A Qualitative Comparison of Facebook and Twitter Bots

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Introduction

- The increasing level of sophistication in the field of machine learning and artificial intelligence has spawned the creation of automated programs called "bots"

- A bot (also known as a software robot) is defined as an automated or semi-automated program that can interact with users or other computers in intrinsically repetitive ways [1].

- Imperva Incapsula Bot Traffic Report shows that nearly half of the Internet is made up of bot

- During a conversation, a normal human can sway from one topic to another-this makes it naturally difficult for bots to pass the criterion for intelligence as proposed by Alan Turing in 1950

Introduction

- The first known IRC bots were Jyrki Alakuijala's Puppe, Bill Wisher's Bartender and Greg Lindahl's GM (Game Manager for the Hunt the Wumpus Game)

- Over the years, the influence of bots became prominent in search engines

- There are many claims that social bots played a crucial role in the United States 2016 Presidential election

- The most pervasive anti-bot technique is the use of Completely Automated Public Turing Test to Tell Computers and Humans Apart (CAPTCHA)

- Other types of CAPTCHAs such as Google recaptcha, "BaffleText", and "ScatterType". Botometer (formerly known as BotOrNot) is a Twitter chatbot detection tool

OVERVIEW OF FACEBOOK BOT

- Facebook Messenger has around 900 million monthly users after it was launched as an independent application

- It was developed using Message Queue Telemetry Transport (MQTT) protocol

- Messenger allows users to create chatbots using their Wits.ai engine.

- Messenger also provides a means for users to search for bots using QR codes that can be scanned by a phone camera

- Bots have three main capabilities for Facebook Messenger. i) Send/Receive API. ii) Generic Message Templates iii) Welcome screen + Null state CTAs

OVERVIEW OF FACEBOOK BOT

- Bots have three main capabilities for Facebook Messenger.

  i) Send/Receive API.

  ii) Generic Message Templates

  iii) Welcome screen + Null state CTAs

- To create a Facebook bot, this steps should be followed:

  i) Create a Facebook App and Page.

  ii) Setup Webhook.

  iii) Get a Page Access Token.

  iv) Subscribe the App to the Page.

  v) Test the bot.

OVERVIEW OF TWITTER BOT

- Twitter is a microblogging service that was developed in March 2006 by Jack Dorsey, Noah Glass, Biz Stone, and Evan Williams

- The project code name for Twitter was originally called "twttr" inspired by Flickr

- Twitter allows users interaction using messages called "tweets".

- The Web interface of Twitter make use of the Ruby on Rails framework deployed on a performance enhanced Ruby Enterprise Edition

- the relationship of following and being followed requires no reciprocation

OVERVIEW OF TWITTER BOT

- Twitter also have something called "hashtag" which is a word or phrase appended with a hash (#) symbol that can be used to group tweets by topic

- There is usually a spike in the usage of Twitter hashtags during prominent events.

- To create a Twitterbot, a developer should follow the steps provided below:

    i) Setup a Twitter application

    ii) Setup development environment.

    iii) Setup Heroku

    iv) Test the bot

COMPARATIVE ANALYSIS

- **Phenomenology**. Can machines learn morality? When does a bot become a person?

  - Conventionally, the term phenomenology refers to the rigorous and systematic study of consciousness

  - The term was first coined by Edmund Husserl in the early 20th century

  - In Husserl's view, one of the initial phenomenological principles is directed by intentionality

  - While Facebook bots, are mostly conversational in nature, most Twitter bots seldom engage with users in a conversation

  - Although Twitter bots can perform tasks such as sending direct messages, tweeting, and retweeting, their primary purpose is to strategically broadcast information with a specific intent

COMPARATIVE ANALYSIS

- One of the best attempts to create a Twitter bot that can engage users in a conversation was the Tay.ai developed by Microsoft.

- Tay learns from users through direct conversation.

- It did not take much time before Tay start posting inflammatory and offensive tweets

- This shows the fundamental truth of artificial intelligence: It is a mirror

- Despite the increasing level of sophistication of artificial intelligence and machine learning, most bots do not have the ability to reveal or unfold experiences over time.

COMPARATIVE ANALYSIS

- **Utility**. Since nearly half of the internet traffic coming from bots [4], it has become imperative to

   evaluate the reasons why they exist and how they support the various business or operational goals of their owners.

- "Feed fetcher" is the most active helper-bot online

- It ferries website content to web and mobile applications.

- Zeifman examined over 16.7 billion visits to 100,000+ randomly selected domains in their

   network and reported that Facebook feed fetchers accounted for 4.16% of the most active good bots; whereas, Twitter bots represented just 0.14%

COMPARATIVE ANALYSIS

- Chu et al. in 2012 [29], the authors proposed the following criteria that indicate whether a

  Twitter account is a bot;

    1. Periodic and regular timing of tweets;

    2. Content of the tweet, i.e., whether it contains known spam;

    3. The ratio of tweets as compared to an average human user.

- Transaction bot is expected to grow from $180 million in 2013 to $5 billion by 2020

- Researchers estimate that the market for fake Twitter followers was worth approximately $40

  million to $360 million as of 2013; whereas, the market for Facebook spam was worth $87
  million to $390 million

COMPARATIVE ANALYSIS

- **Impact**. An article published in 2012 by the New York Times suggested that as much as 70% of

    President Obama's Twitter followers were fake

- The pervasiveness of bots on social media shows that the dynamics of political discussions can

    be influenced in three major ways

- First, by redistributing influence; second, by polarizing political discussions; and, third, by

    spreading misinformation from unreliable sources.

- A growing number of researchers have begun to investigate the logical incentives and
insecurities that come with the usage of bots on social media

COMPARATIVE ANALYSIS

- Chatbots can also be used for benevolent purposes beyond its initial application--for example, suicide prevention bots

- These bots should be capable of demonstrating empathy and be sensitive to the person sitting in front of the computer

- There is a whole gamut of health-related areas where one could envision the application of AI-based bots, such as an autism support and autism awareness bot, a smoking cessation bot, a post-traumatic stress disorder (PTSD) bot, etc

- In an article published in the WIRED magazine [39], the author James Vlahos is on a quest to give his dying father artificial immortality via a chatbot

ANALYSIS

- To evaluate the general perception of bots, we used the IBM Watson cognitive search and content analytics engine on the Watson Discovery News dataset.

- This dataset is pre-enriched with cognitive insights such as: Keyword Extraction, Entity Extraction, Semantic Role Extraction, Sentiment Analysis, Relations, and Category Classification [39].

- It contains news sources that is updated continuously, with approximately 300,000 new articles and blogs added daily [39].

Result

Fig. 6a. Sentiments of bots

51% Negative Sentiment
47% Positive Sentiment
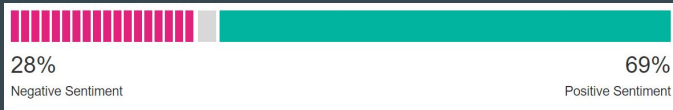
Fig. 6b. Sentiments of Facebook bots

28% Negative Sentiment
69% Positive Sentiment

Fig. 6c. Sentiments of Twitter bots

61% Negative Sentiment
38% Positive Sentiment

Bot + Facebook   1086   Positive
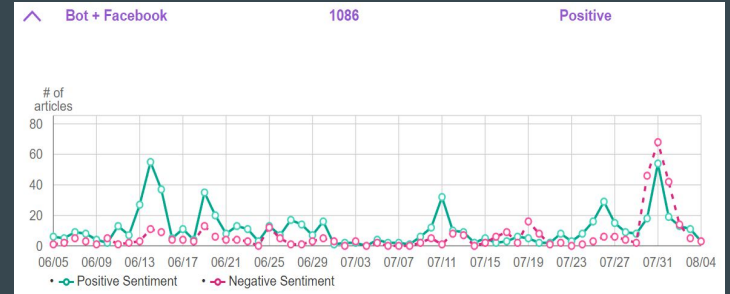
Fig. 6d. Co-Mentions and Trends of Facebook bots

Bot + Twitter   494   Negative
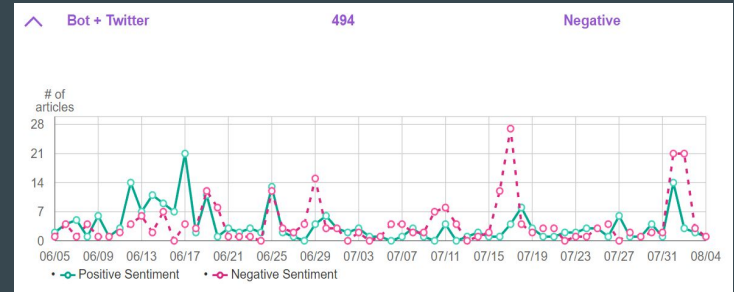
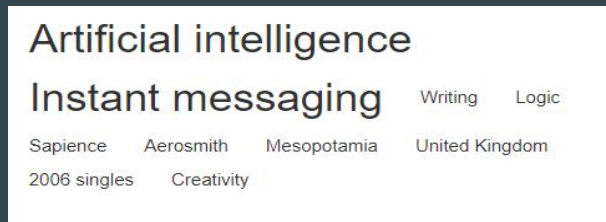Fig. 6e. Co-Mentions and Trends of Twitter bots
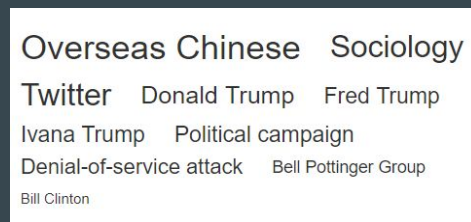
Result (Cont.)

Fig. 6f. Top entities Facebook

Fig. 6g. Top entities Twitter

Discussion

- The result of the analysis shows that Facebook bot had predominantly positive sentiment.

- On the contrary, Twitter bot has high negative sentiment because they mostly play a critical role in propaganda and mis/disinformation.

- Bot traffic is in an uptrend. Hence, it is becoming challenging to evaluate its influence on the social media ecosystem.

- This result is perhaps consistent with findings that Facebook bots contribute to a higher percentage of good bots than do twitter bots, and that a high percentage of malicious bots are impersonator bots