



Watson Cognitive API

Wang Hong Duo
Mi Hui

Agenda

- Why Cognitive
- What is Cognitive Computing
- What is Watson
- Watson Cognitive API
- Key use cases/features

Why Cognitive

Why Cognitive



The Tabulating Era
1900s - 1940s



The Programming Era
1950s - present



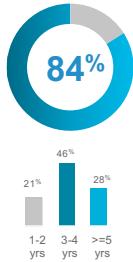
The Cognitive Era
2011 - ?

Why Cognitive

- To extend expertise and make complex decisions
- A category of technologies that uses **natural language processing** and **machine learning** to enable people and machines to interact more naturally to extend and magnify human expertise and cognition

Why Cognitive

Healthcare



... of healthcare executives familiar with cognitive computing believe it will have a critical impact on the future of their business

... of healthcare executives familiar with cognitive computing believe it will play a disruptive role in the healthcare industry

95% of healthcare leaders, who are familiar with cognitive computing intend to invest in cognitive computing in future with the majority doing so in the next 4 years

Insurance

Industry need

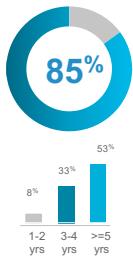


... of insurance CXOs are actively pursuing industry model innovation

Achievement gap

Insufficient business case/ modelling skills	52%
Insufficient buy-in from management	52%
Insufficient skilled resources	51%
Customers reservations to new possibilities	50%
Key roadblocks to pursuing disruptive innovation	

Communications



... of the executives familiar with cognitive computing believe it will play a critical role in their business

... of executives familiar with cognitive computing believe it will play a disruptive role in the communications industry

94% executives familiar with cognitive computing indicated that they are likely to invest in it in future

Government

Data is growing with time, but usability is limited..

.5%

Amount of world's data being analyzed¹

2.63 PB

Projected volume of data stored on average by in US Federal agencies in 2015

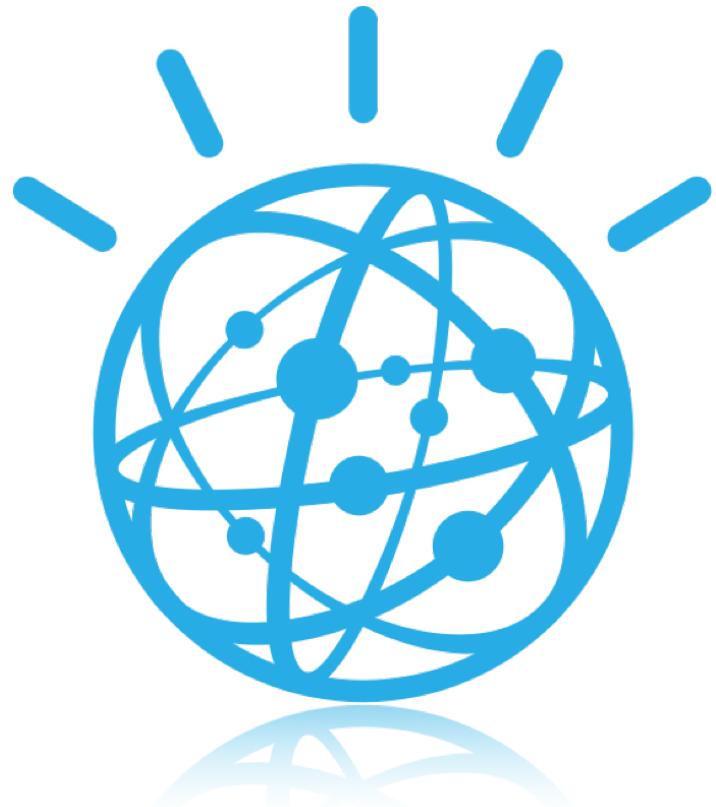
... because of the limits of traditional analytics

- Addresses predefined problems but cannot adapt to new problem domain
- Provides accurate and definitive answers but cannot handle ambiguity or gray areas
- Handles structured and unstructured information with known semantics – thus cannot make use of data from new and varied sources
- Interacts in formal digital means (e.g., commands, screens) with human – thus limits the engagement of end user

What is Cognitive Computing

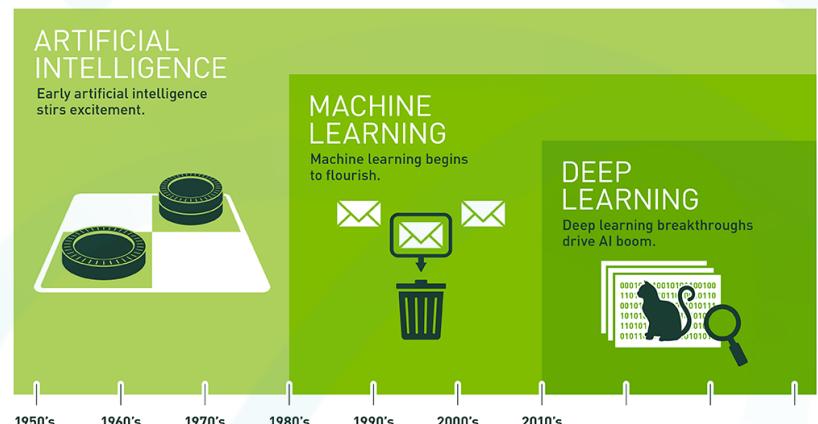
What is Cognitive Computing

- Keywords: machine learning, reasoning, natural language processing, speech and vision
- The development of computer systems modeled after the human brain
- Systems that learn at scale, reason with purpose and interact with humans naturally



A.I. vs Cognitive Computing

- **Artificial Intelligence** describes **autonomous programs** that are capable of goal directed behavior
- **Cognitive computing** describes **technology platforms** that, broadly speaking, are based on the scientific disciplines of Artificial Intelligence and Signal Processing



Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.

What is Watson

What is Watson

- The world's **first** cognitive system
- A question answer computer system
- A platform consists of services and products



Watson Cognitive API

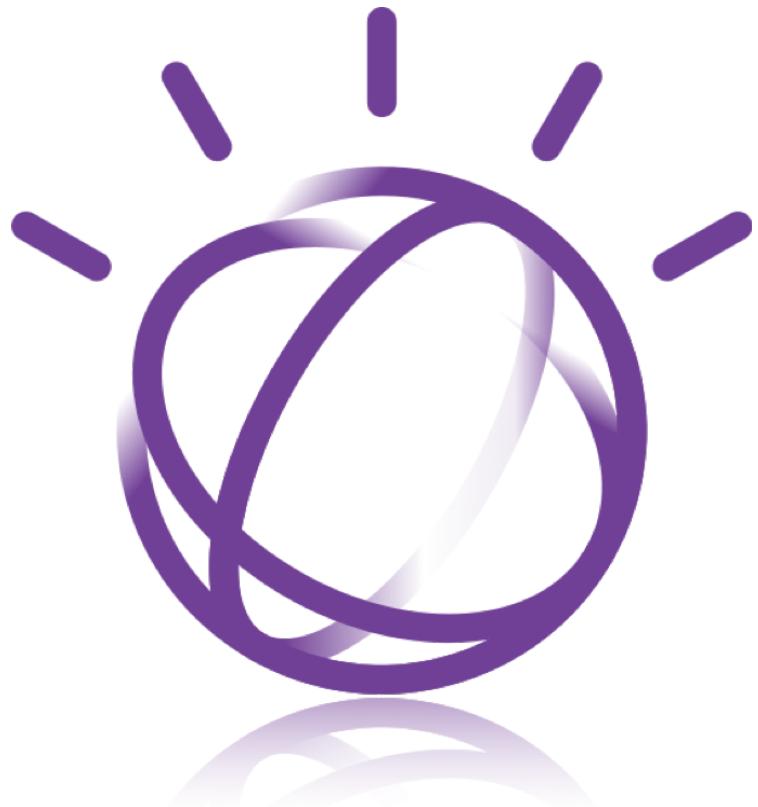
Bluemix

- A **cloud** platform
- An implementation of IBM's Open Cloud Architecture, based on Cloud Foundry (Open-source PaaS), that enables you to rapidly create, deploy, and manage your cloud applications

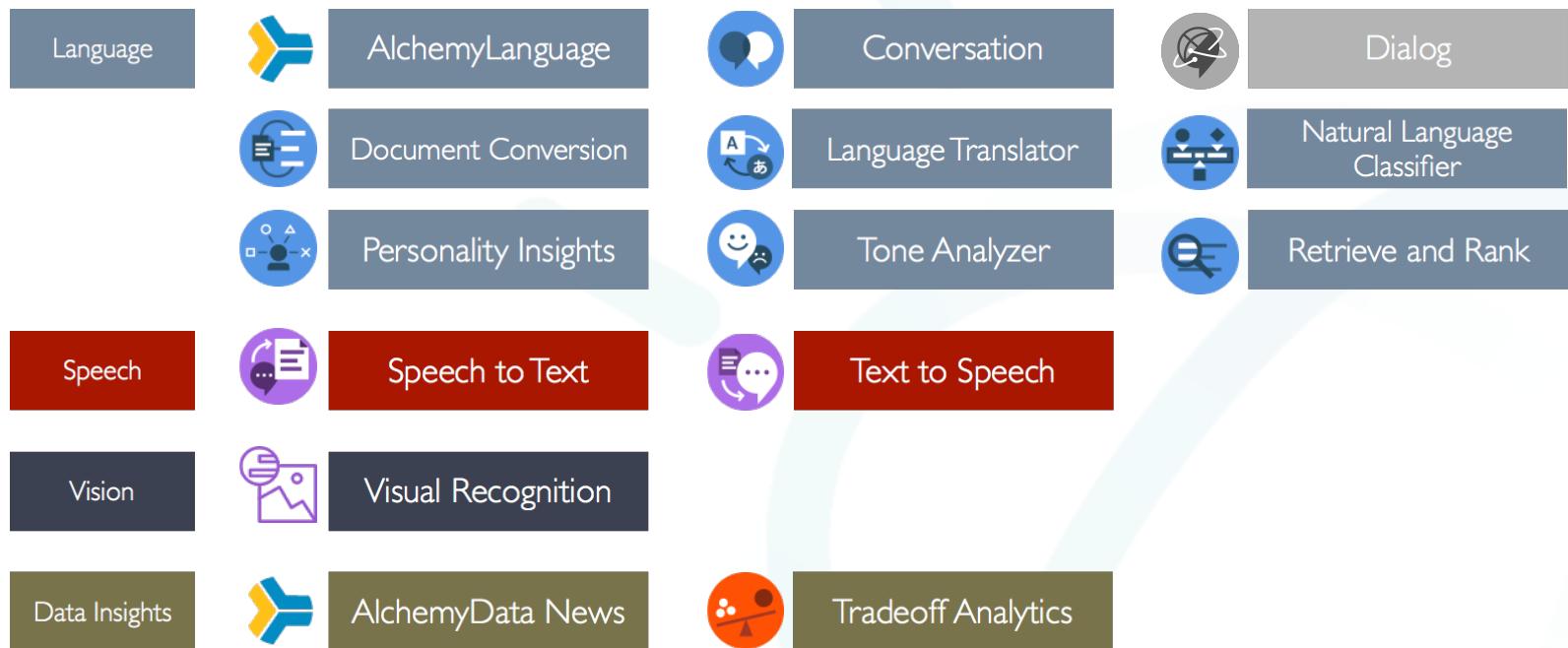


Watson Developer Cloud

- Watson Developer Cloud provides APIs of Language, Vision, Speech and Data insights
- Available resources
 - Open-source **SDKs**
 - **Documentations**
 - **Demos**



Watson Cognitive API



Key use cases/features

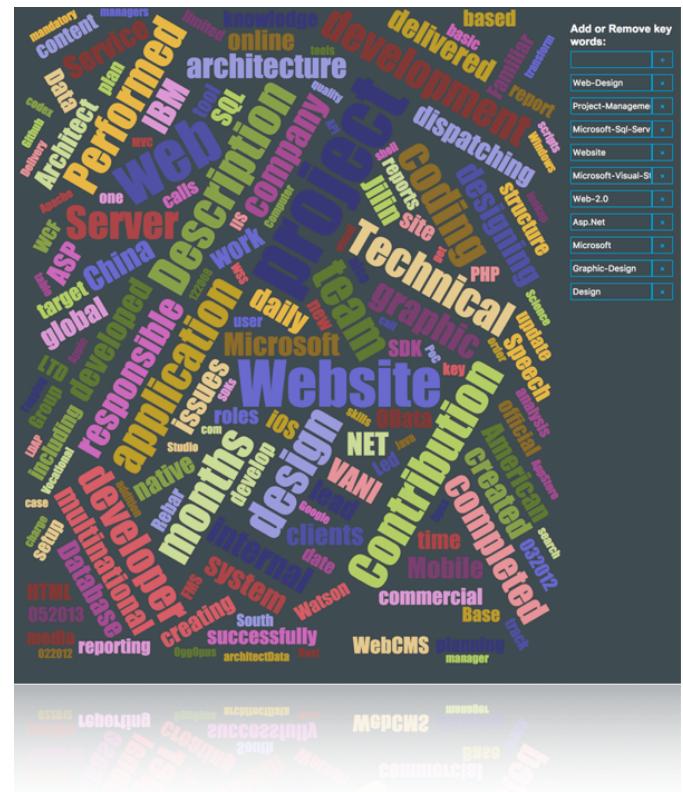
Document Conversion

- Use the Watson Document Conversion service to prepare documents for use by other Watson APIs, like the Watson Retrieve and Rank Service
 - To prepare documents for the Watson Retrieve and Rank service
 - To clean up and normalize HTML
 - To convert documents

AlchemyLanguage



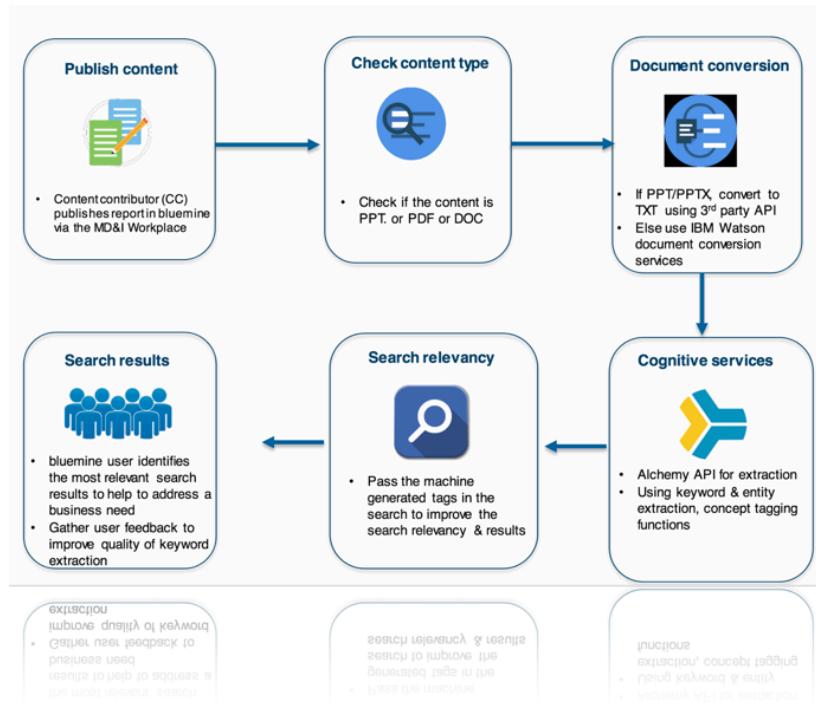
- AlchemyLanguage is a collection of APIs that offer text analysis through natural language processing, it has the abilities of
 - extracting information such as concepts, entities, relation, sentiment and keywords
 - analyzing emotion and sentiment
 - classifying content into a hierarchy of categories that's five levels deep
 - detecting language and feed
 - parsing microformats and providing linked data support



AlchemyLanguage



- Automated tagging - High level architecture using
 - Entity Extraction
 - Keyword Extraction
 - Concept Tagging



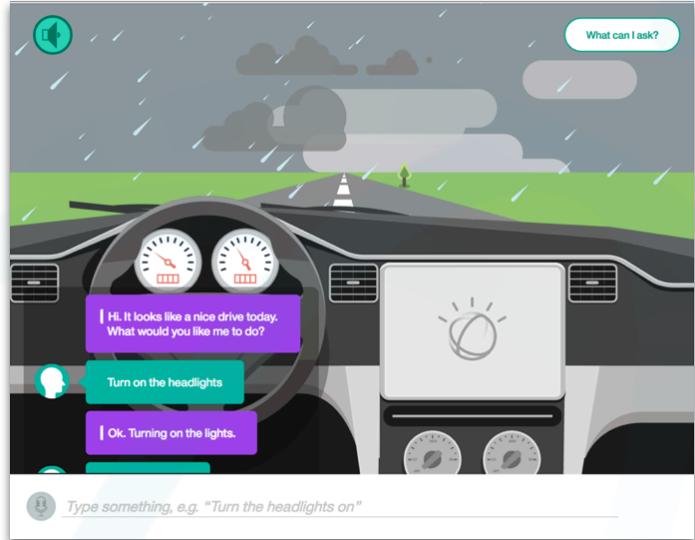
Dialog



- Retired on **September 8, 2016**, deprecate on August 9, 2017

Conversation

- **Chatbot** automatically responds to customers' most frequently asked questions
- Build Twitter, Slack, Facebook Messenger, and other messaging platform chatbots that interact instantly with channel users
- Allow customers to control your mobile app using natural language **virtual agents**



Language Translator

- Conversation translation
- Patent translation
- e.g. translate all of bank product descriptions from English to Arabic using a custom model tailored to product names and terminology



Natural Language Classifier

- The Natural Language Classifier is tuned and tailored to short text (1000 characters or less) and can be trained to function in any domain or application
 - Tackle common questions from your users that are typically handled by a live agent
 - Classify tweets into a set of classes, such as events, news, or opinions



Ask a question about the weather

Watch the Natural Language Classifier categorize your weather-related question. In this demo, the classifier is trained to determine whether the question is related to `temperature` or `conditions`. The output includes the top classification and a confidence score.

Is it hot outside?

Ask

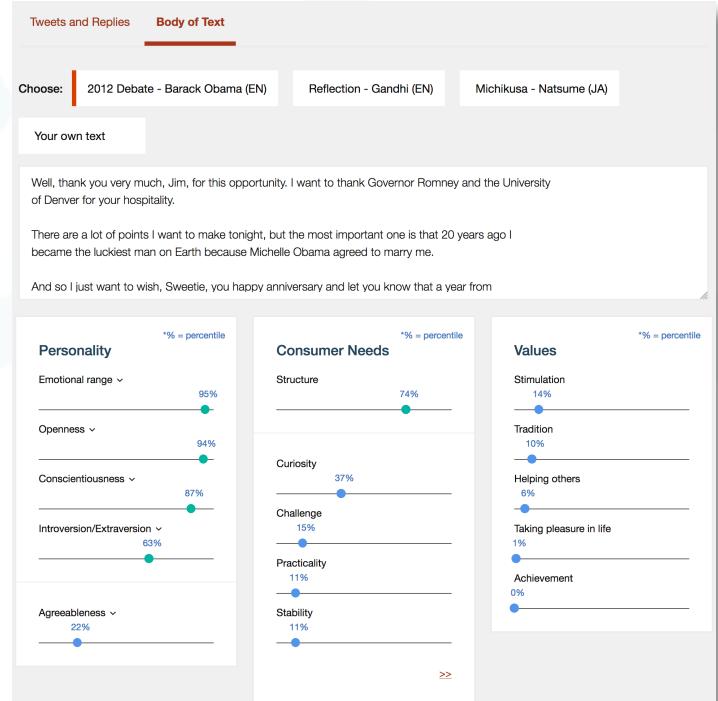
Output

Results JSON

Natural Language Classifier is `100%` confident that the question submitted is talking about `temperature`.

Personality Insights

- Uncover a deeper understanding of people's personality characteristics, needs, and values to drive personalization
 - customer acquisition - enables businesses to design marketing, provide product recommendations, and deliver customer care
 - helps recruiters or university admissions match candidates to companies or universities



Retrieve and Rank

- Helps users find the most relevant information for their query by using a combination of search and machine learning to find “signals” in the data
 - find relevant results like search engine

Input

[Get a random question about aerodynamics](#)

what is the effect of cross sectional shape on the flow over simple delta wings with sharp leading edges .

Output

You can compare the machine learning approach (Retrieve and Rank) and the standard search results (Solr).

Machine learning approach

calculation of the flow past slender delta wings with leading edge separation . 

▲ 7

calculation of the flow past slender delta wings with leading edge separation , the flow past a slender delta wing with a sharp leading edge , at incidences, usually separates along this edge, i.e. a vortex layer extends from the edge and rolls up to form a (local) region of high vorticity , a potential flow model of this is constructed in which the layer is replaced by a vortex sheet which is rolled up into a spiral in the region of the local . this problem is reduced to a two-dimensional one by assuming a conical field and using slender wing theory , the shape and strength of the sheet are determined by the two conditions that it is a stream surface and sustains no pressure difference . use is made of results previously obtained for the core region and the remaining finite part of the sheet is dealt with by choosing certain functions for its shape and strength . the parameters in these functions are found by satisfying the two conditions stated above at isolated points . results are obtained for the pressure distribution, chord loading and normal force coefficient as functions of the ratio of the incidence to the apex angle . the lift for a given incidence is about 15 below that found by brown and michael . flow patterns are indicated in two typical cases . the effect of separation on the drag due to lift of a wing with small thickness is discussed .

▲ 4

the use of conical camber to produce flow attachment at the leading edge of a delta wing and to minimize the lift-dependent drag at sonic and supersonic speeds . 

▼ 2

an experimental study of the flow field about swept and delta wings with sharp leading edges . 

Tone Analyzer



- Discover, understand, and revise the language tones in text
 - Get feedback about communications to improve the effectiveness of the messages and how they are received
 - Message resonance - optimize the tones in your communication to increase the impact on your audience
 - Detect tones in “chatbots”



Speech to Text



- The Speech to Text service converts the human voice into the written word
 - Call center transcription
 - Voice control of embedded systems
 - Converting sound to text to then make data searchable

Text to Speech

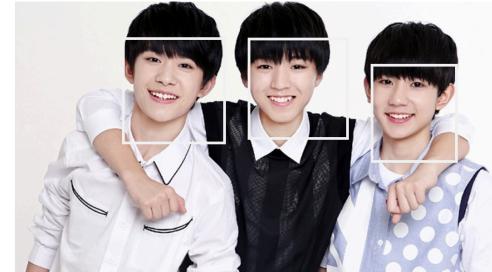
- Synthesize speech audio from an input of plain text with multiple voices, both male and female
 - Assistance tools for the vision-impaired
 - Reading-based education tools



Visual Recognition



- Understand the contents of images
- Organize image libraries into categories
- Segment user interests from social media pictures
- Find great images with specific content faster
- **Recognize** custom content from images
- Recognize matching images



Classes	Score
people	1.00 0 █

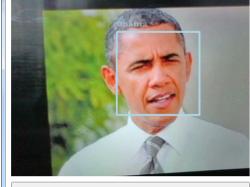
Type Hierarchy

```
/people
```

Faces	Score
age 18 - 24	0.50 0 █
male	0.97 0 █
age - 17	0.58 0 █
male	0.88 0 █
age 18 - 24	0.50 0 █
male	0.88 0 █

Did We Wow You? Yes No

Thoth Trainer







Take your photo from camera
Choose photos
Reset all

Name: Stars Email:
Identify:



40 files, 0 failure

AlchemyData News

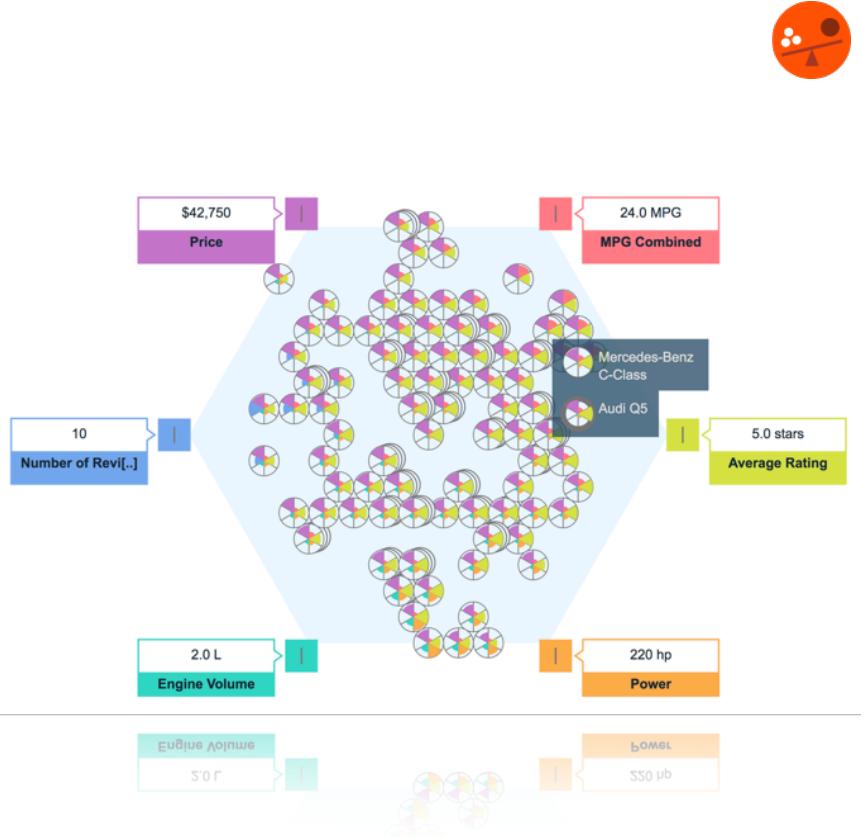


- Provides news and blog content enriched with natural language processing to allow for highly targeted search and trend analysis
 - Highly targeted search, time series and counts for trend analysis and pattern mapping
 - Historical access to news and blog content



Tradeoff Analytics

- Helps users make better choices to best meet multiple conflicting goals
 - Manufacturing: Use images from a manufacturing setting to make sure products are being positioned correctly on an assembly line
 - Help consumers purchase the product that best matches their preferences based on attributes like features, price, or warranties
 - Help physicians find the most suitable treatment based on multiple criteria such as success rate, effectiveness, or adverse effects



Demo of Natural Language Processing

- <https://findyourfit.mybluemix.net/>

Demo of Speech + Conversation

- <https://webchatbot.mybluemix.net/>

Thank You!