



Language Technologies, Futures, and Routes to Market

Seth Grimes
Alta Plana Corporation
@sethgrimes

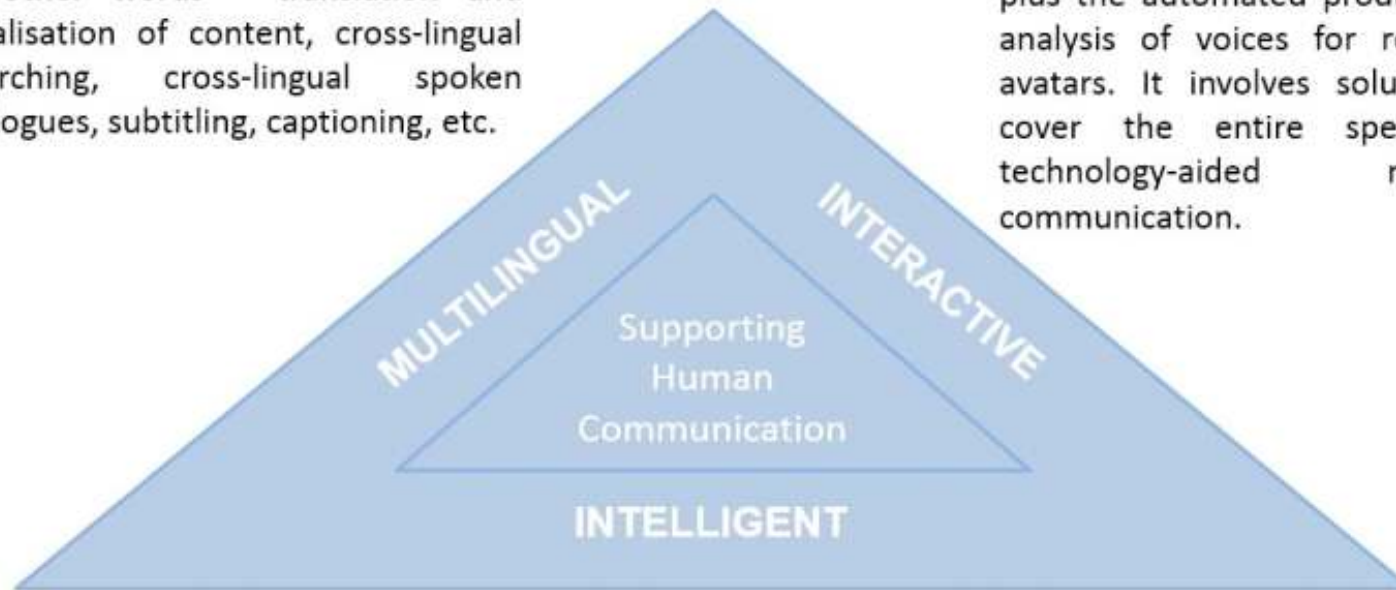
November 21-22, 2016 – Brussels



Language Technologies, per LT-Innovate

Multi- and cross-lingual processing covers all of the contexts in which the presence of multiple languages in the content communication chain requires language-specific solutions. In other words – translation and localisation of content, cross-lingual searching, cross-lingual spoken dialogues, subtitling, captioning, etc.

Interactive communication covers all processing and analytic operations of spoken language (syntax, semantics and pragmatics including emotion, tone, and similar features) in face to face or remote interaction contexts, plus the automated production and analysis of voices for robots and avatars. It involves solutions that cover the entire spectrum of technology-aided multimodal communication.



Intelligent content covers all processing and analytic operations that use natural language processing (syntax & semantics) to parse, understand, link, categorise and leverage text content found in any media (visual or textual documents), often bundled inside other applications. It involves solutions that automate and accelerate the production, communication, reception and comprehension of all these content-centric processes.



Agenda

Language Technologies

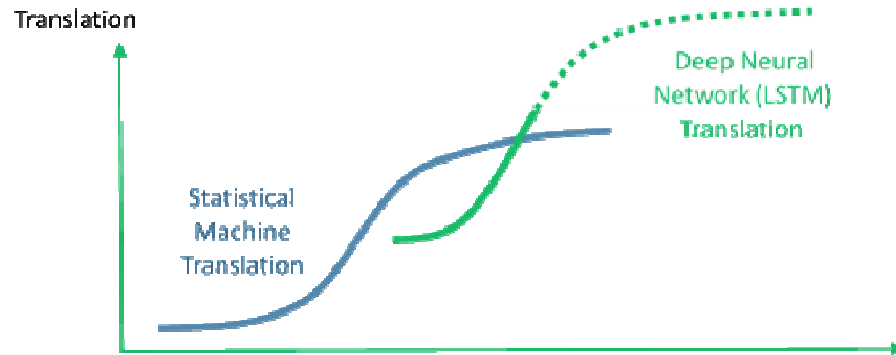
- Multilingual
- Interactive
- Intelligent

Futures

Routes to market



Multilingual



<https://blogs.msdn.microsoft.com/translation/2016/11/15/microsoft-translator-launching-neural-network-based-translations-for-all-its-speech-languages/>

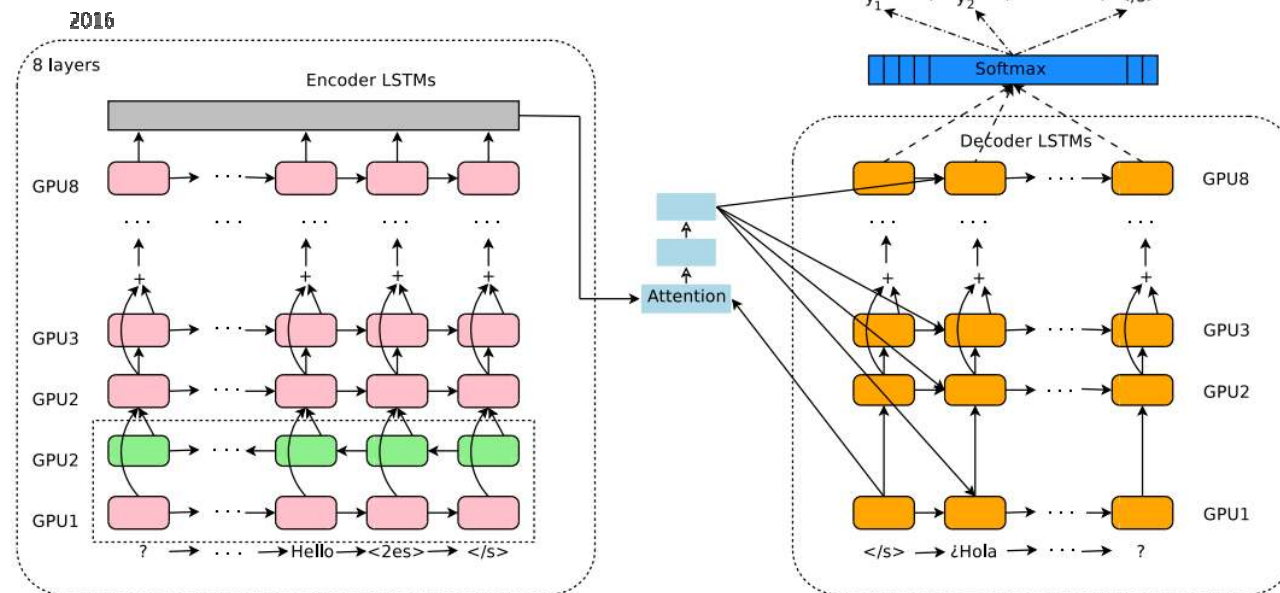


Figure 1: The model architecture of the Multilingual GNMT system. In addition to what is described in [24], our input has an artificial token to indicate the required target language. In this example, the token “<2es>” indicates that the target sentence is in Spanish, and the source sentence is reversed as a processing step. For most of our experiments we also used direct connections between the encoder and decoder although we later found out that the effect of these connections is negligible (however, once you train with those they have to be present for inference as well). The rest of the model architecture is the same as in [24].

“Google’s Multilingual Neural Machine Translation System...”

<https://arxiv.org/pdf/1611.04558v1.pdf>



Interactive

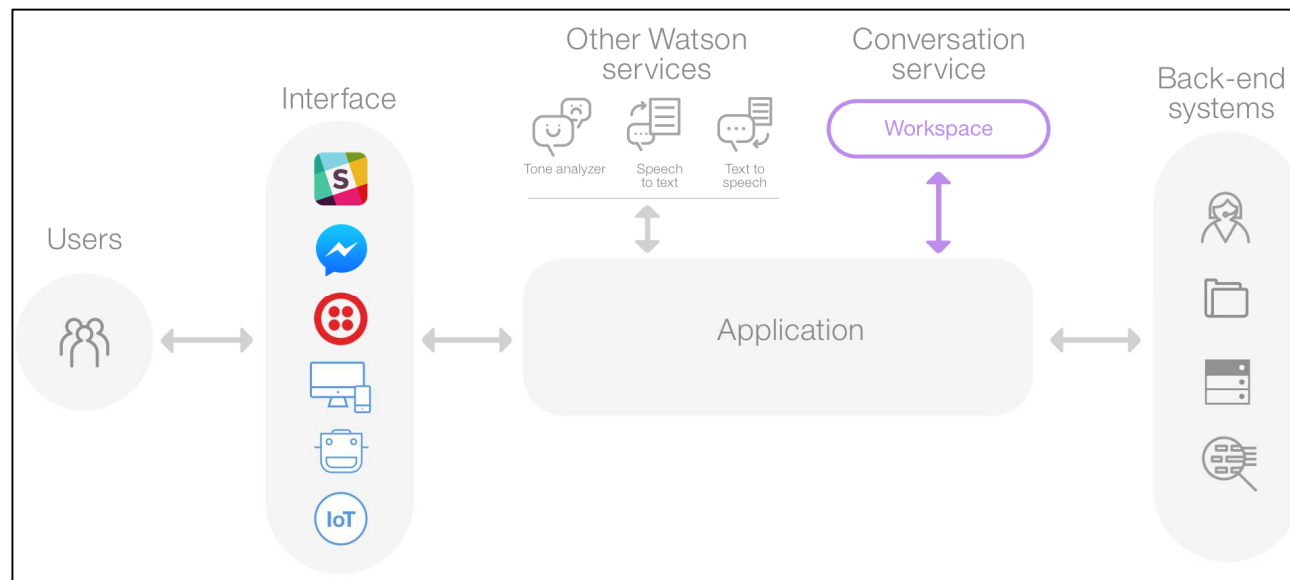
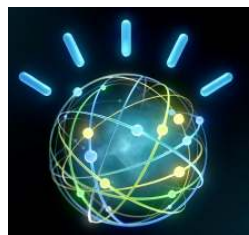
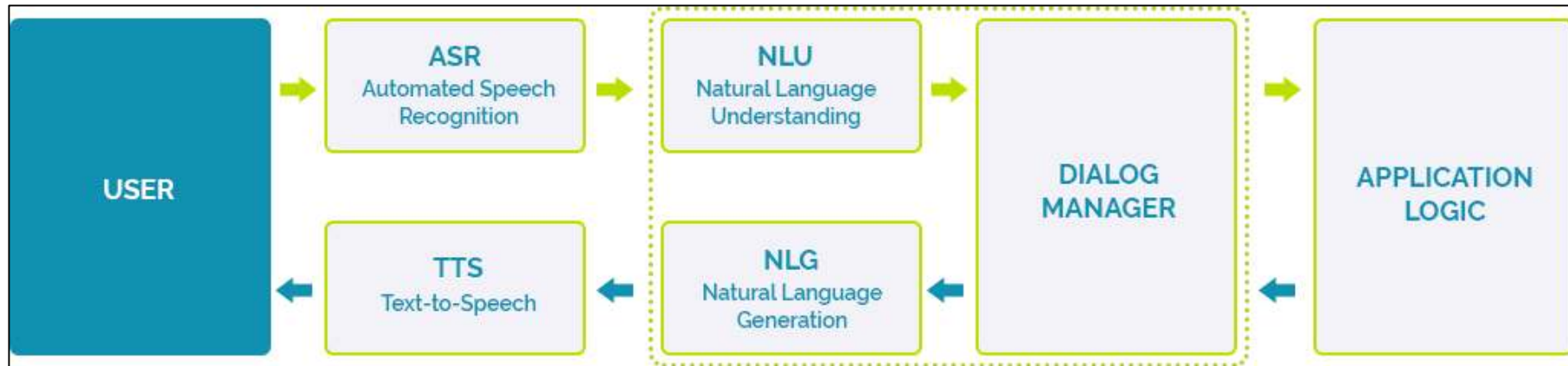
Text, speech

- Understanding
- Generation

Interactivity implies:

- Situational understanding
- Production
- Statefulness
- Temporality

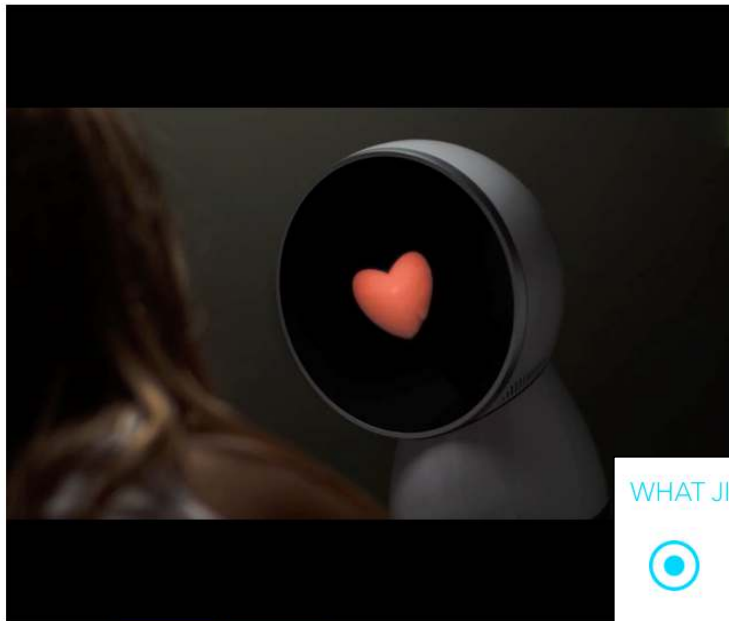






Conversational Interfaces (+ IoT)

Meet Jibo, The World's First Social Robot



Email Tweet Like 9.7K

Join our waitlist

Complete the form below to be notified of new pre-order opportunities and other Jibo related news.



WHAT JIBO CAN DO



See

Two hi-res cameras recognize and track faces, capture photos, and enable immersive video calling.



Hear

360° microphones and natural language processing let you talk to Jibo from anywhere in the room.



Speak

Hands-free reminders and messages, so you'll never forget and can always be in touch.



Learn

Artificial Intelligence algorithms learn your preferences to adapt and fit into your life.



Help

Like a personal assistant, Jibo proactively helps you, to make everyday tasks simpler and easier.



Relate

Communicates and expresses using natural social and emotive cues so you understand each other better.

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Intelligent

LT-Innovate:

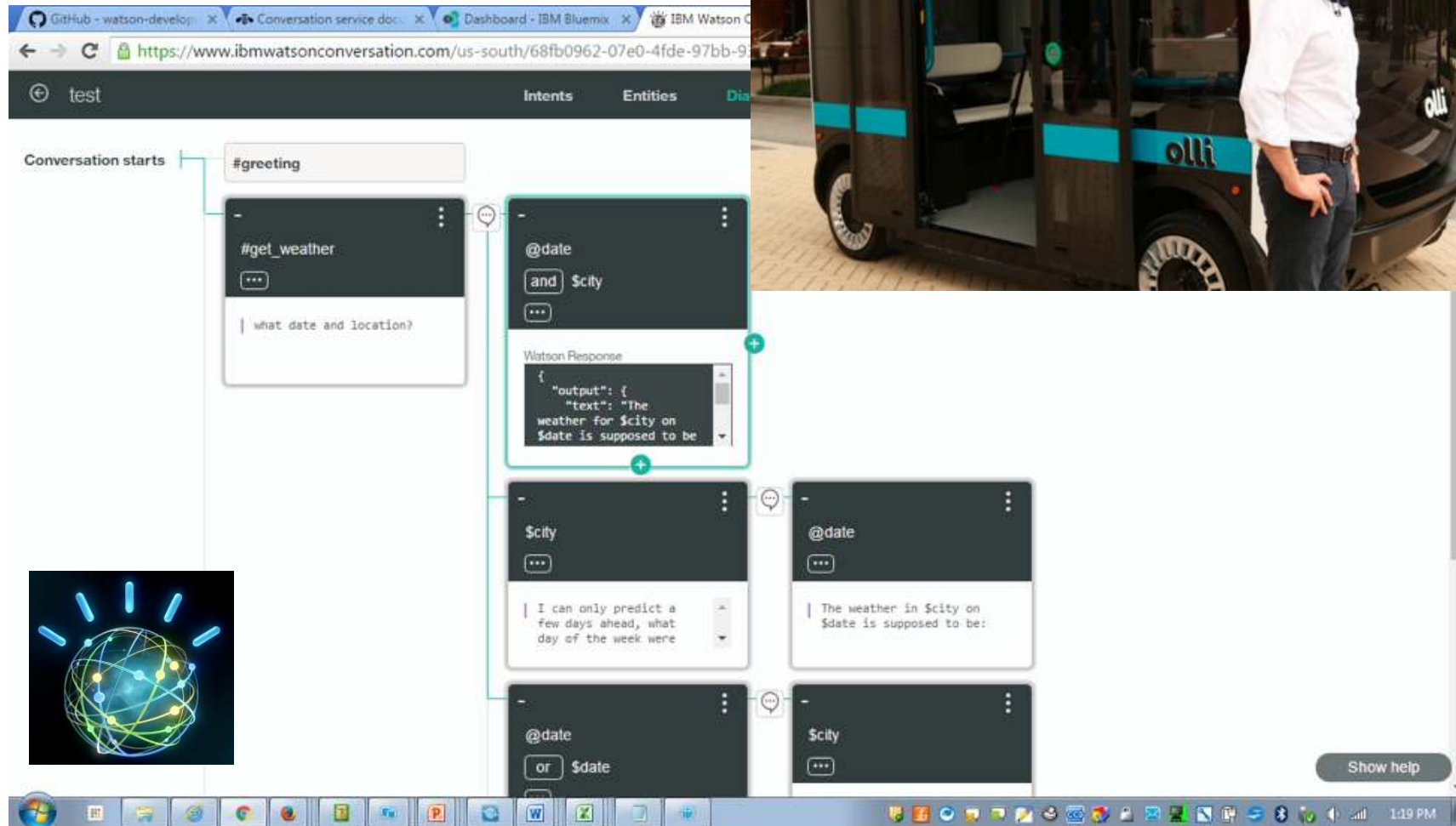
“Intelligent content covers all processing and analytic operations that use natural language processing (syntax & semantics) to parse, understand, link, categorise, and leverage text content...”

Contrast:

Cognitive systems synthesize, infer, and learn.



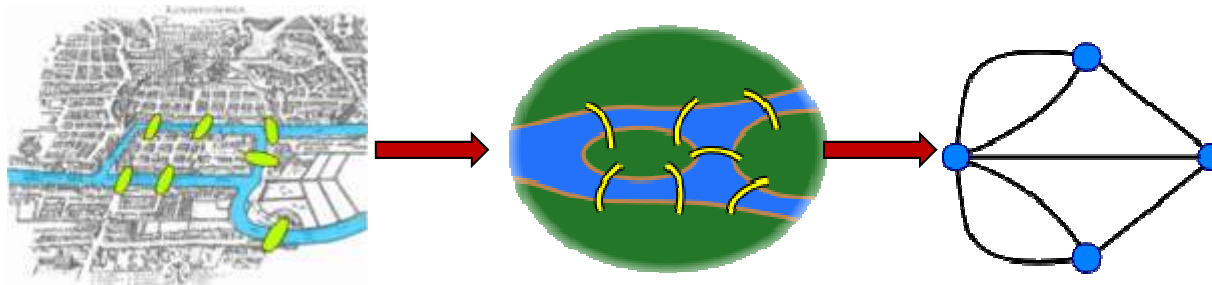
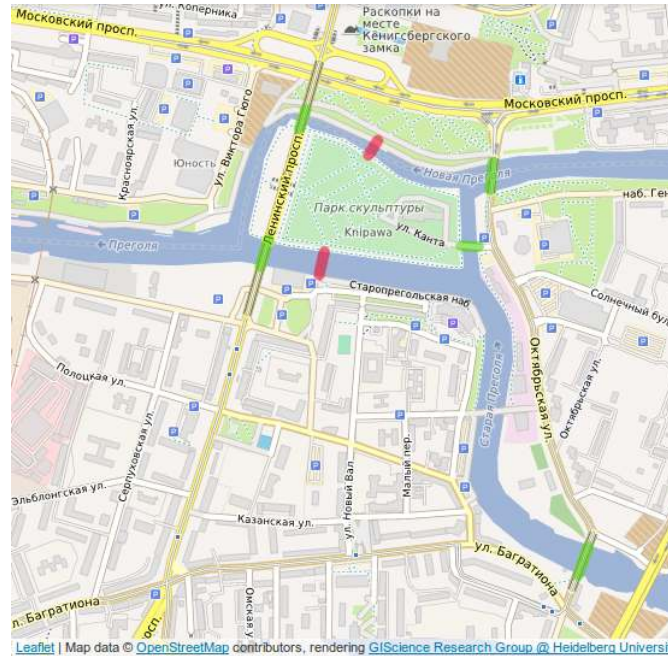
Cognitive?



<https://www.ibm.com/blogs/watson/2016/08/getting-started-watson-conversation-6-steps/>



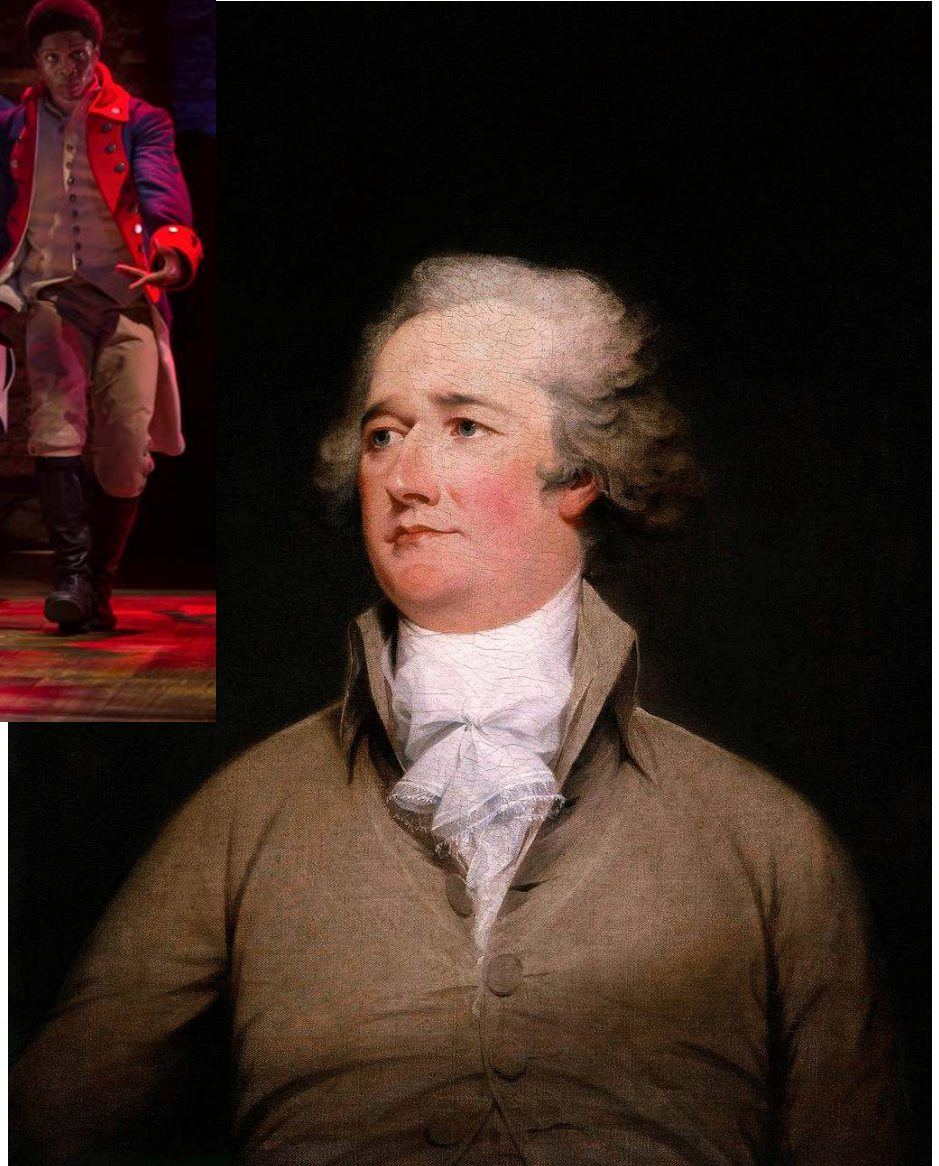
Technology, Model < Solution



http://en.wikipedia.org/wiki/Seven_Bridges_of_K%C3%B6nigsberg



A Modeler





290 trump

47.0% votes | 61,201,031



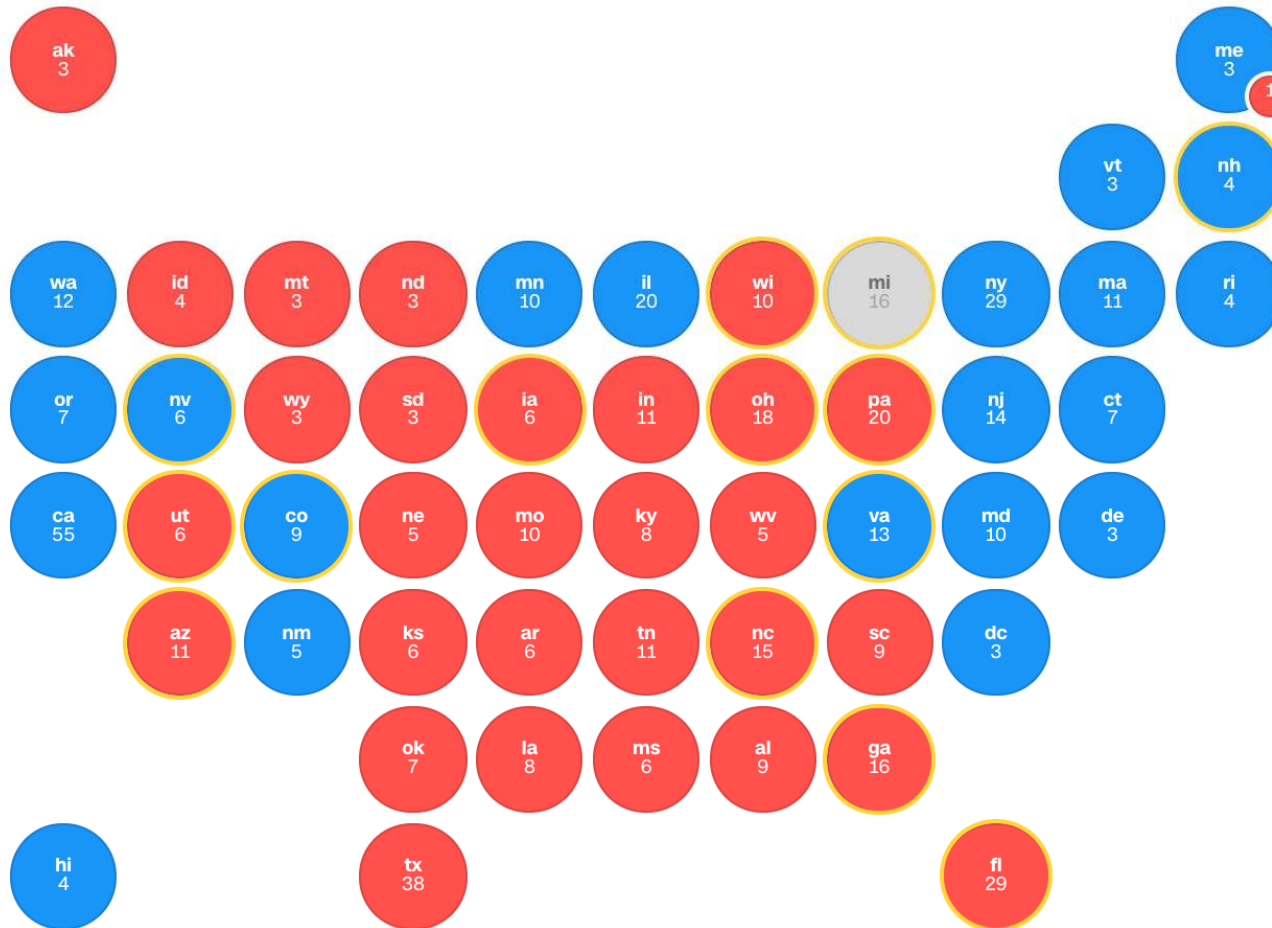
clinton 232

62,523,126 | 48.0% votes

270 electoral votes to win

national map

popular vote



● trump ● clinton ● johnson ● stein ● other ● voting or processing ● key race

<http://www.cnn.com/election/results/president>

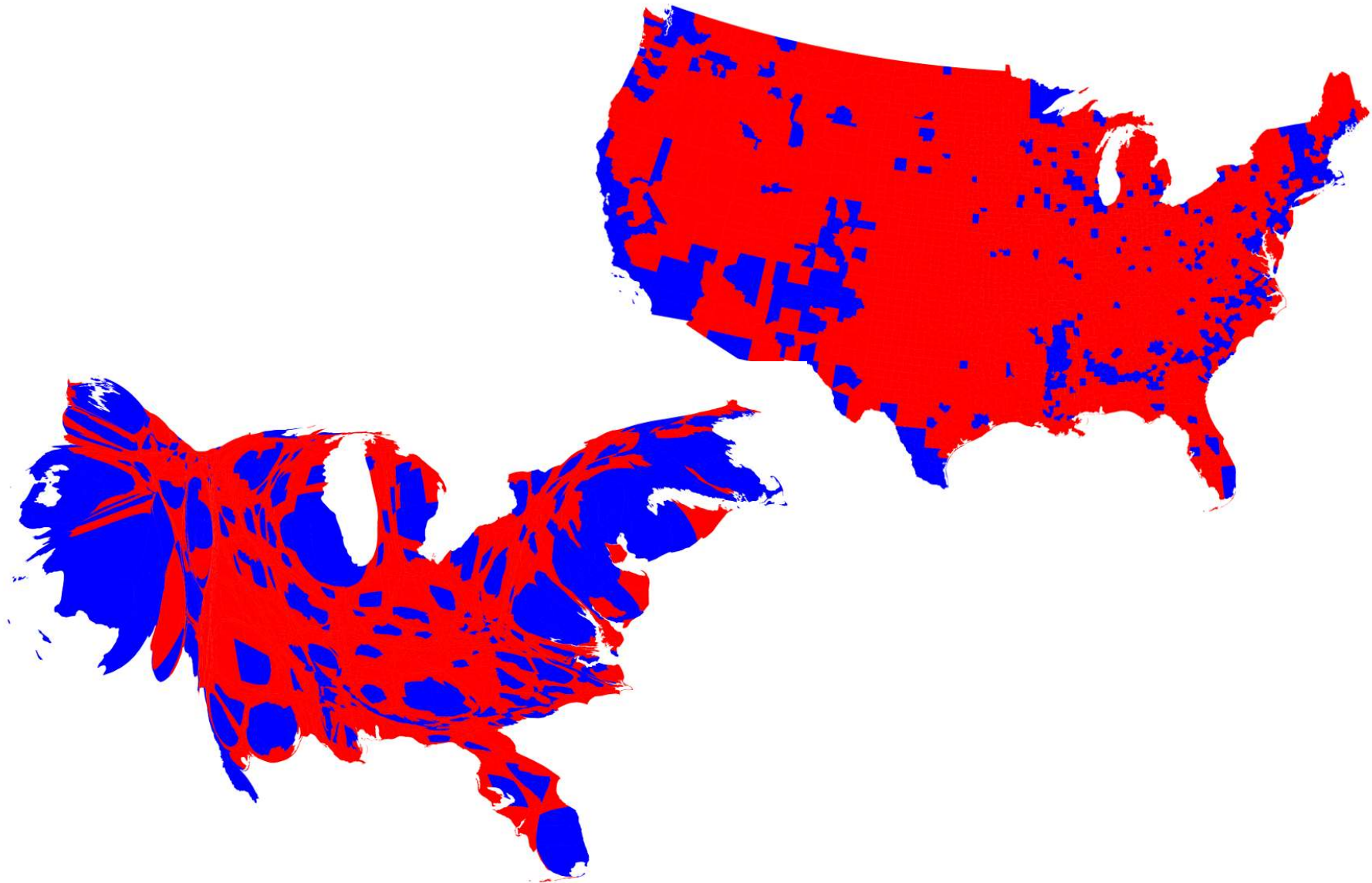
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http://www.nytimes.com/interactive/2016/11/16/us/politics/the-two-americas-of-2016.html?_r=1

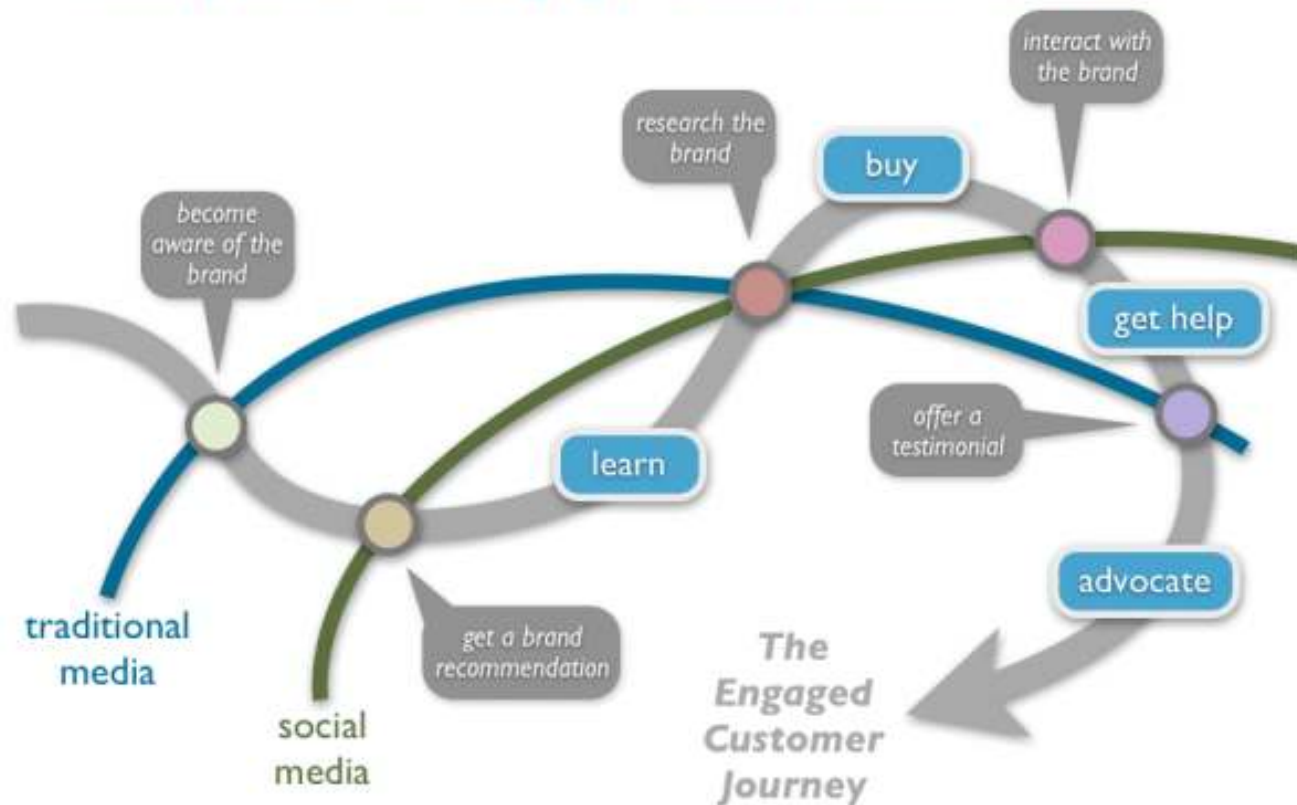







<http://uk.businessinsider.com/2016-election-results-maps-population-adjusted-cartogram-2016-11>

A Journey Map

In 2013: Marketing Strategies That Connect All Touchpoints To Engage Customers At Scale



  Some Rights Reserved. 2013.  DachisGroup by Dion Hinchcliffe

Dion Hinchcliffe

<https://www.enterpriseirregulars.com/58013/social-media-marketing-predictions-for-2013-part-1/>

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Journey Analytics

Company objective

Reduce care costs, improve quality of care

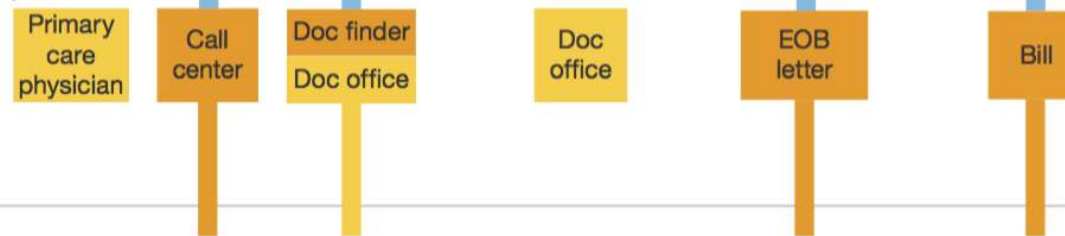
Customer objective

I get the care I need to become healthy

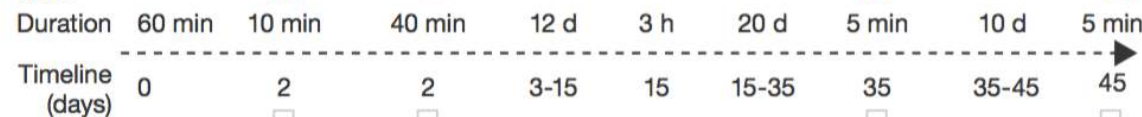
Steps



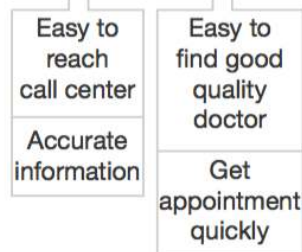
Touchpoints



Time



Expectations



- = Moment of truth
- = Good experience
- = Pain point
- = Touchpoint
- = Touchpoint with a partner
- = Step in the journey
- = Step without interaction with the company
- = Interdependency

FORRESTER

FOR CUSTOMER INSIGHTS PROFESSIONALS

Drive Customer Obsession With Journey Analytics

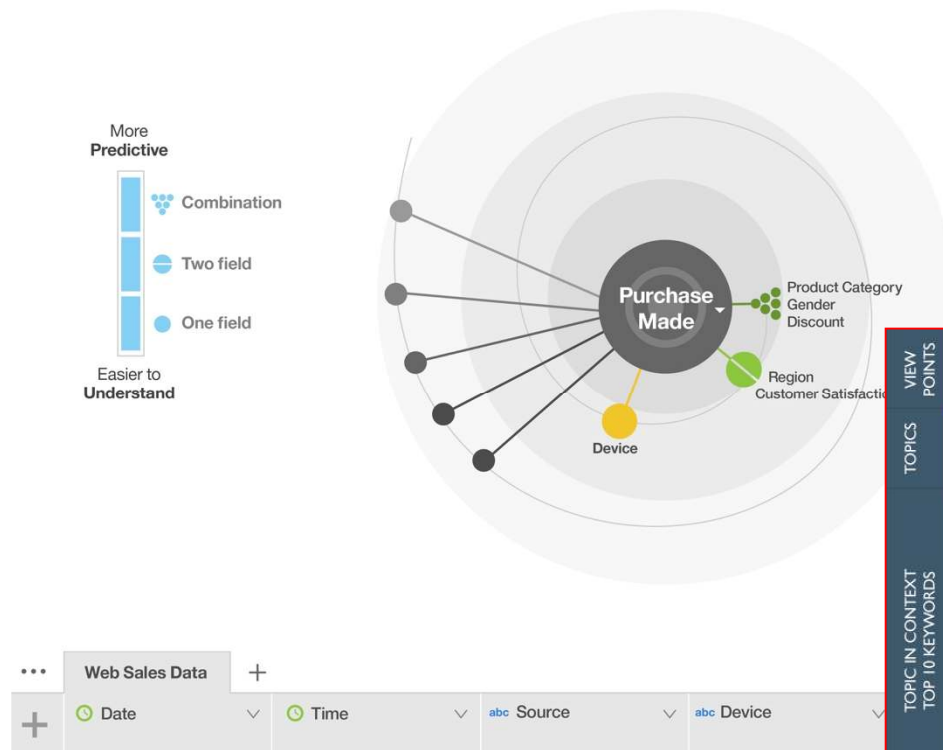
Use Quantitative And Qualitative Customer Data To Analyze, Optimize, And Predict Behavior

by Tina Moffett and Joana van den Brink-Quintanilha
November 30, 2015



What predicts Purchase Made?

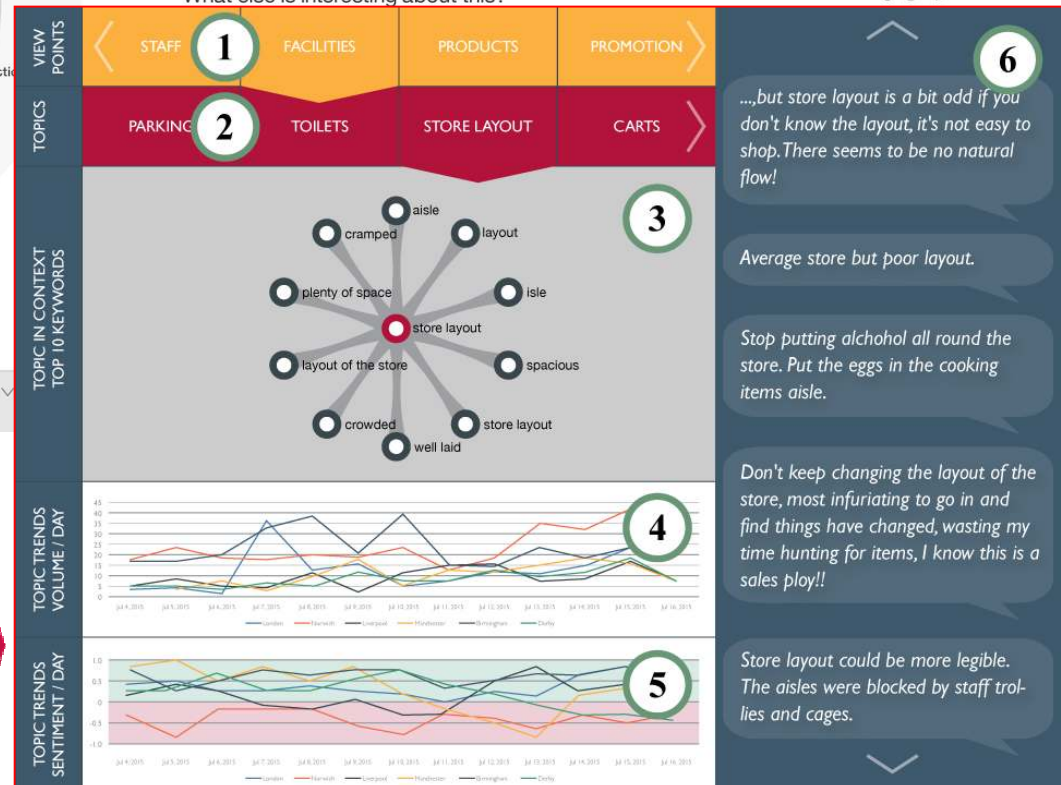
2 strong predictors and 1 moderate predictor have been found and are shown below.



What influences Purchase Made?



What else is interesting about this?



etuma^e

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MACHINE INTELLIGENCE 3.0

ENTERPRISE INTELLIGENCE

VISUAL

Orbital Insight planet
clarifai DEEP VISION
cortica Igocon
SPACE_KNOW Captricity
netra deepomatic

AUDIO

Gridspace TalkIQ
nexidia twilio
CAPIO Expect Labs
Clover Mobvoi
Quirous.AI popUP archive

SENSOR

PREDIX G3IoT MAANA
Sentenai PLANET OS
UPTAKE IMUBIT Preferred Networks
thingworx KONUX Alluvium

INTERNAL DATA

PRIMER IBM WATSON
Cycorp Palantir ARIMO
Alation Osapho Outlier
Digital Reasoning

MARKET

mattermark Quid
DataFox PREMISE
Bottlenose MOTIVA
enigma CB INSIGHTS
Tracxn predata

ENTERPRISE FUNCTIONS

CUSTOMER SUPPORT

DigitalGenius Kasisto
ELOQUENT Wiseio
ACTIONIQ zendesk
Preact CLARABRIDGE

SALES

collective[i] sense
fuse|machines AVISO
salesforce INSIDE SALES .COM clari
Zensight

MARKETING

MINTIGO Lattice RADIUS
LiftIgniter PERSADO
brightfunnel retention science
COGNICOR AIRPR msgai

SECURITY

CYCLANCE DARKTRACE
ZIMPERIUM deepinstinct
Sentinel DEMISTO
graphistry drawbridge
SignalSense AppZen

RECRUITING

textio entelo
Wade & Wendy hiQ
unilive SpringRole
GIGSTER HireVue

AUTONOMOUS SYSTEMS

GROUND NAVIGATION

drive.ai AdasWorks
ZOOX MOBILEYE
UBER Google TESLA
nuTonomy Auro Robotics

AERIAL

SKYDIO SHIELD AI
Airware DJI LILY
DroneDeploy
pilot.ai SKYCATCH

INDUSTRIAL

JAYBRIDGE OSARO
CLEARPATH fetch
KINRED rethink robotics
HARVEST

AGENTS

PERSONAL

amazon alexa
Cortana Allo
facebook
Siri Replika

PROFESSIONAL

butter.ai pogo SKIPFLAG
clara x.ai slack
talla Zoom sudo

INDUSTRIES

AGRICULTURE

BLUE RIVER mavrx
tule TRACE GENOMICS Pivot Bio
TerraAvion AGRI-DATA
Descartes Labs udie abundant robotics

EDUCATION

KNEWTON volley
gradescope
CTI coursera
UUDACITY alt school

INVESTMENT

Bloomberg sentient
ISENTIUM KENSHO
alphasense Dataminr
CEREBELLUM CAPITAL Quandl

LEGAL

blueJ BEAGLE
Everlaw RAVEL
Seal ROSS
LEGAL ROBOT

LOGISTICS

NAUTO Acerta
PRETECKT clearmetal
Routific MARBLE PITSTOP

INDUSTRIES CONT'D

MATERIALS

zymergen Citrine
Eigen Innovations
SIGHT MACHINE
GINKGO BIOWORKS nanotronics
CALCULARIO

RETAIL FINANCE

TALA zest finance
Lendo earnest
affirm MIRADOR
wealthfront Betterment

PATIENT

PULSE CareSkore
ZEPHYR HEALTH IBM Watson Health
Oncoda SENTRIAN
Atomwise Numerate

IMAGE

BUTTERFLY 3SCAN
ARTERYS enlitic
BAYLABS imagia
Google DeepMind

BIOLOGICAL

iCarbonX color GRAIL
deep genomics RECURSION
LUMINIST Numerate
Atomwise verily WHOLE BIOME

TECHNOLOGY STACK

AGENT ENABLERS

OCTANE.AI howdy. Maluuba KITT.AI
OpenAI Gym Kasisto AUTOMAT
semanticmachines

DATA SCIENCE

DOMINO SPARKBEYOND rapidminer
kaggle DataRobot yhat AYASDI
data iku seldon yseop bigml

MACHINE LEARNING

CognitiveScale GoogleML context.relevant
Cycorp HyperScience nora logics minds.ai H2O.ai
SCALED INFERENCE sparkcognition loop GEOMETRIC INTELLIGENCE
deepsense.io reactive skymin bonsai

NATURAL LANGUAGE

agolo PYLLEN LEXALYTICS
Narrative Science loop@spaCy LUMINOSO
cortical.io MonkeyLearn

DEVELOPMENT

SIGOPT HyperOpt fuzzyio pkite
rainforest lobe Anodot
Signifai LAYER 6 bonsai

DATA CAPTURE

CrowdFlower diffbot CrowdAI import io
Paxata DATASIFT amazon mechanicalturk enigma
WorkFusion DATALOGUE TRIFACTA parsehub

OPEN SOURCE LIBRARIES

Keras Chainer CNTK TensorFlow Caffe
H2O DEEPLARNING4J theano torch
DSSTNE Scikit-learn AzureML neon
MXNet DMTK Spark PaddlePaddle WEKA

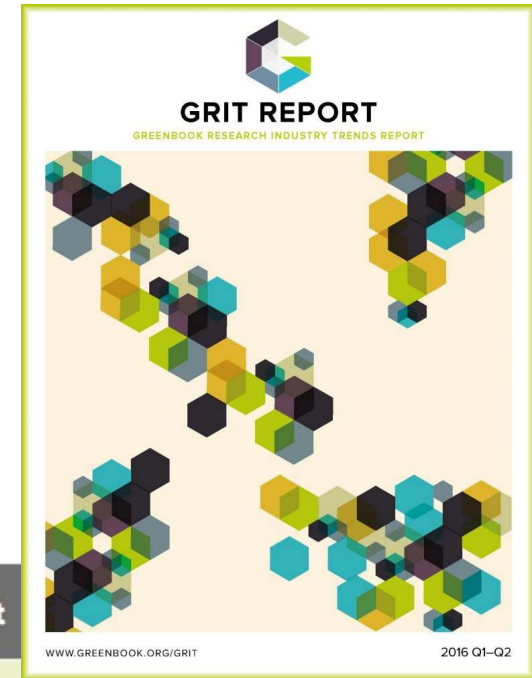
HARDWARE

KNUPATH TENSTORRENT Cirrascale
NVIDIA intel nervana Movidius
tensilica GoogleTPU 1026 Labs qualcomm
Cerebras Isosemi

RESEARCH

OpenAI nnaisense ELEMENT vicarious
KNOGIN Numenta Kimera Systems Cogital

Research & Insights



EMERGING METHODS TOTAL INTEREST

| | In Use | Under Consideration | Total Interest | |
|-----------------------------|--------|---------------------|----------------|---------------|
| Mobile Surveys | 74% | 17% | 91% | Mainstream |
| Online Communities | 61% | 22% | 83% | |
| Social Media Analytics | 48% | 28% | 76% | Wide Adoption |
| Text Analytics | 45% | 27% | 72% | |
| Mobile Qualitative | 44% | 27% | 71% | |
| Webcam-Based Interviews | 42% | 23% | 64% | |
| Big Data Analytics | 39% | 30% | 68% | |
| Eye Tracking | 36% | 22% | 57% | |
| Micro-surveys | 35% | 25% | 60% | |
| Mobile Ethnography | 34% | 27% | 61% | |
| Behavioral Economics Models | 31% | 25% | 56% | |

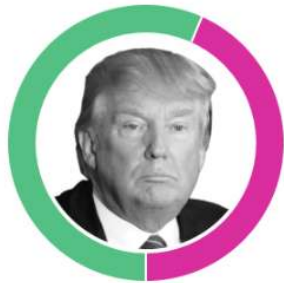


Donald Trump is President-elect of the United States

Geo-tagged tweets in the 10 minutes following Trump victory peak

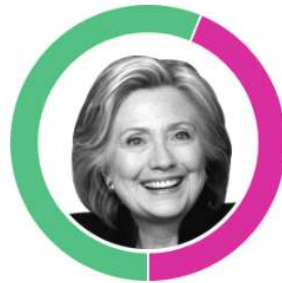


Twitter analysis via Brandwatch | 10% of total mentions of Clinton and Trump | 9 November 2016 (ET) (2:43am - 2



Donald Trump

56.7% Pos | 43.3% Neg



Hillary Clinton

56.2% Pos | 43.8% Neg

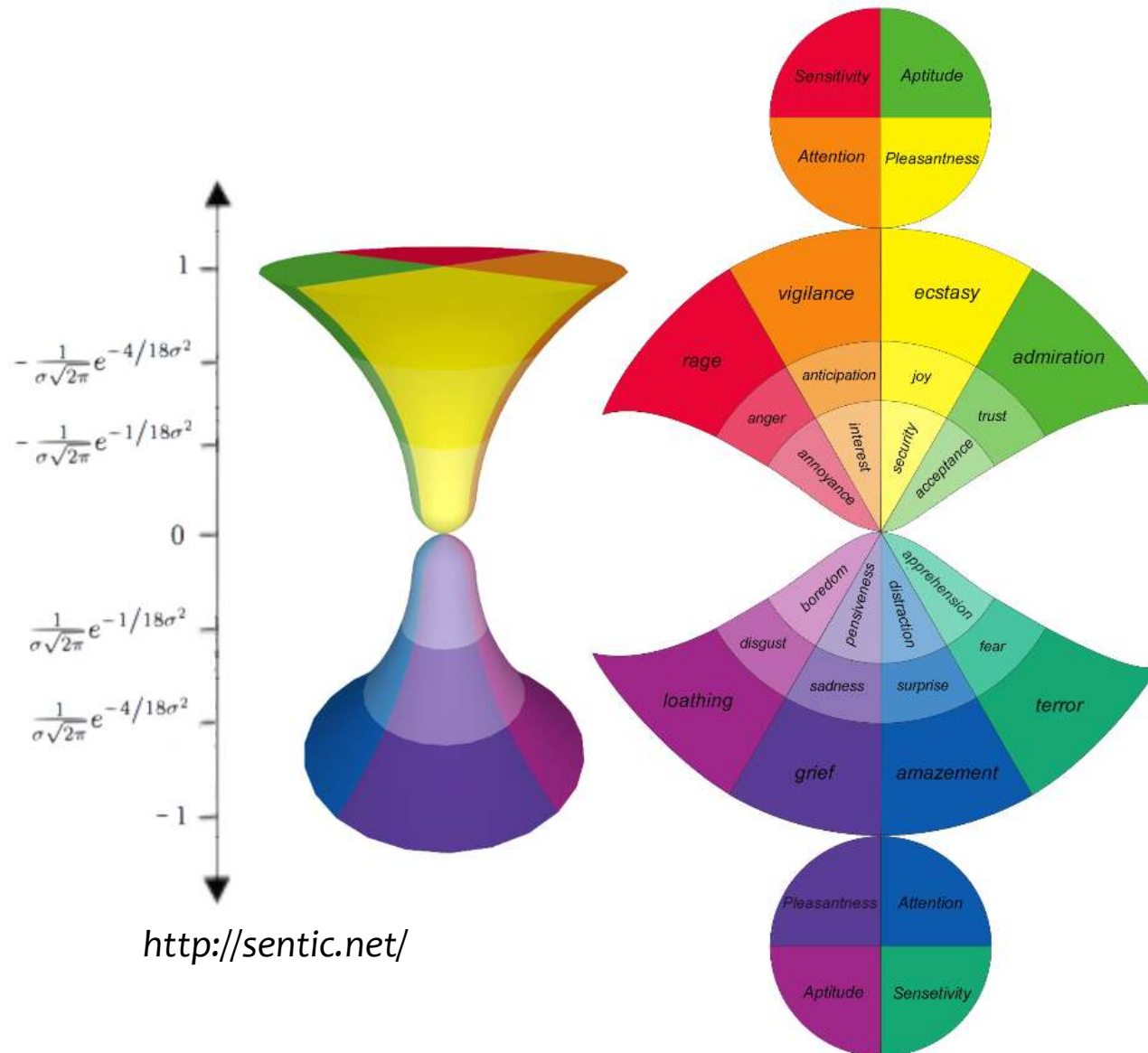
Weak Social / Media Analytics

NETBASE



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Emotion



« Le cœur a ses raisons que la raison ne connaît point. »



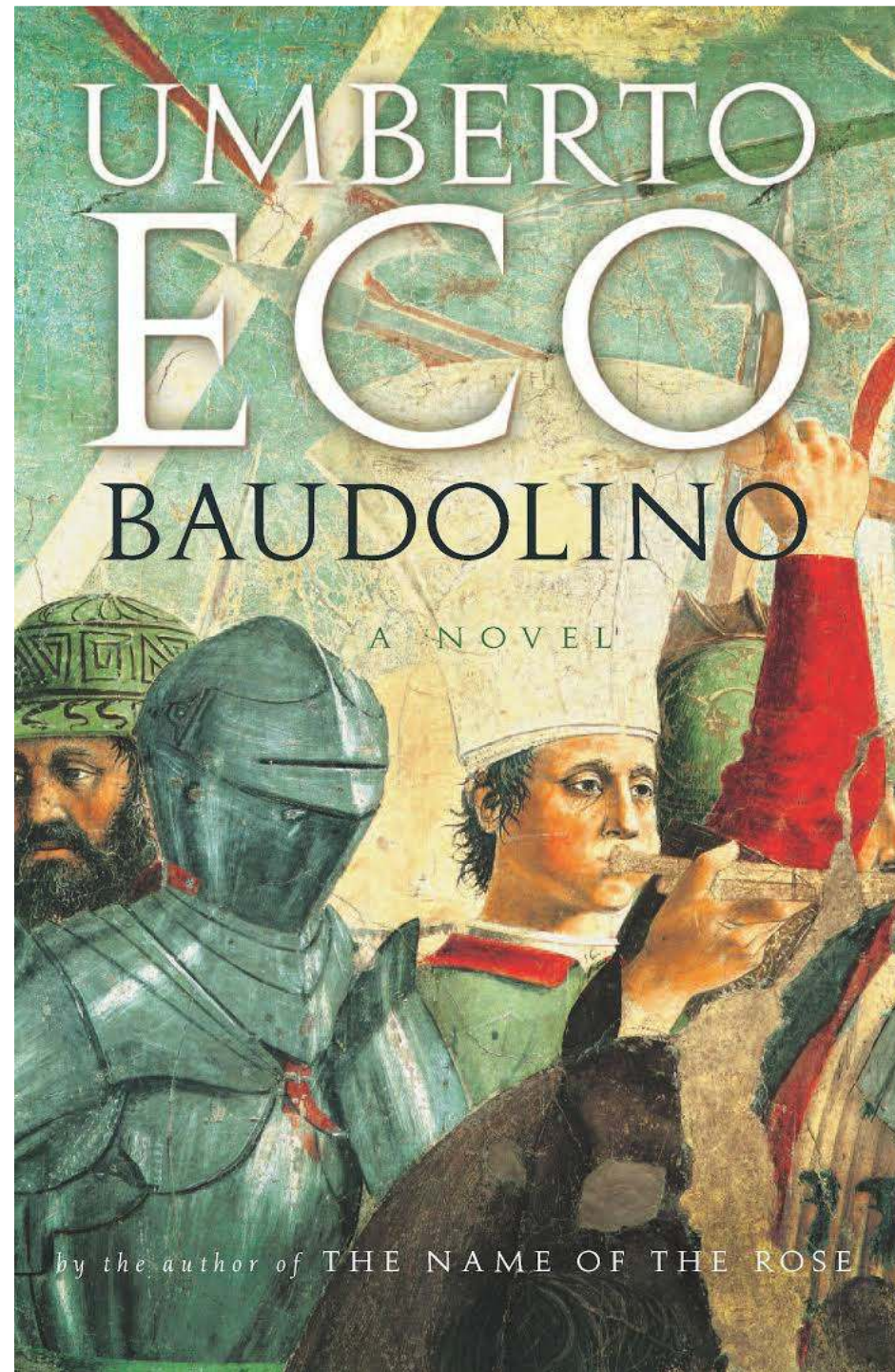


Semiotics



http://www.nytimes.com/2016/08/12/us/politics/confederate-flag-trump-rally.html?_r=0





*Fact vs.
Truth*

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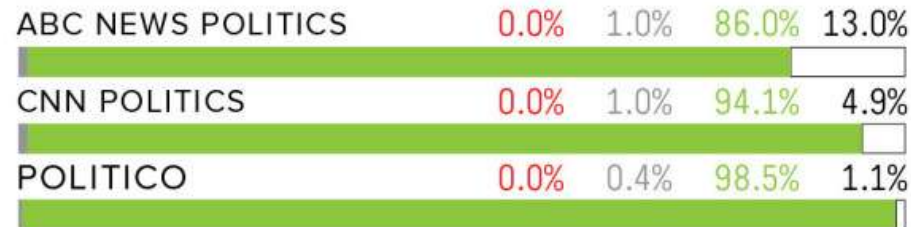


Rating by Page

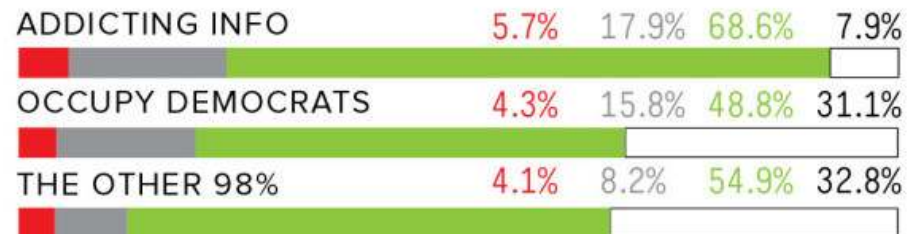
A New World

■ MOSTLY FALSE ■ MIX. OF TRUE AND FALSE ■ MOSTLY TRUE
□ NO FACTUAL CONTENT

Mainstream



Left



Right



Hyperpartisan Facebook Pages Are Publishing False And Misleading Information At An Alarming Rate

<https://www.buzzfeed.com/craigsilverman/partisan-fb-pages-analysis>

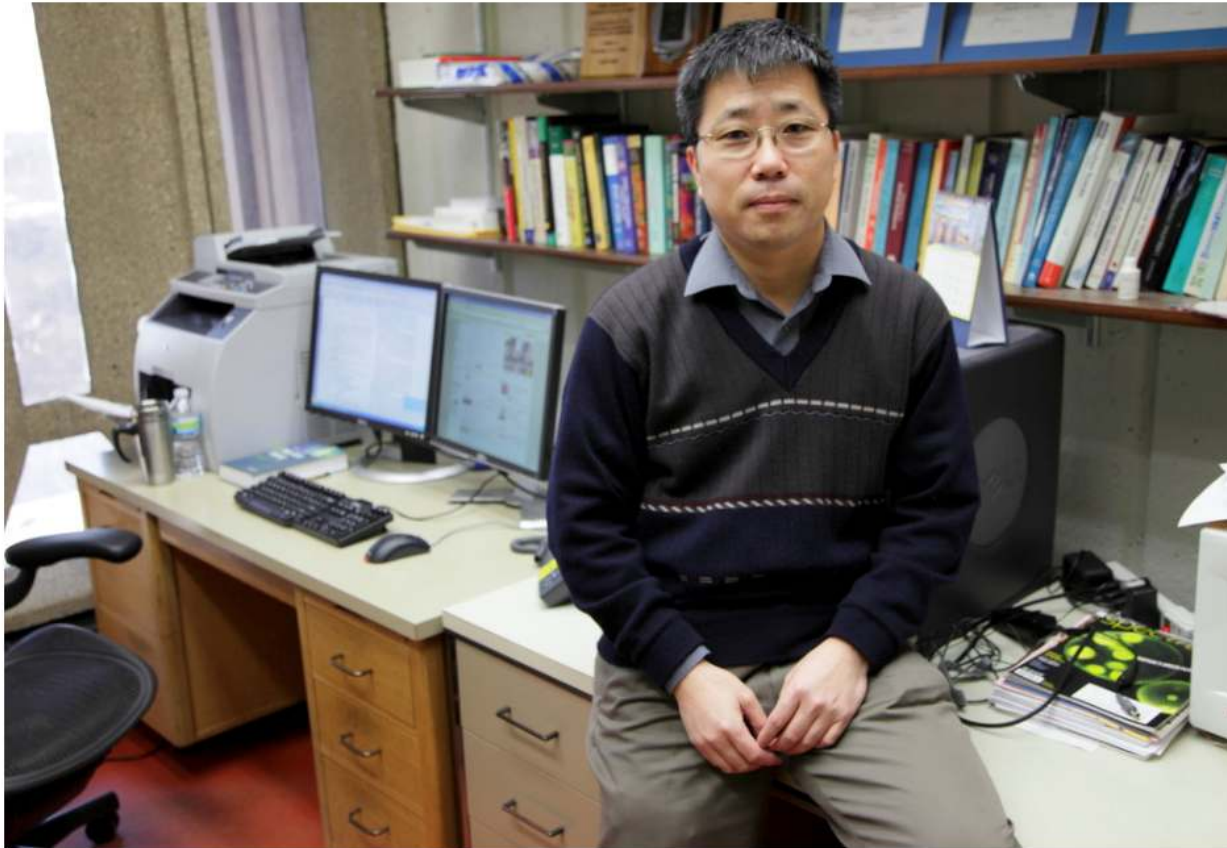
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For \$2 a Star, an Online Retailer Gets 5-Star Product Reviews

Anti-Spam

By DAVID STREITFELD JAN. 26, 2012




Bing Liu, a computer science professor at the University of Illinois at Chicago, is trying to devise mathematical models that can unmask fake product endorsements. "The incentives for faking are getting bigger," he said. "It's a very cheap way of marketing." John Gress for The New York Times

http://www.nytimes.com/2012/01/27/technology/for-2-a-star-a-retailer-gets-5-star-reviews.html?_r=2



Election Results Prediction, Combined: Pennsylvania Outcome $f[x]$

Scoring the model against a new sample, the predicted winner of the Iowa state, 2016 US election is Donald Trump with 54% of votes, and an additional 20 Electoral Votes.

| From / To |  Donald Trump |  Hillary Clinton |  Total | % Correct |
|---|--|---|---|-----------|
|  Donald Trump | 80 | 3 | 83 | 96.39% |
|  Hillary Clinton | 6 | 71 | 77 | 92.21% |
|  Total | 86 | 74 | 160 | 94.38% |



2016 US Election Results: Pennsylvania**
Democratic Party (Hillary Clinton): 0 votes
Republican Party (Donald Trump): 20 votes

Donald Trump
86 / 160
54%

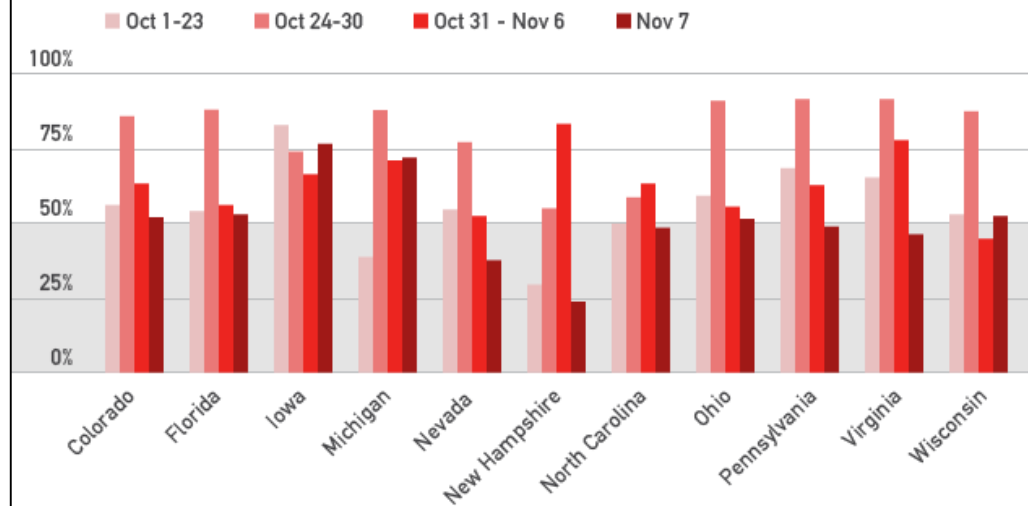
Hillary Clinton
74 / 160
46%

*Confidence interval of 89.66% to 97.01% on predicted values of sample (n=160)

**Predicted results applied to Electoral votes within Pennsylvania (20 Electoral Votes). Source: <http://www.politico.com/2016-election/res>



Pro-Trump or anti-Clinton unique authors as a percentage of all candidate sentiment



<https://www.brandseye.com/images/news/pro-trump-graph.png-analysis>

[✈ Explore AP](#)

Paste Text Here

"And I think if I had to do it all again, what would I have done? Would I have worn a leather shirt? Would I have drank half a bottle of Hennessy and gave the rest of it to the audience? Y'al

Clear Anal

Receptiviti



Tends to be hard driving, competitive, with a sense of time urgency. threatened.

Tends to be impulsive and makes decisions quickly – often without
They may be considered a free spirit who enjoy living in the here-an

Likely often seen as critical, uncooperative, and even rude. Is likely a

People Pattern Portrait Search

Discover your audience

Find, understand and activate your target audience with People Pattern using the filters below. Search across a quarter-billion portraits for people, located in Texas, that mention "Data Scientist" in their bio. Rather than the pre-packaged personas of traditional marketing, People Pattern's data science offers flexibility by harnessing vast, messy, public expression, stitching it with proprietary customer data, to create rich persona datasets and audience insights.

disney

Gender Location Age Race Interest Persona

Results











130.72K Portraits

1.57M Posts

Download

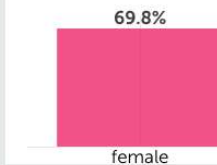
Download a sample of the

Audience

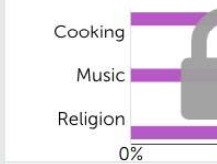
| | | |
|---|---|---------|
|  | Sandra Dewi <small>female</small> 3.92M Followers 37.10K Posts | 84 Infl |
| Actress, Model, TV Host and Business Wom. | | |
|  | Brandon Scott Miller <small>male</small> 1.34M Followers 1.08K Posts | 79 Infl |
| Disney actor & son of Cartoon Network Se... | | |
|  | Jason Dolley <small>male</small> 1.27M Followers 212 Posts | 79 Infl |
| Actor, Disney Channel alumnus, fan of cas... | | |
|  | Raini Rodriguez <small>female</small> 1.03M Followers 19.20K Posts | 78 Infl |
| People call me Raini or that girl who looks... | | |
|  | Coco Rocha <small>female</small> 927.17K Followers 8.00K Posts | 78 Infl |
| Mama to #IoniConran! #StudyOfPose my ... | | |
|  | Bradley Steven Perry <small>male</small> 871.68K Followers 2.42K Posts | 77 Infl |
| On Disney Channel's Good Luck Charlie &... | | |
|  | Calum Worthy <small>male</small> 770.82K Followers 5.66K Posts | 77 Infl |
| Often mistaken for Tilda Swinton. Star, writ... | | |
|  | Adam Hicks <small>male</small> 726.76K Followers 1.94K Posts | 76 Infl |
| The Official Adam Hicks Twitter. Actor. Sin... | | |
|  | Leo Howard <small>male</small> 387.56K Followers 1.07K Posts | 74 Infl |
| Leo Howard is a young actor who currentl... | | |
|  | Darren Simpson <small>male</small> 280.26K Followers 10.51K Posts | 72 Infl |
| Morning Radio Host in Africa's Greatest Cit... | | |

Audience attributes

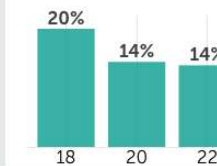
Gender



Interests



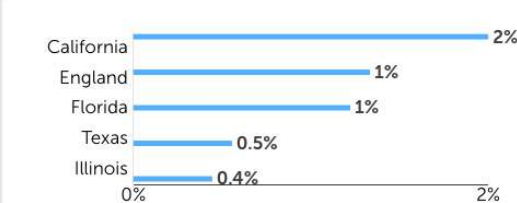
Age



Keywords

| | |
|----------|------------------|
| Disney | 130.72K mentions |
| Princess | 9.02K mentions |
| Walt | 2.88K mentions |
| Rapunzel | 2.35K mentions |
| Duffy | 1.04K mentions |

Location



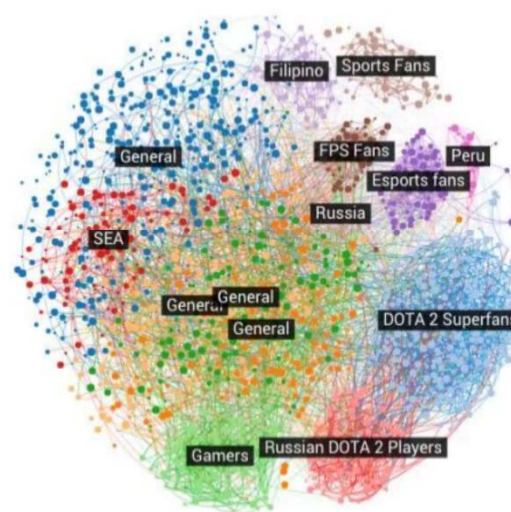
Persona analysis

Influencer identification

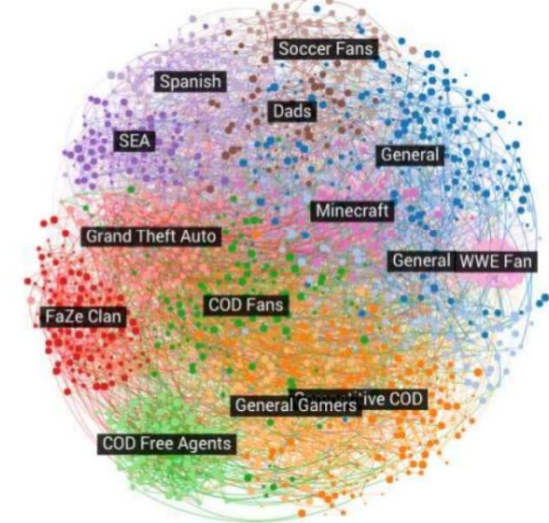
Individual portrait analysis

Personas & Affinities

Affinio Social Graph Analysis of @DOTA vs @codworldleague



DOTA 2



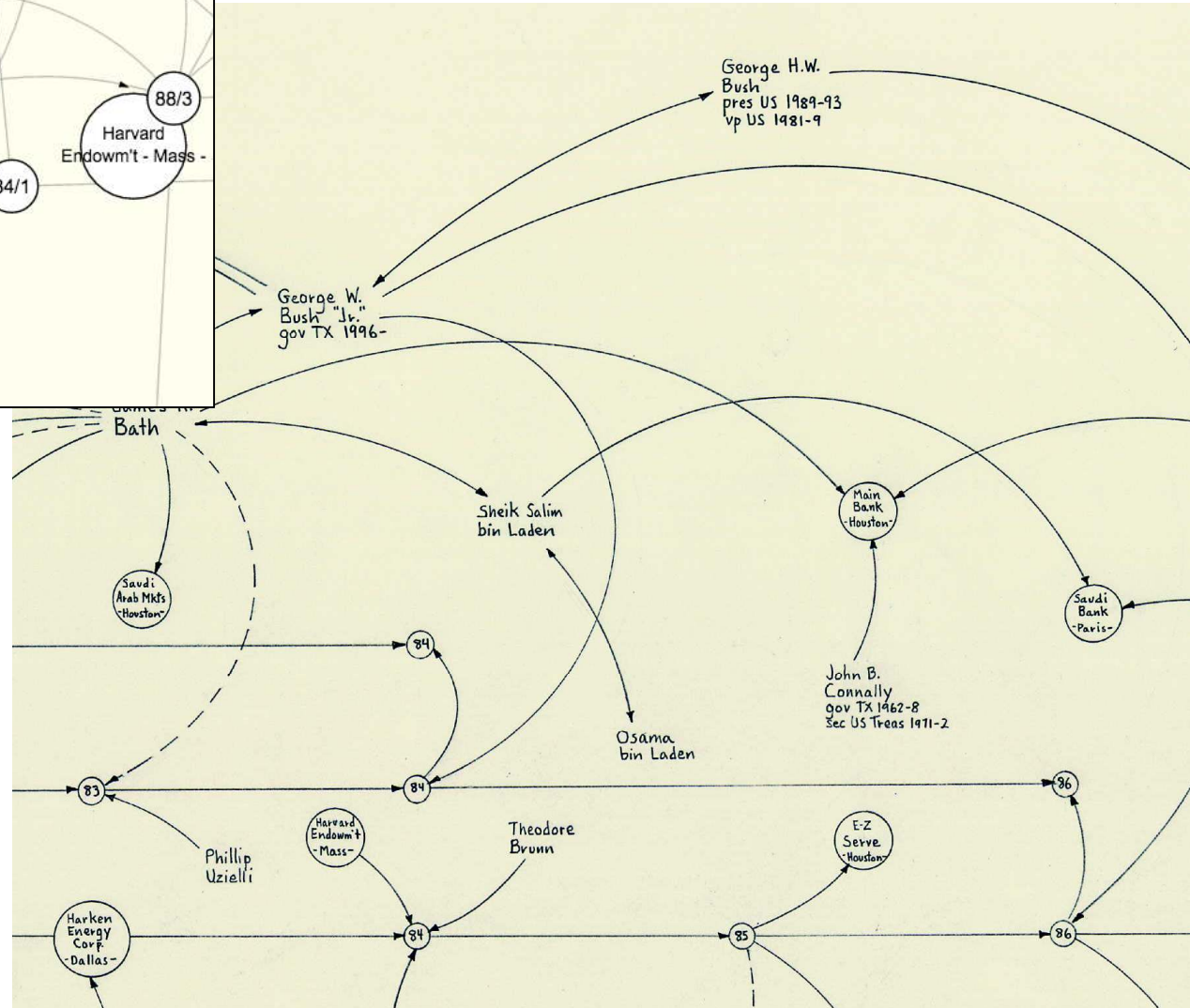
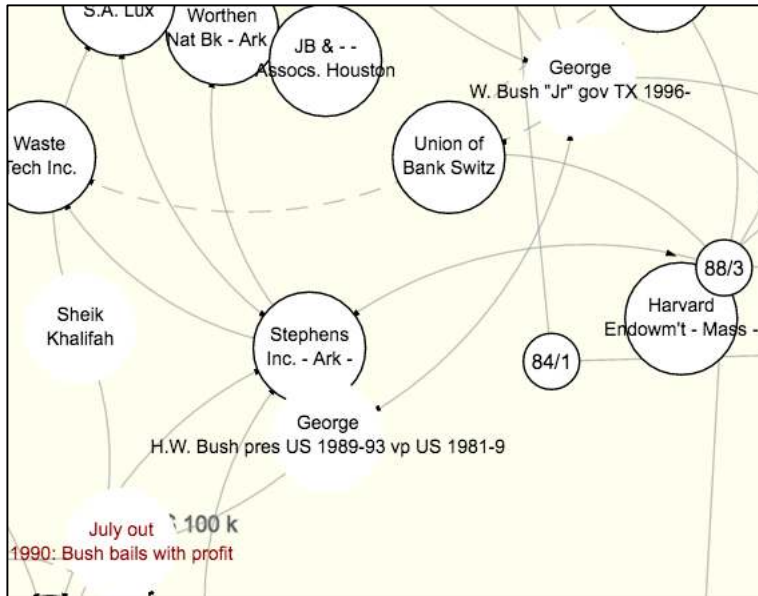
Call of Duty

<http://www.slideshare.net/Affinio/affinio-analysis-of-dota-vs-codworldleague>

Affinio



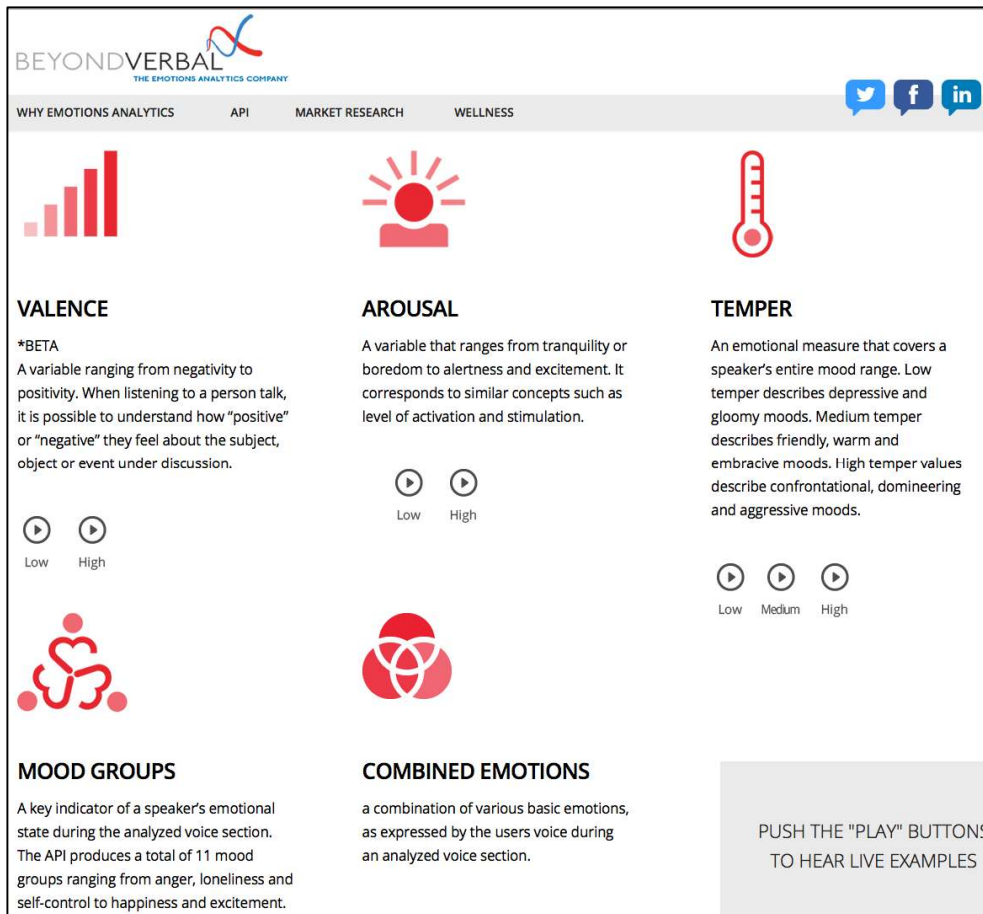
Content + Networks



<http://www.lombardinetworks.net/>

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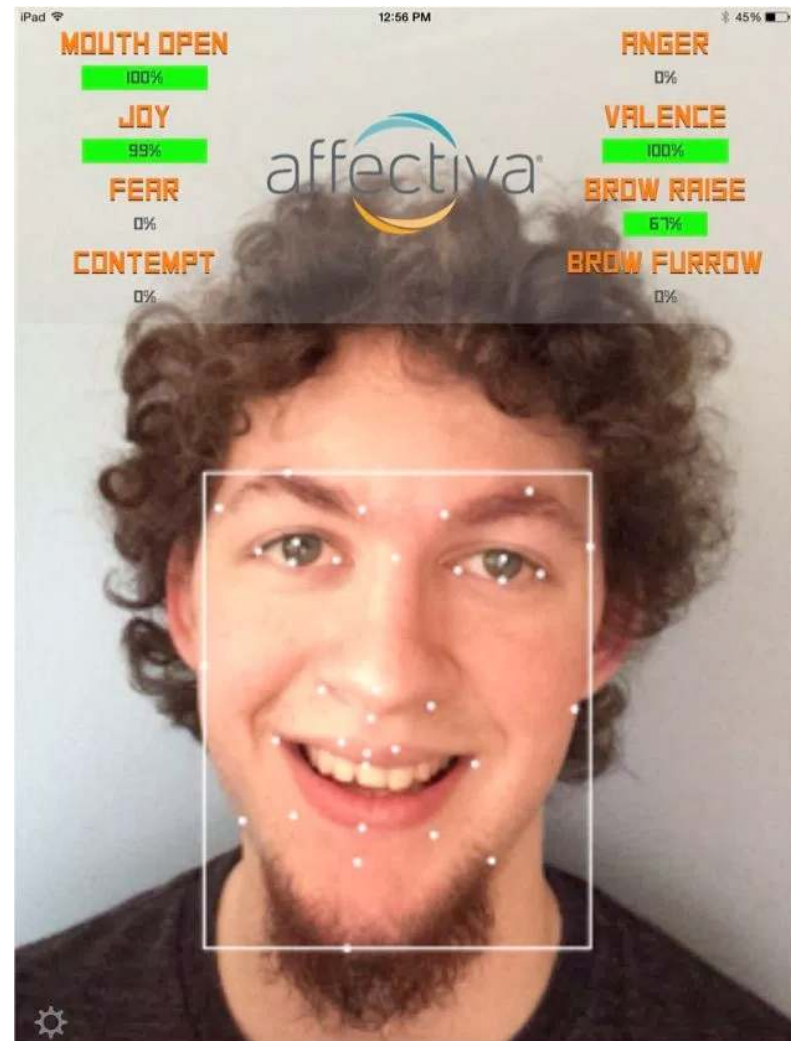




<http://www.beyondverbal.com/#wea>

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Beyond Text



Facial coding demo at: <https://labs-portal.affectiva.com/portal/web-demo>

IBM Debating Technologies

Noam Slonim, IBM Haifa Research Lab

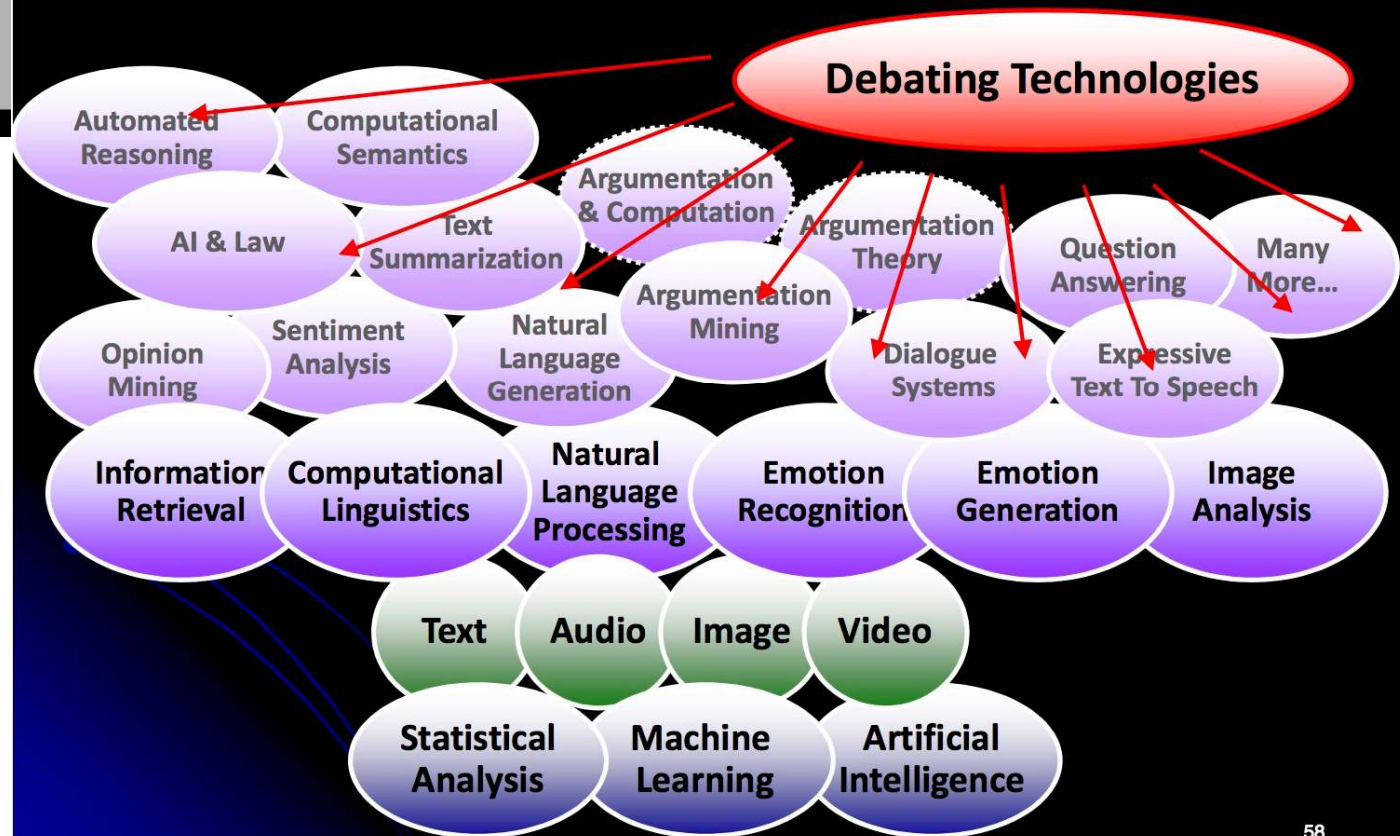
Feb 26, 2015, Rethinking the role of Social Sciences and Humanities (SSH) in Horizon 2020



Needed

http://researcher.watson.ibm.com/researcher/view_group_pubs.php?grp=5443

Debating technologies – computational technologies developed directly to enhance, support, and engage with human debating



Routes to Market

Identify

Respond

Package

- Tool
- Platform
- Application
- Solution

Apply

Differentiate



Decisions

What's your core capability?

What are your differentiators?

Tool, application, component, or solution?

Industry adaptation, e.g., hospitality, healthcare, consumer electronics:

- Models.
- Workflow, interfaces, analyses.

NLP/information extraction capabilities.

Data sources handled & data availability.



Routes to Market

Academic commercialization office.

Angel, venture funding.

Program funding, for example EU, NSF, IARPA, or SBIR.

Consulting/services funded.

Alliance with an integrator/consultancy, solution provider, or customer.

Platform adherence.





Language Technologies, Futures, and Routes to Market

Seth Grimes
Alta Plana Corporation
@sethgrimes

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