French 2003).

General introductions to theories of voting are provided by Taylor (1995), Tulloch (1998) Discussions of Arrow's Impossibility Theorem may also be found in Arrow (1963), Kelly (1978) and Raiffa *et al* (2003).

There are many introductions to behavioural decision studies: we note (Bazerman 2002) and (Kahneman *et al.* 1982). Surveys of issues that relate to communication, particularly in relation to societal decisions are provided by (Bennett and Calman 1999) and (Slovic 2001).

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