Credibility assessment in social media with a focus on social bot detection

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Abstract.
We live in a time of automated information warfare, where hordes of bots (automated software programs) rampage in our online social ecosystems. These content-polluting bots are employed by both malicious actors aiming to spread misinformation, as well as by traditional news outlets fighting for readers' attention.

In this course, we introduce and we experiment with the fundamentals of social media crawling and analysis, we discuss the issues related to information credibility in social media, and we investigate the role of social bots in the spread of high- and low-quality (e.g., fake news) information. We also introduce the task and the challenges of social bot detection. Then, we report on social media platforms capabilities of detecting bots, and on human performance in discriminating between legitimate and bot accounts. Finally, we thoroughly discuss different machine learning and AI approaches to the automatic detection of social bots (e.g., network-, content-, and behavior-based), highlighting those that currently represent the most promising ones. The course also includes hands-on sessions in Python, where participants will write scripts for collecting live data from Twitter and will learn to perform bot detection. The course also covers points such as available datasets, software, and APIs for supporting the study of information credibility and the detection of social bots.

Contents in brief:
- Social media and information credibility (e.g., fake news, coordinated inauthentic behavior);
- Social bots and their role in the spread of low-quality information;
- Early (i.e., supervised) and recent (i.e., unsupervised, group-based) machine learning/AI approaches to the detection of social bots;
- A look into the future of information credibility and social bot detection;
- Data collection from Twitter and bot detection experiments in Python.

Total Hours: 8

References:
[1] Ferrara, E., Varol, O., Davis, C., Menczer, F., & Flammini, A. (2016). The rise of social bots. *Communications of the ACM*, 59(7), 96-104.

[2] Cresci, S., Di Pietro, R., Petrocchi, M., Spognardi, A., & Tesconi, M. (2017, April). The paradigm-shift of social spambots: Evidence, theories, and tools for the arms race. *In Proceedings of the 26th International Conference on World Wide Web Companion* (pp. 963-972). ACM.

[3] Yang, K. C., Varol, O., Davis, C. A., Ferrara, E., Flammini, A., & Menczer, F. (2019). Arming the public with artificial intelligence to counter social bots. *Human Behavior and Emerging Technologies*, 1(1), 48-61.

[4] Cresci, S., Petrocchi, M., Spognardi, A., & Tognazzi, S. (2018, April). From Reaction to Proaction: Unexplored Ways to the Detection of Evolving Spambots. *In WWW (Companion Volume)* (pp. 1469-1470). ACM.

CV of the teacher*.*

Stefano Cresci is a Researcher at the Institute of Informatics and Telematics of the National Research Council (IIT-CNR) in Pisa, Italy. He is Professor of ``Big Data Sources, Crowdsourcing, Crowdsensing'' for the PhD course in Data Science and for the post-graduate Master's degree in Big Data Analytics & Social Mining, at the University of Pisa. He received his PhD in Information Engineering from the University of Pisa in 2018. He received his Bachelor's and Master's degrees in Computer Engineering from the University of Pisa respectively in 2007 and 2013. He also received a post-graduate Master's degree in Big Data Analytics & Social Mining from the University of Pisa in 2016. Stefano published research papers, attended, and presented his works in several national and international conferences (e.g., ACM SIGKDD, ACM WWW, AAAI ICWSM, IEEE DSAA). He also published results of his research in several national and international peer-reviewed journals (e.g., IEEE TDSC, IEEE IntSys, IEEE IntComp, Decision Support Systems). In addition, he attended and actively participated in several national and European project meetings (FP7, Justice, Horizon2020, FAR-FAS). Results of his research activity have also been discussed in local and national newspapers, tv and radio shows, as well as in scientific blogs. Stefano currently is, and has been, part of the technical program committee of several top international conferences (e.g., ACM SIGIR, ACM SIGKDD, AAAI ICWSM). He also serves as a reviewer for several international journals (e.g., Nature Communications, IEEE TKDE, IEEE TMC, IEEE TIFS, ACM TWEB, Decision Support Systems, Information Systems). Furthermore, he is a member of the Editorial Board of the International Journal of Information Systems for Crisis Response and Management (IJISCRAM). In 2018, he was selected among the winners of the prestigious SAGE Ocean Concept Grant. In 2019, he won the IEEE Computer Society Italy Section Chapter 2018 PhD Thesis Award.