

Title: Trust and Distrust: On Sense and Nonsense in Big Data

Abstract: Big data is an appealing source and often perceived to bear all sorts of hidden information. Filtering out the gemstones of information besides the rubbish that is equally easy to “deduce” is, however, a nontrivial issue. The lecture will start by demonstrating a few do’s and don’ts about big data, and then digs deeper into semi-automated evaluation and forecasting of IT security risks. Ideally, this assessment – gained from big data – should be interpretable, justified, up-to-date and comprehensible in order to provide a maximum level of information with minimal additional manual effort. The lecture is about two selected applications of data science for IT security and trust management.

The first part of the lecture focuses on the detection of incidents in a system’s historic record of data footprints. For this purpose, statistical approaches exist which can uncover an artificial manipulation of data (under suitable conditions). The consideration here lies on the possibility of an automated recognition of manipulations purely on the basis of numerical data and in particular without recourse to (human) domain expertise.

The second part of the lecture is about “trust”. Despite being a familiar term, the concept is tricky to capture in formal definitions. Intuitively, trust may be understood as the expectation of correct and secure functioning of a certain system. The first part of the lecture introduces a simple statistical model to quantify trust and to incorporate continuously incoming information into the trust model. The aim is to calculate a (always current) confidence index from the history of a system, from the temporal development of which future risks can be estimated or predicted (forecasting and determination of worst-case scenarios). One lesson taught by the model is that “fairness” in the sense of how information affects the trust is not necessarily naturally consistent with the human understanding of trust, though the model itself stems from clear intuitions.