

Workshop on Social Networks (20–24 February 2012): a report*

It was an unusual mix of people from computer science, biology, physics, social science and many interfacial disciplines at the workshop on social networks that was held in Chennai recently. Social networks have been studied in the social sciences for decades now, but the area is relatively new in the computing sciences. This study has become all the more relevant with the emergence of the Internet and networking tools like Facebook and Twitter that not only make it interesting, but also provide huge possibilities of collecting and analysing data experimentally. All the same it was interesting to hear the speakers expound on studies that ranged from ecosystems to corruption and Twitter links to the behaviour of primates and syncretic pirates networks to clannish Chettiar networks, all under one roof.

According to the organizers, Sitabhra Sinha (IMSc) and Balaraman Ravindran (IITM), the thought of having such a workshop came to them in 2008. Four years later, they were in a position to bring together such a wide and varied set of speakers and provide an overall picture of the field as it is today.

The five-day conference opened with two talks by Sanjay Jain (University of Delhi). In his first talk entitled 'complex systems and social networks', Jain reviewed social networks in the context of existence of systems of high complexity. He presented the idea that in parallel with the way ecosystems recycle every molecule of the organism, thereby paving the way for a stable population to exist, there should be mechanisms in the human society that achieve exactly such a balance between 'the input and output of its material budget'. He stressed upon the importance of understanding the origin, growth, self-organization and fall of

these networks in this context, and considered the intriguing possibility that these networks would play the regulatory role that ecosystems play in the case of multicellular organisms. In his second talk entitled 'Modelling innovation and economic growth through evolving networks', Jain discussed the evolution – formation, growth and fall – of a chemical network and formulated the notion of innovation and emphasized the role played by it in the rise and fall of the network.

S. S. Manna (S. N. Bose Centre for the Basic Sciences, Kolkata) spoke on 'International trade network'. Discussing a theoretical model of the international trade network, Manna presented results following from a 'gravity law' model of the network. There were two talks by Ramasuri Narayanam (IBM India Research Lab) on 'Game theoretic models for social network analysis'. He pointed out that most models used to study social networks suffered from the inadequacy that they failed to describe intelligence and rationality of individuals. Narayanam alternately discussed a game theoretic model into which these parameters fell in place naturally. While his first talk was an introduction to game theory and arrived at centrality measures, his second talk described a few network formation models analytically. The last session everyday was reserved for discussions.

Niloy Ganguly (Indian Institute of Technology (IIT), Kharagpur) spoke about 'Growth with restriction in online social networks'. People active on Twitter were interested by the translation into mathematics of their experiences on hearing Niloy Ganguly speak about, 'Understanding link farming and list in Twitter network' in his second talk. Sony Pellissery (Institute of Rural Management) who gave three talks on 'Human organizational networks' and 'Policy networks'. Lakshmi Subramanian (Centre for Studies in Social Sciences) spoke on 'Merchant networks in the Indian Ocean in historical perspective' and later also spoke on 'Piracy networks in the Indian Ocean'. It was fascinating to hear about the Indian Ocean region as a zone of activity and to understand that the

pirates network had a strong social basis and support, and that there were rules amounting to ownership over the regions of the sea for which the pirates had to pay a tax to the temples in the mainland.

Raman Mahadevan (Independent researcher and economic historian from Chennai) spoke on 'Community/kinship networks and capital accumulation in colonial India: A case study of the Natukkottai Chettiars'. Mahadevan's talk took one back in time when banking in South India was controlled by the Natukkottai Chettiars, and what was interesting was the way in which he described their rise and subsequent fall. Rowena Robinson (IIT, Delhi) spoke on 'Kinship structures and social cohesion'.

Animesh Mukherjee (IIT, Kharagpur) spoke on 'Opinion formation on time-varying social networks'. Neelima Gupte (IIT Madras) spoke on the 'Statistical characteristics of model and real networks'. Gupte was followed by Rabin-dranath Jana whose talk was titled, 'On social networks: formation, data and a few analytical techniques'. 'The local experiences of a global network: Armenians in the 17–18 century Bengal', were described by Santanu Sengupta (Centre for Studies in the Social Sciences).

Sengupta's talk was followed by talks by Balaraman Ravindran and Sitabhra Sinha. Ravindran's talk was on 'Efficient computation of the Shapley value for centrality in networks' in his talk he highlighted the importance of the Shapley value which is used to measure the relative importance of individual nodes in a network. This measure which is called node centrality is of significance in social and organizational networks, biological and communications network and the Internet. He presented results which were the first studies of the Shapley value for network centrality. Striking a different note was Sitabhra Sinha on 'Modularity in social networks'. According to him, dynamical processes taking place on modular networks have a characteristic signature: clear separation in terms of time-scale of fast intra-modular processes from slower inter-modular processes. This is particularly relevant for dynamics on social

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networks such as consensus formation, spreading of contagion or adoption of innovations. He spoke of his group's results, which showed that for strongly modular networks, coordination can happen rapidly within each community, but no global consensus may ever be achieved even when all individuals are trying to agree with their neighbours. From calculations he concluded that, 'communities appear to be a response of social organization to evolve to an optimal configuration when faced with multiple (and often conflicting) constraints'.

The last day had talks by Rushi Bhat (Yahoo! Labs, Bangalore), Srinath Srinivasa (Indian Institute of Information Technology, Bangalore) and Anindya Sinha (National Institute of Advanced Studies, Bangalore). Srinivasa spoke on

'Information networks and semantics', in which he explained that with social networks being a form of information networks, they 'are characteristically different from material networks. While material networks are primarily about transfer of energy, information networks are driven by the need to model or represent underlying semantics'. In his talk, Srinivasa focused on the contrast between information and material networks and different kinds of semantics that can be discerned from the way information elements have been connected. Anindya Sinha's talks on 'Food, sex and society: ecological variability in social networks and individual behavioural strategies in a wild primate population' and 'Of the mind, memes, and macaques: phenotypic flexibility, behavioural traditions and

distributed cognition in primate social networks', were about the studies his group had conducted on primates. He discussed the hierarchical behaviour among primates and how this was used by his group to study the population. This was an apt talk to be chosen as the concluding one, for it left the audience pondering over the 'special' place assigned to humans over other species. In the five days, participants had a wide exposure to the study of social networks from various perspectives and disciplines, and this would perhaps lead to other such interdisciplinary gatherings and studies.

Shubashree Desikan (*S. Ramaseshan Fellow*).

e-mail: shuba.desikan@gmail.com

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