Malicious Behavior on the Web: Characterization and Detection

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Slides are available at http://snap.stanford.edu/www2017tutorial/
Tutorial Outline

Malicious users
- Trolling
- Sockpuppets
- Vandals

Misinformation
- Fake reviews
- Hoaxes

Why DC is better than Marvel

April 28, 2013 by Eric_17

bdiaz209 posts only on this discussion to support and defend Eric_17

Eric_17
April 28 2013, 12AM
Thanks. I knew Marvel fans would try to flame me, but they have nothing other than “oh that’s your opinion” instead of coming up with their own argument

Fellstrike
April 29 2013, 6PM
Quit talking to yourself, *******. Get back on your meds if you’re going to do that
Sock puppetry and fake reviews: publish and be damned

The Hand That Controls the Sock Puppet Could Get Slapped

By BRAD STONE and MATT RICHTER  JULY 16, 2007

Wikipedia blocks hundreds of 'scam' sock puppet accounts

2 September 2015  Technology
Wikipedia: Orangemoody

254 articles edited/created by 381 accounts

Image credit: James Alexander
Online sockpuppetry – why?

- Diversify identity
- Anonymize identity
- Multiply identity
- Privacy concern

Gilbert, et al. (CHB, 2014), Caspi et al. (C&B, 2006)
Sockpuppets in Wikipedia

Inappropriate uses of alternative accounts

Editors must not use alternative accounts to mislead, deceive, disrupt, or undermine consensus. This includes, but is not limited to:

- Creating an illusion of support
- Strawman socks
- Editing project space
- Circumventing policies or sanctions
- Contributing to the same page or discussion with multiple accounts
- Avoiding scrutiny
- Editing logged out to mislead
- Misusing a clean start.
- "Good hand" and "bad hand" accounts

Legitimate uses

Valid reasons for an alternative account include:

- Security
- Privacy
- Doppelgänger accounts
- Clean start under a new name
- Username violations
- Compromised accounts
- Humor accounts
Wikipedia Sockpuppets

An editor has expressed a concern that this account may be a sock puppet of Example (talk · contribs · logs).
Please refer to the sockpuppet investigation of the sockpuppeteer, and editing habits or contributions of the sock puppet for evidence. This policy subsection may also be helpful.


Suspected by volunteers, confirmed and deleted by administrators

Tsikerdekis et al. (ISFP, 2013), Yamak et al. (WWW 2016), Solorio et al (LASM 2013)
Sockpuppets in social media

- Similar login time
- Similar login IP address
- Similar usernames
  
  Liu et al. (FCS 2016)

- Write similar to each other
- Similar point of view
  
  Bu et al. (KBS 2013)

- Support one another
  
  Zheng et al. (IIH-MSP 2011)
Sockpuppets in online discussions
Sockpuppets are accounts that post from the same IP address in the same discussion very close in time, in at least 3 different instances.

Kumar, et al. (WWW 2017)
Sockpuppets in online discussions

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Kumar, et al. (WWW 2017)
Characteristics of sockpuppets
Sockpuppets love controversy

Kumar, et al. (WWW 2017)
One of the worst that I have seen yet...

jakey008
Feb 5 2013, 2PM
should have read the reviews first :(

ricobean27
Feb 5 2013, 3PM
Couldn’t agree more!!

Falcon-X32
Feb 5 2013, 3PM
I agree. You are absolutely right!

Start fewer discussions
\[ p < 10^{-3} \]

Agree more
\[ p < 10^{-3} \]

Write shorter sentences
\[ p < 10^{-3} \]

Address others directly
\[ p < 10^{-3} \]

Write more self-centered posts
\[ p < 10^{-3} \]

Downvoted more
\[ p < 10^{-3} \]

Kumar, et al. (WWW 2017)
One of the worst that I have seen yet…

jakey008  Feb 5 2013, 2PM
should have read the reviews first :(

ricobean27  Feb 5 2013, 3PM
Couldn’t agree more.

Falcon-X32  Feb 5 2013, 3PM
I agree. You are absolutely right!

Smoothzilla  Feb 5 2013, 3PM
Thanks for your support!!!!

Interact more with each other
$$p < 10^{-3}$$

Kumar, et al. (WWW 2017)
Do puppetmasters lead double lives?

Both sockpuppets are more similar to each other

\[ p < 10^{-3} \]

“Good sock/Bad sock” not common
Types of sockpuppets
Are sockpuppets deceptive?

Sockpuppets pick distinct usernames but not as distinct email ids

Kumar, et al. (WWW 2017)
Deceptiveness

Levenshtein distance between usernames

Number of pairs

Non-Pretenders

Pretenders

Sock pairs
Random pairs

srijan
srijan2
srijan
theRealBatman

Kumar, et al. (WWW 2017)
One of the worst that I have seen yet...

Falcon-X32

best article i have read!!!

Falcon-X32

YOU ARE STUPID AND

\[ p < 10^{-3} \]

Smoothzilla

But this article doesn't make any sense

Falcon-X32

i agree.. these morons dont know a thing

\[ p < 10^{-3} \]

Downvoted and reported more

\[ p < 10^{-3} \]

Kumar, et al. (WWW 2017)
One of the worst that I have seen yet...

Falcon-X32

best article i have read!!!

ricobeans27

But this article doesn’t make any sense

Your opinion, my opinion

ricobeans27

You here to join?

Falcon-X32

Sorry accidentally posted from my other account
Supportiveness

Does one sockpuppet support the other or defend from disagreeing user?

60% Neutral  30% Support  10% Oppose

Kumar, et al. (WWW 2017)
Deception is important to create an illusion of public consensus.

Supportiveness and Deceptiveness

Kumar, et al. (WWW 2017)
Detecting sockpuppets
Features for detecting sockpuppets

- **Post:** count of words, characters; fraction of uppercases, punctuations, etc. LIWC features of text, readability, agreement

- **Community:** fraction of reported and deleted posts, upvotes, blocked?

- **Activity:** number of posts, time between posts, age of account
Is an account a sockpuppet?

Kumar, et al. (WWW 2017)
Online discussions

Baseline

Post: 0.57
Community: 0.54
Activity: 0.59
All: 0.68

Kumar, et al. (WWW 2017)
Do two accounts belong to the same person?

Kumar, et al. (WWW 2017)
Online discussions

Baseline

Post

Community

Activity

All

AUC

Kumar, et al. (WWW 2017)
Summary: Sockpuppets

- **Sockpuppets**: Usage of multiple accounts, both for benign and malicious intent
- Sockpuppets write worse than non-sockpuppets
- Sockpuppet accounts help each other
- Sockpuppets can vary in how deceptive they are and how supportive they are
- Sockpuppets can be detected from what they post and how they post, but not efficiently from community feedback
References


Liu, D., Wu, Q., Han, W. & Zhou, B. Sockpuppet gang detection on social media sites. Frontiers of Computer Science

References


End of Part 1