SOE 4: Social Systems, Opinion and Group Dynamics I

Time: Monday 11:30–13:15 Location: MA 001

SOE 4.1 Mon 11:30 MA 001

Predicting hidden user properties using online egocentric networks — •Gábor Tamás and János Török — Department of Theoretical Physics, Budapest University of Technology and Economics, H-1111 Budapest, Hungary

Social physics applies the methods of statistical physics to study the effects of human relations. Social networks are considered to be composed of humans as nodes and social relations as links between them. Using data from online social networks it is possible to study the properties and behavior of humans and even pin out and correct errors and missing information. Here we aim to predict the age of egos with a very simple method. This is an important issue in a world when privacy is a key issue.

We had access to a Hungarian social network site, where the connections and the birth date of the registered users were given. The basis of our method is to use the egocentric network of people to determine its communities and the average age within them. We found that most of our acquaintances have similar age as we have or they are 25 year younger or older (different generation) which could be separated by histogram technique.

Our algorithm does not use machine learning methods and is based only on a few assumptions. It was very efficient, in some cases the code predicted the age of the ego with more than 90 % probability with 2 years accuracy. Our success suggests that we need the privacy of our friends to hide our properties.

SOE 4.2 Mon 11:45 MA 001

Quantifying and suppressing ranking bias — •Giacomo Vaccario[1], Matus Medo[2], Nicolas Wider[1], and Manuel S. Marian[2] — [1]ETH, Zurich, Switzerland — [2]University of Friburg, Friburg, Switzerland

With the increasing size of information repositories as the World Wide Web or scholarly publication databases, we rely more and more on rankings algorithms to filter and rank information. Ranking algorithms that have proven to be particularly successful are those based on a network perspective, such as Google's PageRank, or on normalization procedure, such as relative citation count. Even though these algorithms seem to be objective and hence, are often considered "fair" they have strong biases. For example, the popular Google PageRank is known to fail in individuating young valuables nodes in time evolving networks. For this reason we propose a new method to define and quantify biases of rankings. In this method, we define a null model based on a multivariate hyper-geometric distribution to generate random, but unbiased rankings. Then we quantify the bias of a given ranking by computing its average deviation from the unbiased rankings using the Mahalanobis distance. As example, we apply the proposed method on established indicators of papers importance (citation count, relative citation count and PageRank) and show that their rankings are biased with respect to both the age and topic of the papers. Finally, we give a general normalization procedure to partially cure the observed biases.

SOE 4.3 Mon 12:00 MA 001

Are modern democracies dynamical unstable? — •Claudius Gros — Institute for Theoretical Physics, Goethe University Frankfurt

Modern societies face the challenge that the time scale of opinion formation is continuously accelerating in contrast to the time scale of political decision making. With the latter remaining of the order of the election cycle we examine here the case that the political state of a society is determined by the continuously evolving values of the electorate. Given this assumption we show that the time lags inherent in the election cycle will inevitable lead to political instabilities for advanced democracies characterized both by an accelerating pace of opinion dynamics and by high sensibilities (political correctness) to deviations from mainstream values. Our result is based on the observation that dynamical systems become generically unstable whenever time delays become comparable to the time it takes to adapt to the steady state. The time needed to recover from external shocks grows in addition dramatically close to the transition. Our estimates for the order of magnitude of the involved time scales indicate that socio-political instabilities may develop once the aggregate time scale for the evolution of the political values of the electorate falls below 7-15 months.

European Physical Journal B 90, 223 (2017).

SOE 4.4 Mon 12:15 MA 001

How to effectively use LinkedIn to enhance your employability? Insights from a social experiment in India — •Yash Chawla, Rafal Weron, Grzegorz Chodak, and Katarzyna Sznajd-Weron — Wroclaw University of Science & Technology, Wroclaw, Poland

LinkedIn is one of the leading social networks for building professional profiles, with over 39 million students/graduates on the platform. However, students treat LinkedIn as a job application portal rather than a professional networking platform. Through observations and monitoring activities, we have developed a simple protocol for the students to increase their employability. The protocol defines the content strategy as well as the type of users, groups, company pages to follow and engage with. We have carried out an empirical study among a group of 100 students in India, half of which applied the protocol, and have been able to determine that the protocol gave students an advantage in terms of job availability information, skill set requirements identification, mentoring, making applications and recruitment. We believe that our study not only provides practical advice for LinkedIn users, but also valuable insights for researchers modeling opinion formation and information spreading in social networks.

SOE 4.5 Mon 12:30 MA 001

A Qualitative Introduction to Normative Sociodynamics — •Hermann Rampacher — Rampacher&Partner GbR VDE Überlingen

In normative sociodynamics peace is an observable P depending on n arguments p[a(i)], where a(i) are actions performed with probability p[a(i)].If for increasing p a(i) contributes with the value b(i) to increase the risk of global self-destruction, a(i) is prohibited by a social norm. n p[a(i)] with the largest values b(i) represent states of a certain social system. If n norms are obeyed, P reaches its ideal value. We postulate: if a social system's solidarity - everybody does one's duty - reaches its ideal value, as well as peace reaches its ideal value. Action d(i) if done, is a duty, as far as d(i) contributes to reduce the risk of global self-destruction. Solidarity as a long-term project always differs from its ideal value, consequently P differs from its ideal value, because needy men without immediate help are forced to violate some norms to get what they need to survive. Government interventions - the government has the monopoly on the use of force - to approximate real and ideal value of P has to put through norms with larger b(i) at the expense of those of smaller b(j). The smaller the intervention force - including death penalties and imprisonment -, the higher is the value of the nation's justice. Another observable, more simple to measure, the social temperature T, observes the actual probabilities of force between citizens and between citizens and their government. The larger T, the worse the actual prognosis of a nation's stability, peace and future.

SOE 4.6 Mon 12:45 MA 001

The role of educational trainings in the diffusion of smart metering platforms: An agent-based modeling approach — •Tomasz Weron[1], Anna Kowalska-Pyzalska[2], and Rafał Weron[2] — [1]Faculty of Pure and Applied Mathematics, Wrocław University of Science and Technology, 50-370 Wrocław, Poland — [2]Department of Operations Research, Wrocław University of Science and Technology, 50-370 Wrocław, Poland

Using an agent-based modeling approach we examine the impact of educational programs and trainings on the diffusion of smart metering platforms (SMPs). We also investigate how social responses, like conformity or independence, mass-media advertising as well as opinion stability impact the transition from predecisional and preactional behavioral stages (opinion formation) to actional and postactional stages (decision-making) of individual electricity consumers. We find that mass-media advertising (i.e., a global external field) and educational trainings (i.e., a local external field) lead to similar, though not identical adoption rates. Secondly, that spatially concentrated 'group' trainings are never worse than randomly scattered ones, and for a certain range of parameters are significantly better. Finally, that by manipulating the time required by an agent to make a decision, e.g., through

promotions, we can speed up or slow down the diffusion of SMPs.

SOE 4.7 Mon 13:00 MA 001

The Packing Rate: a new gold standard in estimating the strength of soccer teams? — •Andreas Heuer — Inst. f. Phys. Chemie, WWU Münster, Germany

A few years ago a new objective metric, the packing rate, has entered the field of soccer statistics. It expresses the total number of players of the opponent which are taken out by passes or by dribbles of a team and has been used by different media to express the strength of soccer teams.

In this presentation, we analyze the information content of this observable. An informative quantity has to fulfill two requirements. (1) In the long-time limit, i.e. without random effects, it has to display a high correlation with the team strength as reflected by the actual results of the team. (2) The random contributions have to be small.

These and other properties of this new metric are analysed on an objective level and compared with other observables, which currently are used to express the strength of soccer teams [1]. It turns out that the packing rate is highly informative.

[1] A. Heuer, O. Rubner, PLoS ONE 9, e104647 (2014)