The RiddlerBot
A next step on the ladder towards computational creativity

Ben Verhoeven
Iván Guerrero
Francesco Barbieri
Pedro Martins
Rafael Pérez y Pérez

DHBenelux
9 June 2015
Different Twitter users

• People

Ben Verhoeven
@verhoevenben
Researcher in computational linguistics at @clipsua - @UAntwerpen | Improviser at @Swajplimpro | Musician at facebook.com/kuzojband
Different Twitter users

• Organizations

CLiPS
@clipsua  FOLLOWS YOU
Computational Linguistics and Psycholinguistics Research Center, University of Antwerp

UAntwerpen
@UAntwerpen  FOLLOWS YOU
UAntwerpen is een jonge & dynamische onderzoeksuniversiteit met 20.109 studenten. Onderzoek en onderwijs zijn nauw met elkaar verbonden |
#UAntwerpen
Different Twitter users

• Bots
We present

TheRiddlerBot

- Interactive Twitter bot
- Creates riddles
- Strives to be considered creative
Riddles

• Text fragments that employ ordinary language restricted by semiotic, aesthetic and grammatical constraints
  (Pepicello & Green, 1984)

• Language game, initiated by a question, with the goal to mislead the guesser
  (Weiner & De Palma, 1993)

• What has no beginning, end or middle?
Creativity

• To be creative usually relates to the generation of something novel and interesting, not only to oneself, but also to partners sharing a common background (Mayer 1999)
Twitter bots

• Automatic Twitter users

Different types of bots (Cook 2015)
• feeder bots, which create tons of Tweets for their followers (mere generation);
• watcher bots: constantly looking for specific texts to extract information;
• interactive bots: which ask followers for specific ways of communication and information sharing
Feeder bots

Every Color
@everycolorbot

colors. all of ‘em. | developed by @vogon; feel free to send him feedback/feature requests

the RGB color space
github.com/vogon/everycolor...

Tweet to Every Color

14.8K Photos and videos

Tweets
TWEETS  FOLLOWERS  FAVORITES
14.8K   51.2K   2

Tweets
Tweets & replies  Photos & videos

Every Color @everycolorbot · 44m

0xe1372c
Feeder bots

SF QuakeBot
@earthquakesSF

I am a robot that live-tweets earthquakes in the San Francisco Bay area. Built by @billsnitzer. Data is from the USGS. Get prepared: amzn.to/PayIDo

San Francisco, CA

eqbot.com

Joined May 2009

Tweet to SF QuakeBot

Tweets

<table>
<thead>
<tr>
<th>Tweets</th>
<th>Tweets &amp; replies</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF QuakeBot @earthquakesSF · 21h</td>
<td></td>
</tr>
<tr>
<td>SF QuakeBot @earthquakesSF · Jun 6</td>
<td></td>
</tr>
</tbody>
</table>

A 2.0 magnitude earthquake occurred 7.46mi ENE of Yountville, California. Details: eqbot.com/VSS Map: eqbot.com/VSQ

A 1.3 magnitude earthquake occurred 3.73mi SSW of Calistoga, California. Details: eqbot.com/VSU Map: eqbot.com/VS5
Watcher bots

Pentametron
@pentametron
With algorithms subtle and discrete / I seek iambic writings to retweet.
Stratford-upon-Internet
pentametron.com
Joined March 2012

Tweets
Followers 20.4K
Favorites 111
Tweets
0 Followers you know

Tweet to Pentametron

Pentametron retweeted
ideasNE @fakkulord · 48m
jet fuel something something something something beams

Pentametron retweeted
$ara @swayzesara · 2h
My night consisted of the weirdest dreams 😞

Pentametron retweeted
Hannah @hannah_cherie_ · 12h
Extremely happy at the moment tho 😊
Watcher bots

Hug Bot
@HugsToThe Rescue

Everyone needs a hug now and then. a bot by @sachawheeler

Joined January 2013

Tweets
58.5K

Following
1,060

Followers
1,511

Favorites
5,661

Tweets
Tweets & replies
Photos & videos

Hug Bot retweeted
24 @Jayy_Von24 · 11m
Give yo grandmother a hug today

Hug Bot @HugsToThe Rescue · 11m
{{{hugs}}} RT @ChadCross23 What up love I need a hug cause drugs been taking ocer

Hug Bot @HugsToThe Rescue · 11m
{{{hugs}}} RT @spiderman1 I need a hug.
Interactive bots

how 2 sext
@wikisext

 Sexting bot. Learned everything it knows from wikihow. Tweets hourly. // idea:
@rumnogg, implementation:
@thricedotted

sex place

twitter.com/thricedotted/...
More on bots?

• A brief history of the future on Twitter bots
  Michael Cook (2015) - @mtrc

• http://www.gamesbyangelina.org/talks/codecamp.pdf

• Also check: #botally on Twitter
Computational Creativity

• First generation Twitter bots: Tweet-generating systems that autonomously perform useful and well-defined services (Veale 2014)

• Second generation bots: supposed to be creative on purpose instead of hit-and-miss. High curation coefficient: evaluate outputs before posting. (Veale 2015)
Our system: TheRiddlerBot

Specific task:
• Create a riddle about a famous person/character
• Use both structured and poorly-structured real-world resources
• Evaluate its own output where possible
• Interact with Twitter users
Our model

• Five modules that each have the same three layers in it
Character selection

- Non-Official Character (NOC) list (Veale, 2015)
  > 800 characters
  > 20 attributes, e.g. gender, profession, adjectives, ...
- Select one, possibly taking public relevance into account (~Google News)
- Expand from Wikipedia: persons that have a page in at least 50 languages
Feature extraction

Information Retrieval
- Gathers attributes from NOC list
- Combine with information (hypernyms) from common sense knowledge bases, e.g. Perception in NodeBox, ConceptNet
- Also poorly-structured sources, e.g. Wikipedia

Processing
- Select three attributes

Evaluation
- Evaluate attributes on uniqueness and interestingness
  - Subset of features is unique when refers to 1 person
Perception (NodeBox)

ARNOOLD SCHWARZENEGGER » 6 rules

<table>
<thead>
<tr>
<th>IS-A</th>
<th>HAS-SPECIFIC</th>
<th>IS-PART-OF</th>
<th>HAS-PART</th>
<th>IS-OPPOSITE-OF</th>
<th>IS-PROPERTY-OF</th>
<th>HAS-PROPERTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conan The Barbarian</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>funny</td>
<td></td>
</tr>
<tr>
<td>person</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>masculine</td>
<td></td>
</tr>
<tr>
<td>politician</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Terminator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

www.nodebox.net/perception
Analogy generation

• Comparisons with different characters
  – Fictional world
    • E.g. Doc Emmett Brown is like Walter White but in Back to the Future
  – Group affiliation
    • E.g. Lisa Simpson is the Timothy McGee of The Simpsons Family
Natural language generation

• Retrieval of different types of phrasal templates for parts of the riddle
  – Initial phrase
  – Clues
  – Final question
• Phrasal template: previously-known sentence with slots to be further filled by specific words
• Different templates exist for each type to have a wider variety of generations.
Example phrasal templates

<table>
<thead>
<tr>
<th>Profession attribute</th>
<th>-be/VB &lt;value&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-be/VB &lt;value&gt;, &lt;pos_adj&gt;</td>
</tr>
<tr>
<td></td>
<td>yet &lt;neg_adj&gt;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opponent attribute</th>
<th>-do/VB not like &lt;value&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-be/VB definitely not a</td>
</tr>
<tr>
<td></td>
<td>close friend of &lt;value&gt;</td>
</tr>
</tbody>
</table>
User interaction

• Twitter users can guess the answer to the riddle
• The bot will check if the answer is correct with the official name and all Wikipedia aliases
• The bot replies: correct or false, also with different templates.
Sample riddles generated

• Who is a basketball player, fast yet smug, lives in USA, wears clown shoes?
• Who is a sultry actress, loves starring in Hollywood movies, likes wearing a tight dress?
• Who can be found in Germany, wears an SS uniform, is the Colonel Kurtz of The Nazi Party?
Evaluation

• Metadata of the bot (number of retweets, favorites, answers, …) could be used for evaluation?

• Some statistics:
  – 57 followers
  – 285 riddles generated
  – 10 different users with 34 correct answers
Evaluation

- Crowd-sourced quality-control
- 86 people evaluated 5 riddles each

Bar chart showing:
- Yes: 15.58% for Correct answer, 54.19% for Awareness of the character.
- No: 84.42% for Correct answer, 45.81% for Awareness of the character.
Evaluation

- Crowd-sourced quality-control
- 86 people evaluated 5 riddles each
Best riddles generated

• Who is a creative professional, pretty yet superficial, can be found in USA, enjoys monetizing celebrity status?
• Who is a religious leader, loves spreading Christianity, likes wearing sandals?
• Who is a creator, can be found in Italy, wears a paint-stained smock?
To conclude

• We built an interactive Twitter bot that generates riddles and posts responses to guesses.
• The novelty and creativity is in
  – The combination of well-structured and poorly-structured information sources.
  – The creation of analogies
• The fun is in the gamification.
• Entire code available online: https://github.com/ivangro/theriddlerbot
Let’s play!

TheRiddlerBot @TheRiddlerBot · 3h
I am known as a creative professional, live in UK, like creating dictionaries. Who am I?

9:17 AM · 9 Jun 2015 · Details

Reply to @TheRiddlerBot

Ben Verhoeven @verhoevenben · 19m
@TheRiddlerBot Samuel Johnson

TheRiddlerBot @TheRiddlerBot · 19m
@verhoevenben You did it! The answer was indeed Samuel Johnson.