A Qualitative Comparison of Facebook and Twitter Bots
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
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 CAPTCHAAs 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, these 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
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.
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.
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%
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
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.
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.
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

Fig. 6b. Sentiments of Facebook bots

Fig. 6c. Sentiments of Twitter bots

Fig. 6d. Co-Mentions and Trends of Facebook bots

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

Fig. 6f. Top entities Facebook

Artificial intelligence
Instant messaging
Sapience  Aerosmith  Mesopotamia  United Kingdom
2008 singles  Creativity

Fig. 6g. Top entities Twitter

Overseas Chinese  Sociology
Twitter  Donald Trump  Fred Trump
Ivana Trump  Political campaign
Denial-of-service attack  Bell Pottinger Group
Bill Clinton
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.