Onur VAROL

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Center for Complex Network Research at Northeastern University
177 Huntington Ave. 11th floor Boston, MA 02115

Research Interests

Complex Systems, Network Science, Data Science, Machine Learning, Computational Social Science

Appointments

Center for Complex Network Research, Northeastern University, Boston, Massachusetts, USA
Postdoctoral Research Associate (July 2017, —)

Indiana University, Bloomington, Indiana, USA
Research Assistant (August 2012, December 2017)
Teaching Assistant (December 2017, May 2017)

Education

Indiana University, Bloomington, Indiana, USA
Ph.D., Informatics, Complex Systems Track and minor in Statistics, (June 2017)
Dissertation: Analyzing Social Big Data to Study Online Discourse and its Manipulation
Committee: Filippo Menczer, Alessandro Flammini, Yong-Yeol Ahn, Christine Ogan, Weihua An

Koç University, Istanbul, Turkey
M.Sc., Computer Science and Engineering, (July 2012)
Thesis: Modal analysis of Myosin II and Identification of Functionally Important Sites
Advisors: Deniz Yuret, Alkan Kabakçıoglu

Istanbul Technical University, Istanbul, Turkey
B.Sc., Electronics Engineering, (June 2010)
B.Sc., Physics Engineering, (June 2012)

Publications

Journal Articles

J.7 **O Varol**, E Ferrara, F Menczer, A Flammini. **"Early Detection of Promoted Campaigns on Social Media"**. *EPJ Data Science* 6(13), 2017

J.6 C. Ogan, **O. Varol "What is gained and what is left to be done when content analysis is added to network analysis in the study of a social movement: Twitter use during Gezi Park"**, *Information, Communication and Society* 20(8):1220-1238, 2017

J.5 E Ferrara, **O Varol**, C Davis, F Menczer, A Flammini **"The Rise of Social Bots"**, *Communications of the ACM* 59(7):96-104, 2016

J.4 Davis CA, Ciampaglia GL, Aiello LM, Chung K, Conover MD, Ferrara E, Flammini A, Fox GC, Gao X, Gonçalves B, Grabowicz PA, Hong K, Hui P, McCaulay S, McKelvey K, Meiss MR, Patil S, Peli Kankanamalage C, Pentchev V, Qiu J, Ratkiewicz J, Rudnick A, Serrette B, Shiralkar P, **Varol O**, Weng L, Wu T, Younge AJ, Menczer F. **"OSoMe: The IUNI observatory on social media"**, *PeerJ Computer Science* 2: e87, 2016

J.3 V.S. Subrahmanian, A. Azaria, S. Durst, V. Kagan, A. Galstyan, K. Lerman, L. Zhu, E. Ferrara, A. Flammini, F. Menczer, R. Waltzman, A. Stevens, A. Dekhtyar, S. Gao, T. Hogg, F. Kooti, Y. Liu, **O. Varol**, P. Shiralkar, V. Vydiswaran, Q. Mei, T. Huang. **"The DARPA Twitter Bot Challenge"**, *IEEE Computer* 49(6), 2016

J.2 M JafariAsbagh, E Ferrara, **O Varol**, F Menczer, A Flammini **"Clustering memes in social media streams"**, *Social Network Analysis and Mining* 4(237):1-13, 2014

J.1 **O. Varol**, D. Yuret, B. Erman, A. Kabakçıoglu **"Mode coupling points to functionally important residues in Myosin II"**, *PROTEINS: Structure, Function, and Bioinformatics* 82(9):1777-86, 2014

Refereed Conference Proceedings

Conferences are a main venue of research dissemination in computer science. Conference proceedings are peer-reviewed and acceptance rates for top-tier conferences range from 10-15%.

C.13 **Varol O.**, Davis C., Ferrara E., Menczer F., Flammini A. **"Online Human-Bot Interactions: Detection, Estimation, and Characterization"**, ICWSM'17

C.12 Olteanu, A., **Varol, O.**, Kiciman, E. **"What Does Social Media Say about the Outcomes of Personal Experiences"**, CSCW'17

C.11 Ferrara E., Wang W., **Varol O.**, Flammini A., Galstyan A. **"Predicting online extremism, content adopters, and interaction reciprocity"**, SocInfo'16

C.10 **O Varol**, **"Spatiotemporal Analysis of Censored Content on Twitter"**. WebScience'16

C.9 A Das, S Gollapudi, E Kiciman, **O Varol**, **"Information Dissemination in Heterogeneous-Intent Networks"**. WebScience'16

C.8 E. Ferrara, **O Varol**, F Menczer, and A Flammini. **"Detection of Promoted Social Media Campaigns"**. ICWSM'16

C.7 A Olteanu, **O Varol**, E Kiciman. **"Towards an Open-Domain Framework for Distilling the Outcomes of Personal Experiences from Social Media Timelines"**. ICWSM'16

C.6 C Davis†, **O Varol**†, E Ferrara, A Flammini, F Menczer **"BotOrNot: A System to Evaluate Social Bots"**. WWW'16 Developers Day

C.5 **O Varol**, E Ferrara, C Ogan, F Menczer, and A Flammini. **"Evolution of online user behavior during a social upheaval"**. WebScience'14 (**Best paper award**)

C.4 **O Varol** and F Menczer. **"Connecting Dream Networks Across Cultures"**. WWW 2014 workshop on "Connecting Online & Offline Life" (COOL)

C.3 Ferrara, E., **Varol, O.**, Menczer, F. & Flammini, A. **"Traveling Trends: Social Butterflies or Frequent Fliers?"**, ACM Conference on Online Social Networks (COSN 2013)

C.2 E Ferrara, M JafariAsbagh, **O Varol**, V Qazvinian, F Menczer, A Flammini **"Clustering Memes in Social Media"**, ASONAM 2013

C.1 Yasemin Alban; Tuba Ayhan; **Onur Varol**; Müştak Erhan Yalçın **"A Feature Filtering Method for EEG Data Classification"**, Signal Processing and Communications Applications (SIU), IEEE 19th Conference, Antalya, April 20-22 2011.

Book chapter

B.1 **Varol O.**, Davis C., Menczer, F., Flammini, A. **"Feature Engineering for Social Bot Detection"**, Feature Engineering for Machine Learning and Data Analytics

Preprints & Under review

P.3 C. Shao, GL Ciampaglia, **O. Varol**, A. Flammini, F. Menczer **"The spread of fake news by social bots"**

P.1 **O. Varol**, **"Deception Strategies and Threats for Online Discussions"**

P.1 **O. Varol**, **"Analyzing Censorship on Twitter"**

Conducted Research and Academic Experience

Research Projects

DOISAC: Project name stands for "Detecting Orchestrated Information and Synthetic Account Campaigns". This project founded by the Office of Naval Research aims at detecting orchestrated information and synthetic activity campaigns on social media using machine learning and computational tools. In this project, I studied individual and group activities of terrorist recruiters. We build predictive models to identify accounts with malicious intentions and activities.

PIs: Emilio Ferrara, Alessandro Flammini,

DESPIC: Project name stands for "Detecting Early Signature of Persuasion in Information Cascades" and aims to design a system detect persuasion campaigns at their early stage of inception, in the context of online social media. Our team built a system that analyzes social media data and extracts network, temporal, content, and user-based features to detect online campaigns. I worked on several modules of this framework: (i) a clustering procedure that uses metadata to compute similarity between memes; (ii) a classification system that determines whether a meme is potentially an orchestrated campaign or a genuine, grassroots conversation; (iii) a social bot detection framework called BotOrNot. This project founded by DARPA SMISC program.

PIs: Alessandro Flammini, Filippo Menczer

Truthy: This project aims to understand how information propagates through complex socio-technical information networks. In this project, I analyzed and studied roles of individuals during social upheavals, diffusion of trending topics in spatio-temporal space, and characterization of social media censorship and its effect on user behavior.

PIs: Alessandro Flammini, Filippo Menczer

Teaching Experience

Indiana University, Bloomington IN, USA
Topics in Informatics: Performance Analytics (Spring 2017)

Koç University, Istanbul, Turkey
Machine Learning (Spring 2012)
Microprocessors (Fall 2011)
Probability and Random Variables (Spring 2011)
Discrete Mathematics (Fall 2010)

Work Experience

Microsoft Research, Redmond WA, USA
Research Intern (June 2015 - September 2015): I worked in CLUES group at MSR. I studied social media timelines of individuals to detect experiential activities and analyzed outcomes of those actions. This projects involves analyzing search query logs and social media timelines.

Microsoft Research, Redmond WA, USA
Research Intern (June 2014 - September 2014): I worked in CLUES group at MSR. I studied how individuals in social networks adopts their behavior to match with their inner intents. I carried out experiments on Amazon Mechanical Turk platform to justify our hypothesis in micro level and analyzed Twitter data to validate effects on macro level.

Stonefish Software Consultant, Istanbul, Turkey
Software Developer (August 2009 - March 2010): I worked on an enterprise web application development using C♯, ASP.NET, MSSQL.

Honors and Awards

Fragile Families Challenge top scoring submission for progress prize
Best paper award (WebSci'14)
Best poster award (CCS'15)
Travel grants: SIGWEB for WebSci'16 (750$), ICWSM'16 (350$), ACM for COSN'14 (1,500$), IU RKCSI for INFORMS'16 (500$)
Research Assistantship Indiana University (2012-2016)
Scholarship from TUBITAK (2010-2012)
Graduate scholarship from Koç University (2010-2012)
Electrical Engineering Society (EMO) Project Competition 1^{st} place (2010)
Bosch Scholarship for Undergraduate Education (2009)
Istanbul Technical University Student Council Vice President (2009)

Talks and Events

Invited Talks

- Predicting adolescence academic performance through panel survey data, Fragile Families Challenge Scientific Workshop at Princeton University (11/17/2017)
- Observatory on Social Media: Investigating Bots and Disinformation, Digital Disinformation Forum Stanford (06/26/2017)
- The Impact of Censorship on Tweeting Behaviors, Indiana University Conference on Big Data and Network Science (03/23/2017)
- Studying Individuals and Groups using Online Data, Northeastern University Network Science Institute (03/09/2017)
- Analysis of Online Discourse and Information Diffusion, INFORMS Meeting Nashville (11/15/2016)
- Detection of Online Manipulation, UND Big Data Summit Event (04/07/2016)
- Twitter Applications: Industry Panel Speaker, UND Big Data Summit Event (04/07/2016)
- Campaign and Social Bots Detection on Social Networks, Workshop in Network Science (WINS) Indiana University (02/18/2016)
- Evolution of online user behavior during a social upheaval, Indiana University Turkish Flagship Center (01/21/2015)
- Studying Social Dynamics Through Social Media, Istanbul Technical University Physics Department Colloquia (04/28/2014)

Computer and Language Skills

Programming Languages and Skills:

Frequent user of Python for data analysis using Matplotlib, NetworkX, Pandas, Scikit-learn, etc.
Experience in LaTeX, C / C++, C#, Java, MATLAB, R, OpenBUGS
Familiar with HTML, CSS, JS for frontend, Flask, Django, and ASP.NET for larger applications
Used MySQL, NoSQL (CouchDB and Riak), Map-Reduce
View projects on Github: github.com/onurvarol

Languages:

English (fluent), German (beginner), Turkish (native)

Community Service	**Workshop co-chair**: Open Science for an Open Society (CCS'16) **Conference Senior PC member**: HT'18 **Conference PC member**: WWW'17/'18; CHI'18; CSCW'18; CompleNet'18; NetSci'17/'18; SocInfo'17; IC2S2'17; HyperText'17; ICWSM'17; IEEE DSAA'17 **Workshop PC member**: IEEE BigData'17 (Application of Big Data for Computational Social Science) **Conference subreviewer**: ICWSM'15; IC2S2'15; ASONAM'15; WebScience'14 **Journal reviews**: Science Advances; PLoS One; Network Science; Information, Communication and Society; IEEE TKDE; IEEE Access; Big Data; First Monday; JMIR; Computers in Human Behavior; Data Mining and Knowledge Discovery
Interests	I enjoy playing basketball and foosball. I also love traveling a lot and feeling wanderlust, you can visit my online travel journal (onurvarol.com/my_travels).