

Computação Cognitiva: conceitos e aplicações

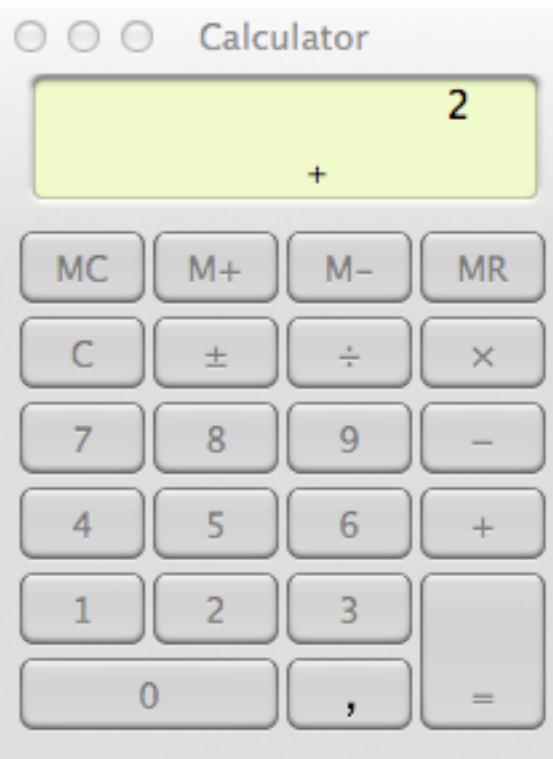
Fabrício J. Barth
Technical Lead
Watson Group



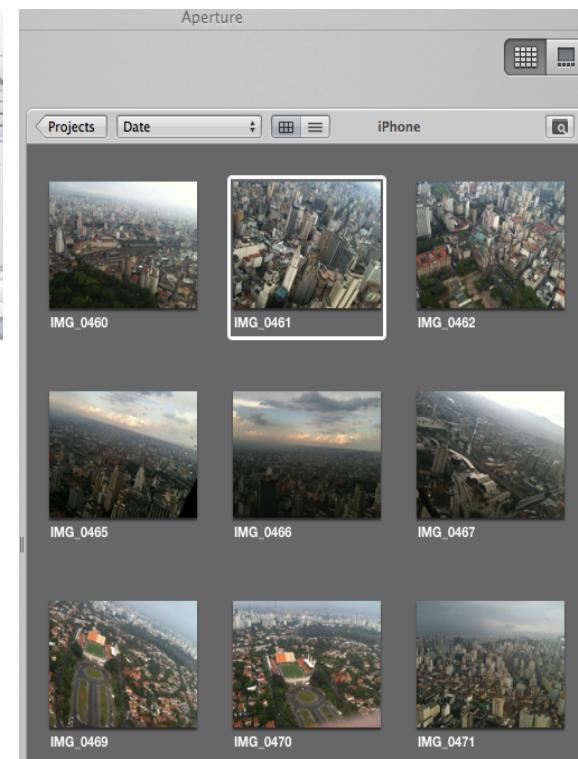
Sumário

- O que é computação cognitiva e o que são aplicações cognitivas?
- Exemplos de aplicações cognitivas.
- Serviços cognitivos no Bluemix.
- Desenvolvimento de aplicações cognitivas usando o Bluemix: método e ferramentas
- Considerações Finais

Computação e Aplicações Cognitivas



A screenshot of a Microsoft Word-like document editor titled "Document1". The toolbar at the top includes icons for file, home, layout, document elements, tables, and other functions. The main content area contains the text "Exemplo de Editor De Textos" with the word "Exemplo" underlined. A vertical ruler on the left indicates text alignment from center to right.



Calculadora

Gestor de Imagens

Browser

Editor de textos

Site Web

ERP

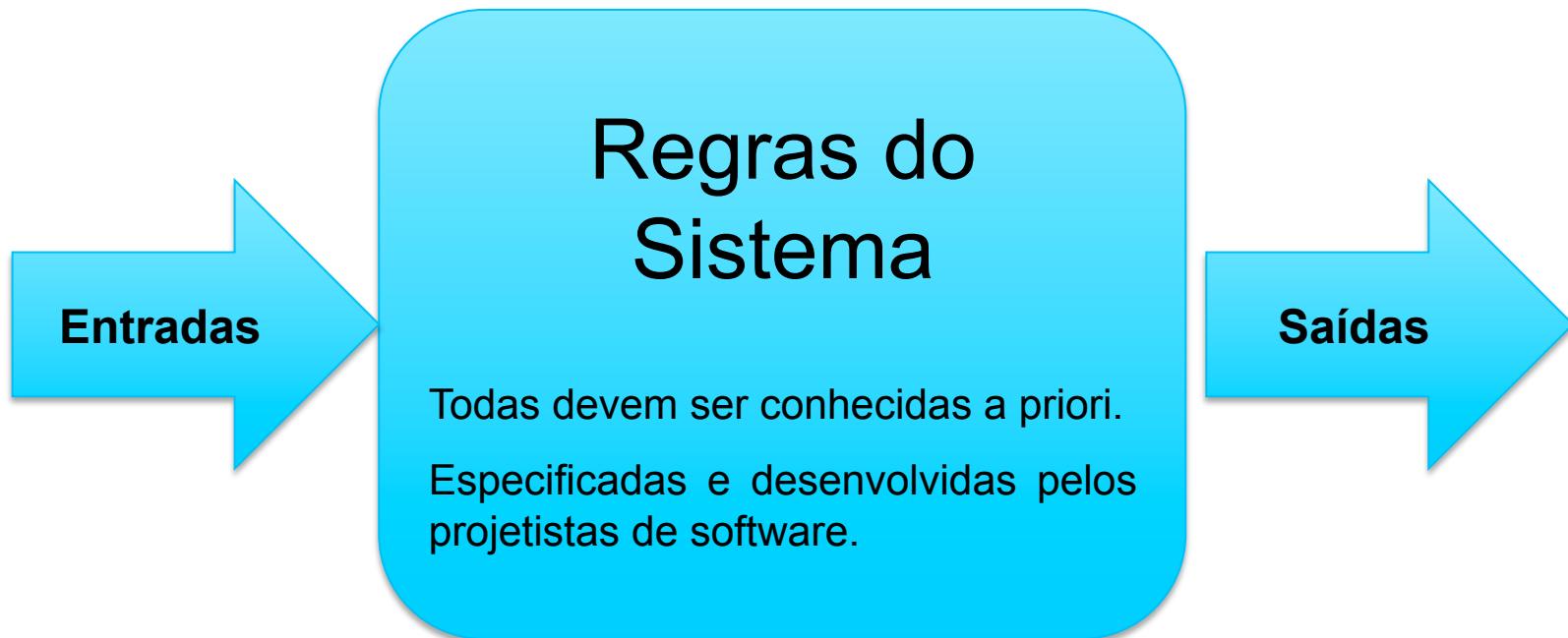
Leitor de emails

GPS

SO de dispositivos móveis

O que estes sistemas têm em comum?

São sistemas programáveis





Deep Blue vs. Kasparov chess matches



Deep Blue
IBM chess computer



Garry Kasparov
World Chess Champion

The 1996 match

| Game # | White | Black | Result | Comment |
|--------|-----------|-----------|--------|--|
| 1 | Deep Blue | Kasparov | 1–0 | |
| 2 | Kasparov | Deep Blue | 1–0 | |
| 3 | Deep Blue | Kasparov | ½–½ | Draw by mutual agreement |
| 4 | Kasparov | Deep Blue | ½–½ | Draw by mutual agreement |
| 5 | Deep Blue | Kasparov | 0–1 | Kasparov offered a draw after the 23rd move. |
| 6 | Kasparov | Deep Blue | 1–0 | |

Result: Kasparov–Deep Blue: 4–2

The 1997 rematch

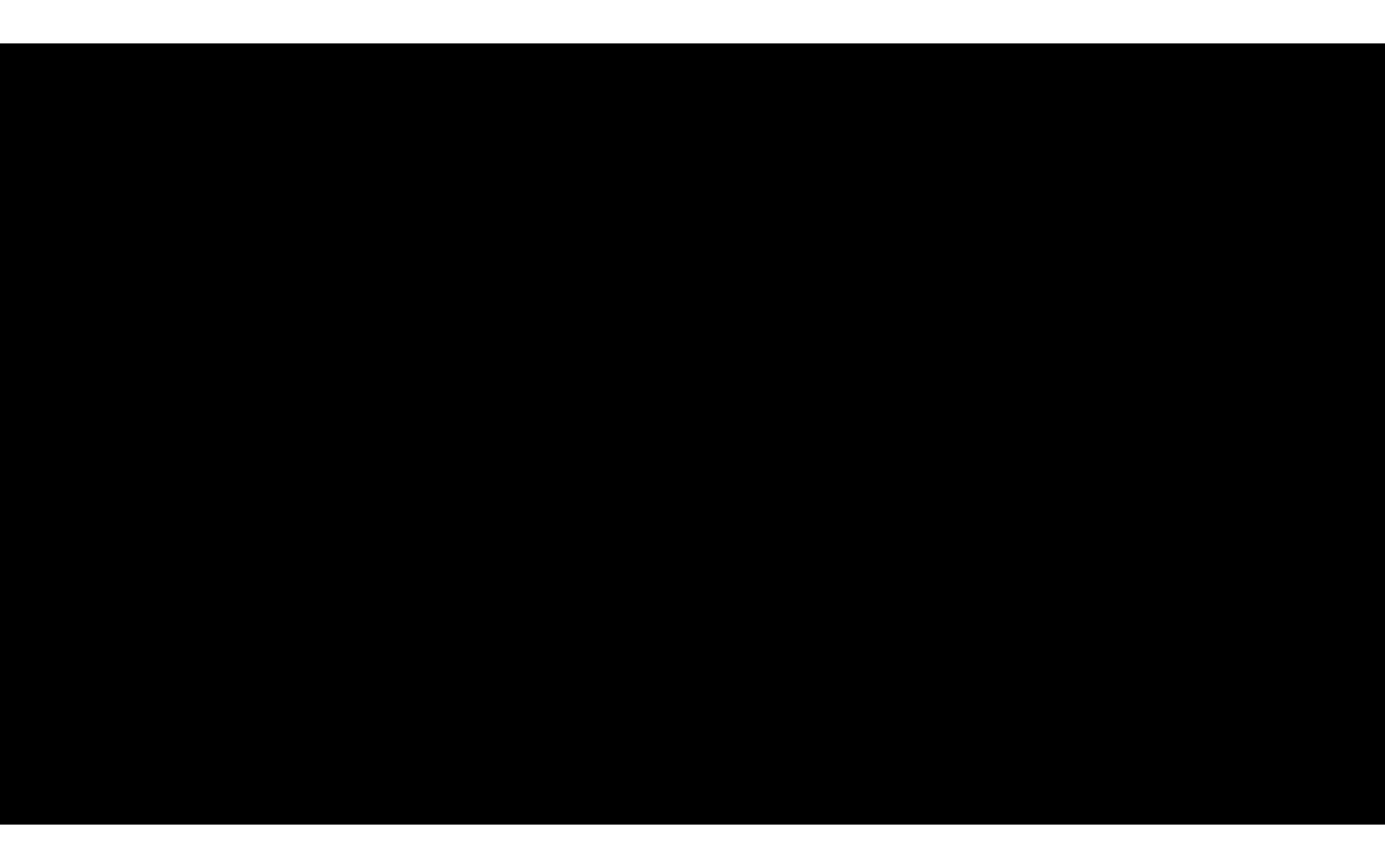
| Game # | White | Black | Result | Comment |
|--------|-----------|-----------|--------|--|
| 1 | Kasparov | Deep Blue | 1–0 | |
| 2 | Deep Blue | Kasparov | 1–0 | |
| 3 | Kasparov | Deep Blue | ½–½ | Draw by mutual agreement |
| 4 | Deep Blue | Kasparov | ½–½ | Draw by mutual agreement |
| 5 | Kasparov | Deep Blue | ½–½ | Draw by mutual agreement |
| 6 | Deep Blue | Kasparov | 1–0 | |

Result: Deep Blue–Kasparov: 3½–2½

É possível desenvolver um jogador de Xadrez, com habilidade para ganhar do campeão mundial, especificando e codificando todas as regras a priori?

NÃO !

Jeopardy! The IBM Challenge



Calculadora

Jeopardy! Deep Q&A

Browser

Sistemas de Diagnóstico

Site Web

Deep Blue

Mecanismos de
Busca

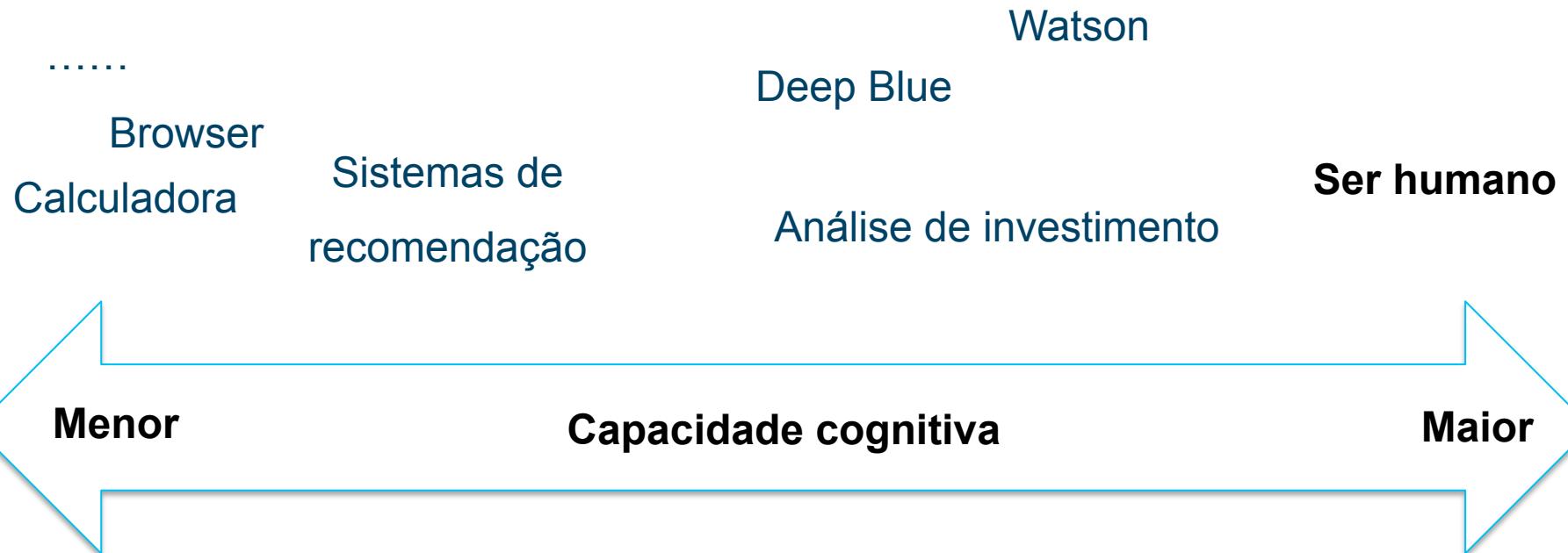
Leitor de emails

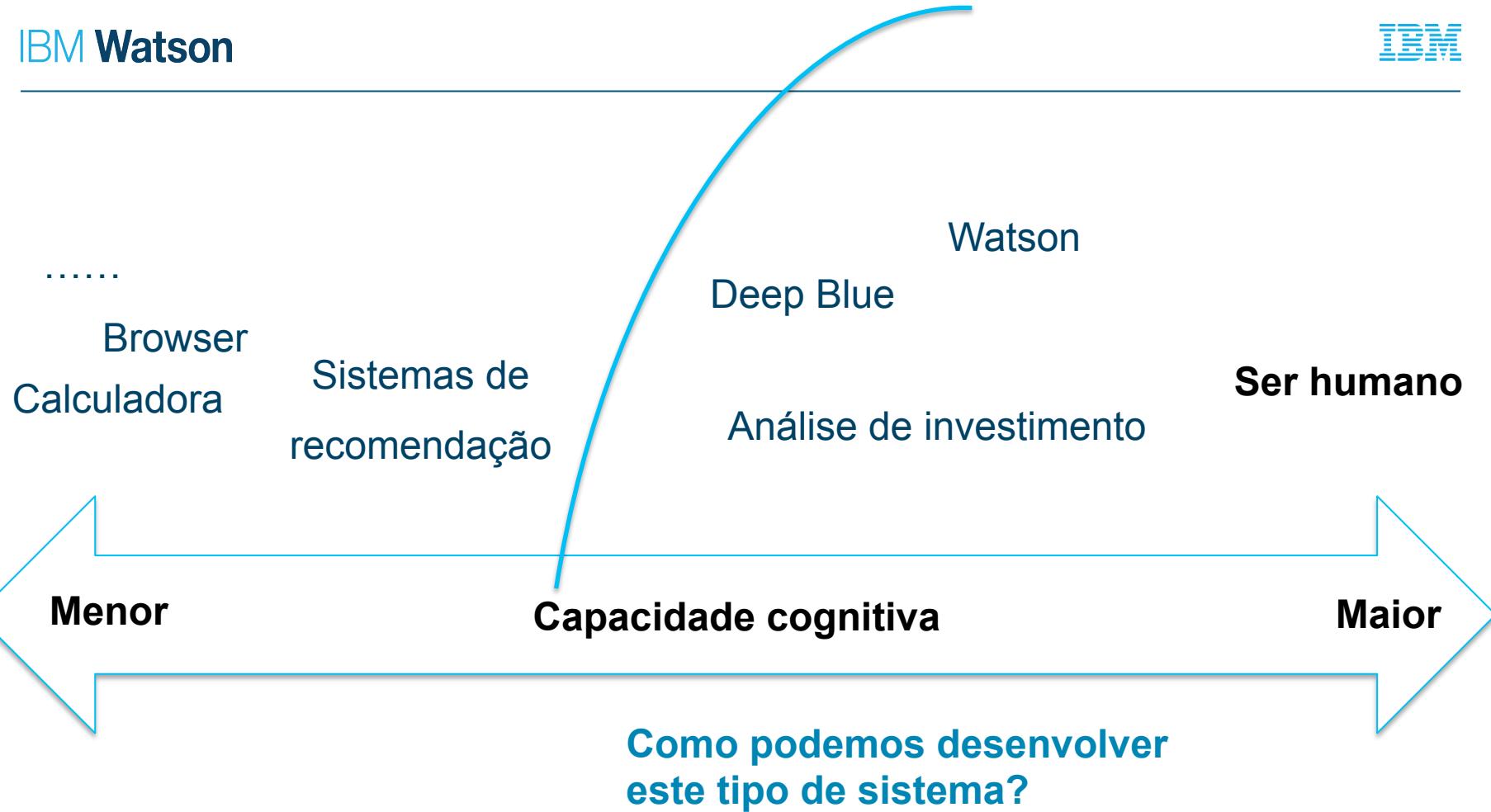
ERP

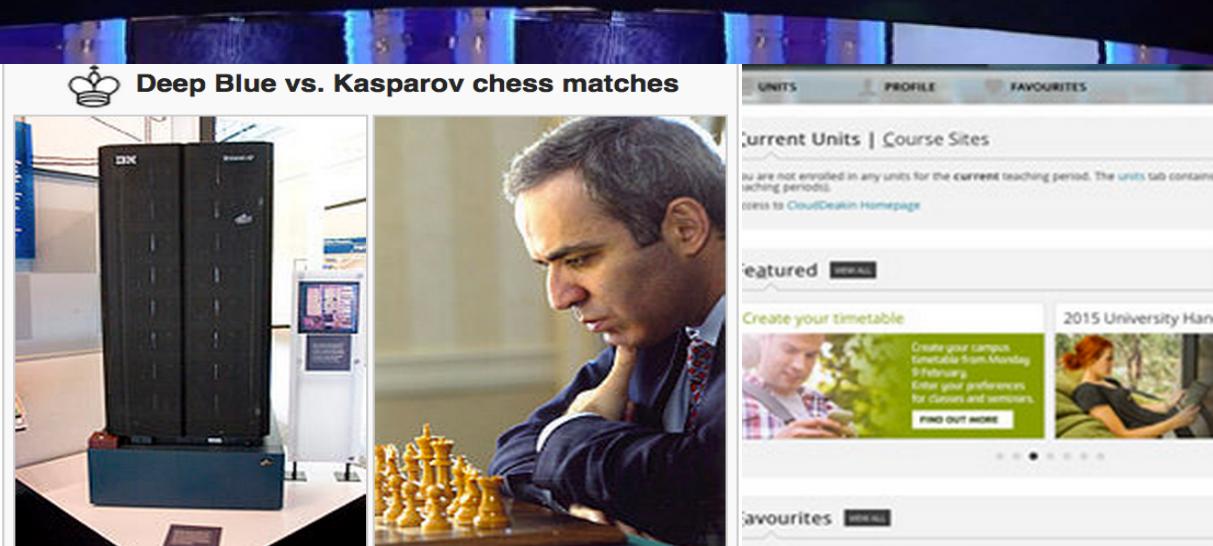
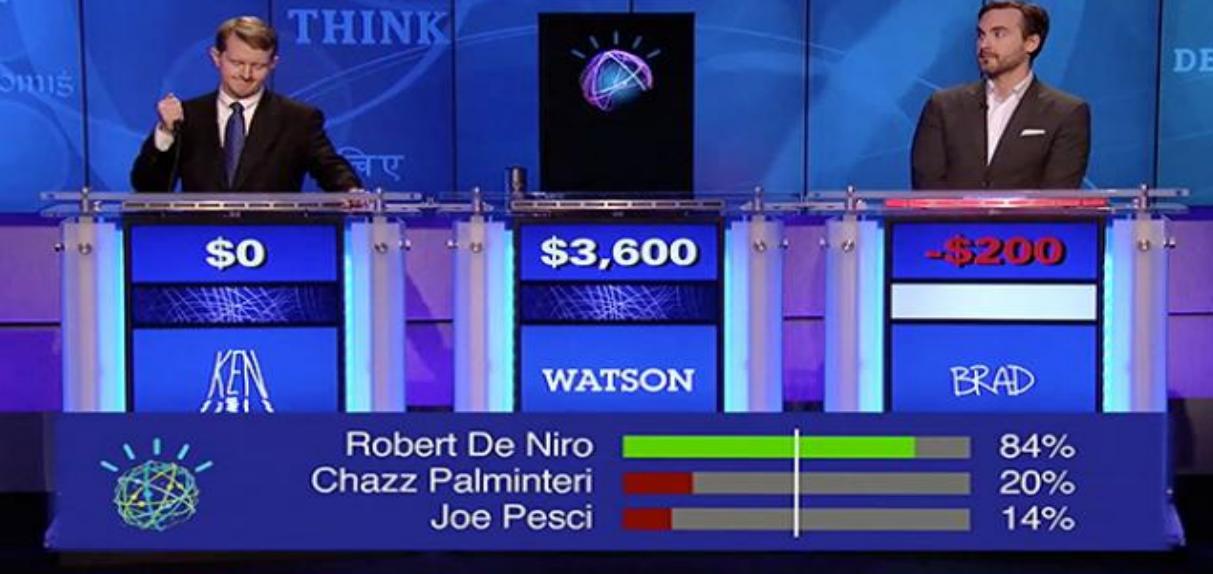
Veículos Autônomos

GPS

Sistemas de Recomendação







NEW TO DEAKIN?

Get answers to everyday questions at Deakin ... and help train Watson

ASK WATSON

POWERED BY IBM

TODAY

All Day
MCC

Sistemas cognitivos

Sistema Cognitivo

Nem todas as regras estão implementadas.

O sistema possui autonomia para mudar o seu comportamento em tempo de execução.

Percepções

Ações

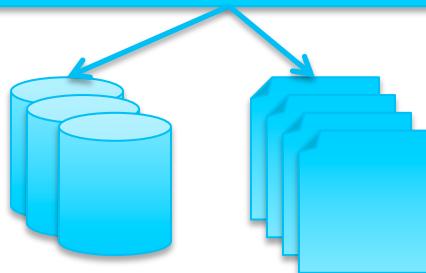
Desenvolvimento de sistemas cognitivos

Sistema Cognitivo

Aprendizagem de Máquina

Identificação de padrões

Recuperação de informação



Bases de conhecimento

Percepções

Processamento de Linguagem Natural,
Processamento de imagens

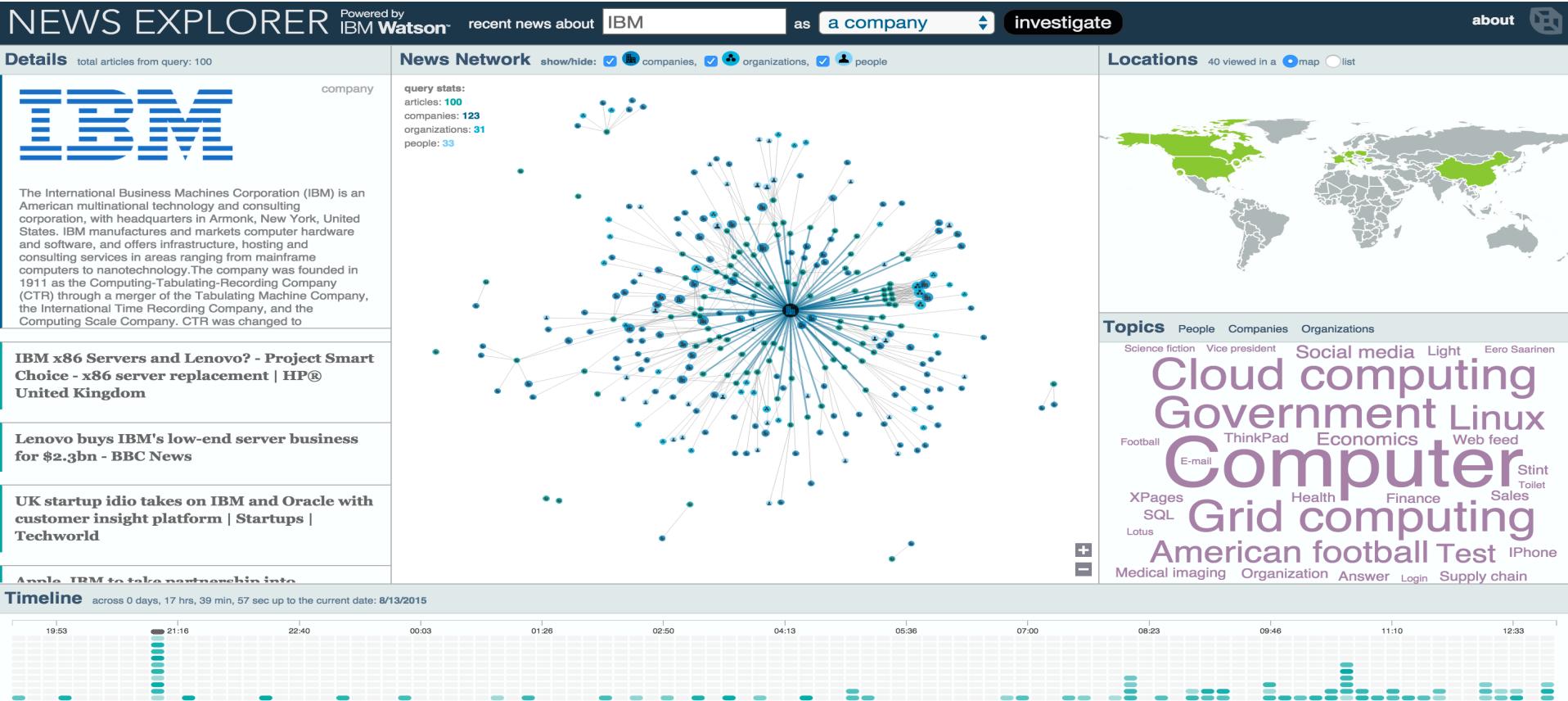
Ações

Síntese de Voz, Visualização de dados e
Apresentação de padrões

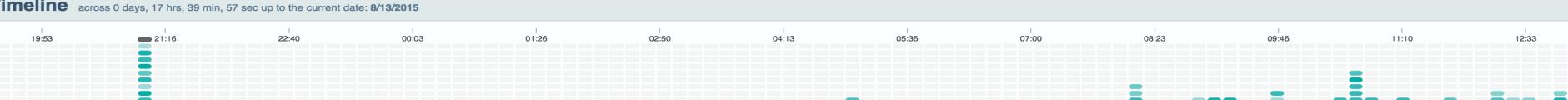
Exemplos de aplicações cognitivas

News Explorer

<http://news-explorer.mybluemix.net>



Timeline across 0 days, 17 hrs, 39 min, 57 sec up to the current date: 8/13/2015



Reconhecimento de imagem

Select a sample image or Upload your own below



Start Over

Output

Classifier: All (Default)



Auto Racing

Race Car
Auto Track Racing
Motor Sport
Scene
Bird
Vehicle
Land Vehicle
Sports Activity
Outdoors
Sports
Man Made Scene
People Activity
Activity Facility
Object

Start Over

Output

Classifier: All (Default)



Crowd

| | |
|-----------------|-----|
| Disturbance | 69% |
| Demonstration | 67% |
| Human | 66% |
| People Activity | 65% |
| Mixed Color | 64% |
| Group of People | 63% |
| People View | 61% |
| Sports | 59% |
| Bike | 53% |
| Scene | 52% |

75%

| | |
|-----------------|-----|
| Disturbance | 69% |
| Demonstration | 67% |
| Human | 66% |
| People Activity | 65% |
| Mixed Color | 64% |
| Group of People | 63% |
| People View | 61% |
| Sports | 59% |
| Bike | 53% |
| Scene | 52% |

Classifier: All (Default)



Outdoors

| | |
|-------------------|-----|
| Full Body | 68% |
| Water Scene | 68% |
| Cycling | 67% |
| Sports | 66% |
| Activity Facility | 65% |
| Scene | 63% |
| People Activity | 63% |
| Human | 62% |
| Bicycle | 61% |
| Land Vehicle | 58% |
| Bird | 58% |
| Person | 52% |
| Shoes | 52% |

70%

| | |
|-------------------|-----|
| Full Body | 68% |
| Water Scene | 68% |
| Cycling | 67% |
| Sports | 66% |
| Activity Facility | 65% |
| Scene | 63% |
| People Activity | 63% |
| Human | 62% |
| Bicycle | 61% |
| Land Vehicle | 58% |
| Bird | 58% |
| Person | 52% |
| Shoes | 52% |



Fabrício Barth

Technical Lead, IBM Watson Group

Fabrício Barth's Personality*

You are inner-directed, skeptical and strict.

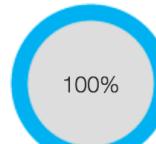
You are authority-challenging: you prefer to challenge authority and traditional values to help bring about positive changes. You are independent: you have a strong desire to have time to yourself. And you are solemn: you are generally serious and do not joke much.

Experiences that give a sense of self-expression hold some appeal to you.

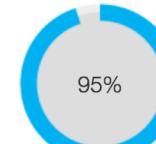
You consider achieving success to guide a large part of what you do: you seek out opportunities to improve yourself and demonstrate that you are a capable person. You are relatively unconcerned with tradition: you care more about making your own path than following what others have done.

*Compared to most people who participated in our surveys.

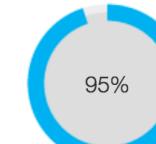
Your top concepts



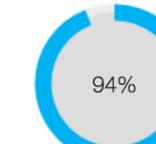
Naive Bayes classifier



Supervised learning



Personalized search



Unsupervised learning

Suggested jobs

Click the job title to see other candidates.

100% Research Scientist- Natural language processing

Information retrieval, Machine learning, Data mining, Information extraction, Natural language processing, Text analytics, Computational linguistics, Data privacy, Corpus linguistics, Computer science

100% Watson Cloud Developer

Machine Learning, Data Mining, Semi-supervised learning, Document summarization, Pattern recognition, Natural Language Processing, Lucene, Knowledge representation and reasoning, Automatic speech recognition, Knowledge acquisition

99% Researcher - Cognitive Solutions and Services

Information retrieval, Machine learning, Data mining, Information extraction, Natural language processing, Text analytics, Data modeling, Statistical data, Computer Science, Interaction

99% Machine Learning Msc/Phd Research Student - Social Technologies Group

Recommender systems, Information Retrieval, Machine learning, Data Mining, Big Data, Social search, Data modeling, Human computer interaction, Social CRM, User interfaces

IBM Watson: Prova de Conceito com Laudos Médicos

Entre com o texto do laudo:

TRIPLEX-SCAN DAS ARTÉRIAS CARÓTIDAS E VERTEBRAIS Estudo da circulação cerebral, extra-craniana, com aparelho de ECO-COLOR-DOPPLER: IMAGEM: - Pequena placa fibrótica na carótida comum esquerda,determinando estenose (10%). - Placa heterogênea,de superfície regular na emergência da carótida interna direita,na sua porção bulbar sem determinar estenose pelo critério NASCET. - Artérias vertebrais de diâmetros assimétricos, sendo a esquerda menor e sem fluxo ao mapeamento em cores. DOPPLER: - Ausência de fluxo na vertebral esquerda. Fluxos normais nas demais artérias. CONCLUSÃO: - Doença aterosclerótica das carótidas e vertebrais.
Oclusão da artéria vertebral esquerda. - Estenose leve (10%) da carótida comum esquerda.
- Placa complexa (heterogênea) na carótida interna direita, sem estenose pelo critério NASCET W16/W16/1 USG CRM 8368/BA - DR. AQUILES FERREIRA GUIMARAES USG CRM 8368/BA - DR. AQUILES FERREIRA GUIMARAES

Avalie

Teste o serviço com alguns exemplos de laudos abaixo:

[Laudo 1](#)
[Laudo 2](#)
[Laudo 3](#)
[Laudo 4](#)

Resultado

O sistema tem **99%** de confiança que o laudo submetido é do tipo '**MODERADA**'.

Classificação: MODERADA

Confiança: 99%



Natural Language
Classifier



SDK for Node.js™

Diálogo

Watson Self Assistant

Watson Hello Patty! How can I help you today with the product IBM Power 710? ① 14:29

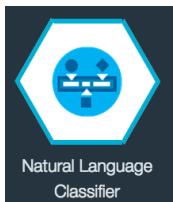
Patty Hi ② 14:30

Watson Hello :) How can I help you today with the product IBM Power 710? ③ 14:30

Patty I need to upgrade my firmware ④ 14:30

Watson Please visit this link: <http://www.ibm.com/developerworks/aix/tutorials/au-power-systems-firmware-upgrade/> ⑤ 14:30

Type your message here... Send



Watson Self Assistant

Watson Please visit this link: <http://www.ibm.com/developerworks/aix/tutorials/au-power-systems-firmware-upgrade/> ① 14:30

Patty What else can I do for you Patty? ② 14:30

Watson just that ③ 14:30

Watson Is your email patty.lis@customer.com? ④ 14:31

Patty whatever can I do for you Patty? ⑤ 14:31

Watson yes ⑥ 14:31

Watson I am sending you an email with number 1234,567,890 whose Status is Pending. If you need further help on it, you can call our customer center on +1 111 1111. It was a pleasure to help you Patty. I am here for attending you next time, 24x7. ⑦ 14:31

Type your message here... Send

Fabrício J. Barth

Home > Assistente do professor Barth

Projetos

Publicações

Materiais

ML Blog

EduTecCul Blog

Contatos

Assistente

Pós Graduação

Tem alguma pergunta para fazer para o Barth?

Alguma dúvida sobre o conteúdo da prova, datas de entregas de projetos, regras, normas ou onde encontrar material das disciplinas?

Pergunte ao assistente do professor Barth no campo abaixo:

Onde eu encontro o material da disciplina?

Pergunte

Resposta

Todos os materiais das disciplinas ministradas pelo Barth estão em
<http://fbarth.net.br/materiais/disciplinas.html>

<http://fbarth.net.br/assistente.html>

Componentes e serviços cognitivos

Serviços no Bluemix

<https://console.ng.bluemix.net>

IBM Bluemix

ORG: fbarth@br.ibm.com

DASHBOARD SOLUTIONS CATALOG PRICING DOCS COMMUNITY

Type here to search

Services // The building blocks of any great app

Watson

Build cognitive apps that help enhance, scale, and accelerate human expertise

AlchemyAPI View More

Concept Expansion IBM BETA

Concept Insights IBM BETA

Dialog IBM BETA

Language Translation IBM

Natural Language Classifier IBM BETA

Personality Insights IBM

Question and Answer IBM BETA

Relationship Extraction IBM BETA

Speech To Text IBM

Text to Speech IBM

Tradeoff Analytics IBM

Visual Recognition IBM BETA

Cognitive Commerce™ Third Party

Cognitive Graph Third Party

Cognitive Insights™ Third Party

Starters

- Boilerplates

Compute

- Runtimes
- Containers

Services

- Watson
- Mobile
- DevOps
- Web and Application
- Integration
- Data & Analytics
- Security
- Business Analytics
- Internet of Things

Provider

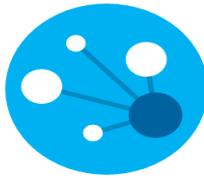
- IBM
- Third Party

Serviços cognitivos



Concept Expansion
BETA

Maps euphemisms or colloquial terms to more commonly understood phrases



Concept Insights
BETA

Explores information based on the concepts behind your input, rather than limiting investigation to findings based



Language Identification
BETA

Identifies the language in which text is written



Language Translation
GA

Identify the language text is written in. Translate text from one language to another for specific domains.



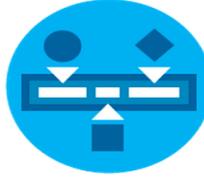
Machine Translation
BETA

Globalize on the fly. Translate text from one language to another



Message Resonance
EXPERIMENTAL

Communicate with people with a style and words that suits them



Natural Language Classifier
BETA

Interpret natural language and classify it with confidence



Personality Insights
GA

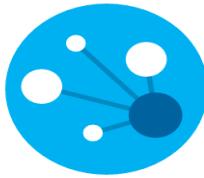
Enables deeper understanding of people's personality characteristics, needs, and values to help engage users on

Serviços cognitivos



Concept Expansion
BETA

Maps euphemisms or colloquial terms to more commonly understood phrases



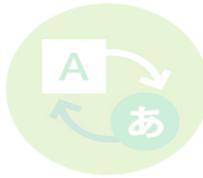
Concept Insights
BETA

Explores information based on the concepts behind your input, rather than limiting investigation to findings based



Language Identification
BETA

Identifies the language in which text is written



Language Translation
GA

Identify the language text is written in. Translate text from one language to another for specific domains.



Machine Translation
BETA

Globalize on the fly. Translate text from one language to another



Message Resonance
EXPERIMENTAL

Communicate with people with a style and words that suits them



Natural Language Classifier
BETA

Interpret natural language and classify it with confidence



Personality Insights
GA

Enables deeper understanding of people's personality characteristics, needs, and values to help engage users on

Serviços cognitivos



Concept Expansion
BETA

Maps euphemisms or colloquial terms to more commonly understood phrases



Concept Insights
BETA

Explores information based on the concepts behind your input, rather than limiting investigation to findings based



Language Identification
BETA

Identifies the language in which text is written



Language Translation
GA

Identify the language text is written in. Translate text from one language to another for specific domains.



Machine Translation
BETA

Globalize on the fly. Translate text from one language to another



Message Resonance
EXPERIMENTAL

Communicate with people with a style and words that suits them



Natural Language Classifier
BETA

Interpret natural language and classify it with confidence



Personality Insights
GA

Enables deeper understanding of people's personality characteristics, needs, and values to help engage users on

Serviços cognitivos



Concept Expansion
BETA

Maps euphemisms or colloquial terms to more commonly understood phrases



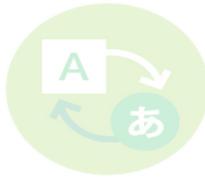
Concept Insights
BETA

Explores information based on the concepts behind your input, rather than limiting investigation to findings based



Language Identification
BETA

Identifies the language in which text is written



Language Translation
GA

Identify the language text is written in. Translate text from one language to another for specific domains.



Machine Translation
BETA

Globalize on the fly. Translate text from one language to another



Message Resonance
EXPERIMENTAL

Communicate with people with a style and words that suits them



Natural Language Classifier
BETA

Interpret natural language and classify it with confidence



Personality Insights
GA

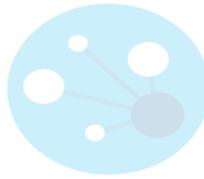
Enables deeper understanding of people's personality characteristics, needs, and values to help engage users on

Serviços cognitivos



Concept Expansion
BETA

Maps euphemisms or colloquial terms to more commonly understood phrases



Concept Insights
BETA

Explores information based on the concepts behind your input, rather than limiting investigation to findings based



Language Identification
BETA

Identifies the language in which text is written



Language Translation
GA

Identify the language text is written in. Translate text from one language to another for specific domains.



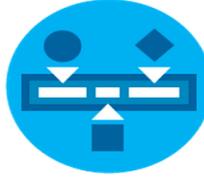
Machine Translation
BETA

Globalize on the fly. Translate text from one language to another



Message Resonance
EXPERIMENTAL

Communicate with people with a style and words that suits them



Natural Language Classifier
BETA

Interpret natural language and classify it with confidence



Personality Insights
GA

Enables deeper understanding of people's personality characteristics, needs, and values to help engage users on

Serviços cognitivos



Concept Expansion
BETA

Maps euphemisms or colloquial terms to more commonly understood phrases



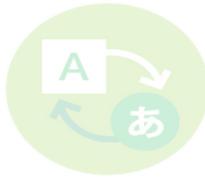
Concept Insights
BETA

Explores information based on the concepts behind your input, rather than limiting investigation to findings based



Language Identification
BETA

Identifies the language in which text is written



Language Translation
GA

Identify the language text is written in. Translate text from one language to another for specific domains.



Machine Translation
BETA

Globalize on the fly. Translate text from one language to another



Message Resonance
EXPERIMENTAL

Communicate with people with a style and words that suits them



Natural Language Classifier
BETA

Interpret natural language and classify it with confidence



Personality Insights
GA

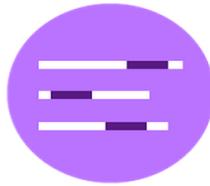
Enables deeper understanding of people's personality characteristics, needs, and values to help engage users on

Serviços cognitivos



Question and Answer
BETA

Direct responses to user inquiries fueled by primary document sources



Relationship Extraction
BETA

Intelligently finds relationships between sentence components (nouns, verbs, subjects, objects, etc.)



Speech to Text
GA

Low-latency, streaming transcription



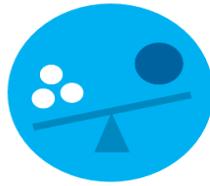
Text to Speech
GA

Synthesizes natural-sounding speech from text



Tone Analyzer
EXPERIMENTAL

Helps users understand the attitudes toward subject and audience that are implied in input text



Tradeoff Analytics
GA

Helps users make better choices to best meet multiple conflicting goals, combining smart visualization and



Visual Recognition
BETA

Analyzes the visual content of images and video frames to understand the content directly without the need for a textual



Visualization Rendering
EXPERIMENTAL

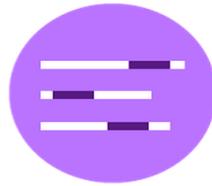
Graphical representations of data analysis for easier understanding

Serviços cognitivos



Question and Answer
BETA

Direct responses to user inquiries fueled by primary document sources



Relationship Extraction
BETA

Intelligently finds relationships between sentence components (nouns, verbs, subjects, objects, etc.)



Speech to Text
GA

Low-latency, streaming transcription



Text to Speech
GA

Synthesizes natural-sounding speech from text



Tone Analyzer
EXPERIMENTAL

Helps users understand the attitudes toward subject and audience that are implied in input text



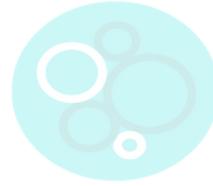
Tradeoff Analytics
GA

Helps users make better choices to best meet multiple conflicting goals, combining smart visualization and



Visual Recognition
BETA

Analyzes the visual content of images and video frames to understand the content directly without the need for a textual



Visualization Rendering
EXPERIMENTAL

Graphical representations of data analysis for easier understanding

Serviços cognitivos



Question and Answer
BETA

Direct responses to user inquiries fueled by primary document sources



Relationship Extraction
BETA

Intelligently finds relationships between sentence components (nouns, verbs, subjects, objects, etc.)



Speech to Text
GA

Low-latency, streaming transcription



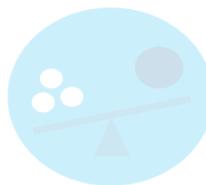
Text to Speech
GA

Synthesizes natural-sounding speech from text



Tone Analyzer
EXPERIMENTAL

Helps users understand the attitudes toward subject and audience that are implied in input text



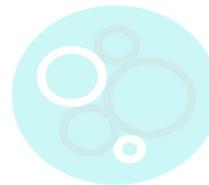
Tradeoff Analytics
GA

Helps users make better choices to best meet multiple conflicting goals, combining smart visualization and



Visual Recognition
BETA

Analyzes the visual content of images and video frames to understand the content directly without the need for a textual



Visualization Rendering
EXPERIMENTAL

Graphical representations of data analysis for easier understanding

Serviços cognitivos



Question and Answer
BETA

Direct responses to user inquiries fueled by primary document sources



Relationship Extraction
BETA

Intelligently finds relationships between sentence components (nouns, verbs, subjects, objects, etc.)



Speech to Text
GA

Low-latency, streaming transcription



Text to Speech
GA

Synthesizes natural-sounding speech from text



Tone Analyzer
EXPERIMENTAL

Helps users understand the attitudes toward subject and audience that are implied in input text



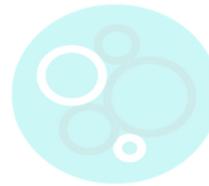
Tradeoff Analytics
GA

Helps users make better choices to best meet multiple conflicting goals, combining smart visualization and



Visual Recognition
BETA

Analyzes the visual content of images and video frames to understand the content directly without the need for a textual



Visualization Rendering
EXPERIMENTAL

Graphical representations of data analysis for easier understanding

Exemplo: Desenvolvimento de um sistema de pergunta & resposta para um domínio específico

Durante um projeto Q&A precisamos:

Criar o conjunto de treinamento



Coletar questões permitinientes ao domínio.

Agrupar as questões de acordo com as suas intenções.

Garantir uma amostra suficiente.

Conectar as intenções com as respostas.

Treinar o NLC



Submeter o conjunto de treinamento ao NLC

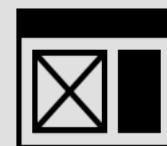
Validar



Validar as respostas geradas pelo sistema.

Fazer análise de precisão, cobertura e acurácia.

Criar a aplicação



Inserir na sua aplicação (portal, aplicação mobile) a funcionalidade de pergunta e resposta.

Fazer o deploy para o ambiente real.

Monitorar as perguntas e respostas em ambiente real.

Melhorar o modelo



Analizar as respostas fornecidas pelo sistema

Modificar a base de treinamento adicionando novos exemplos que possam melhorar o desempenho do sistema.

Criar o conjunto de treinamento



Coletar questões
permittinentes ao
domínio.

Agrupar as questões
de acordo com as
suas intenções.

Garantir uma amostra
suficiente.

Conectar as intenções
com as respostas.

Qual é a nota da minha prova?

O que vai cair na prova?

Como será o projeto da disciplina de Estrutura de Dados?

Tem aula hoje?

Tem prova hoje?

Como é calculado a média?

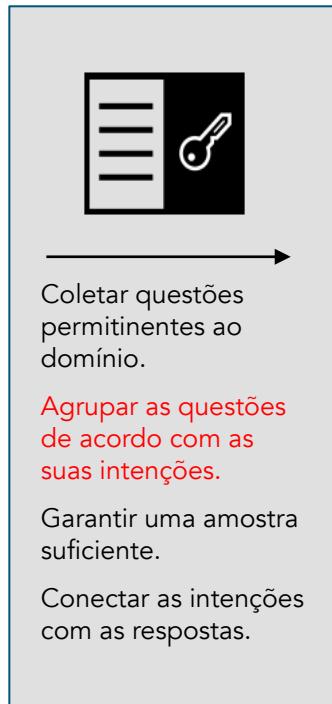
Perdi a prova, posso fazer a sub?

Quantas faltas eu posso ter?

Qual é a fórmula para cálculo da média final?

Qual é a data de entrega do projeto?

Criar o conjunto de treinamento



Qual é a nota da minha prova?



Nota

Como fui na prova?

Qual é a nota do meu trabalho?



Conteúdo avaliação

O que vai cair na prova?

Como vai ser a prova?

Como será o projeto da disciplina de Estrutura de Dados?



Agenda

Tem aula hoje?

Tem prova hoje?

Qual é a data de entrega do projeto?



Regras

Como é calculado a média?

Perdi a prova, posso fazer a sub?

Quanto faltou eu posso tirar?

Criar o conjunto de treinamento



Coletar questões permitinientes ao domínio.

Agrupar as questões de acordo com as suas intenções.

Garantir uma amostra suficiente.

Conectar as intenções com as respostas.

Qual é a nota da minha prova?

Como fui na prova?

Qual é a nota do meu trabalho?

O que vai cair na prova?

Como vai ser a prova?

Como será o projeto da disciplina de Estrutura de Dados?

Tem aula hoje?

Tem prova hoje?

Qual é a data de entrega do projeto?

Como é calculado a média?

Perdi a prova, posso fazer a sub?

Quantos faltos eu posso ter?



Nota



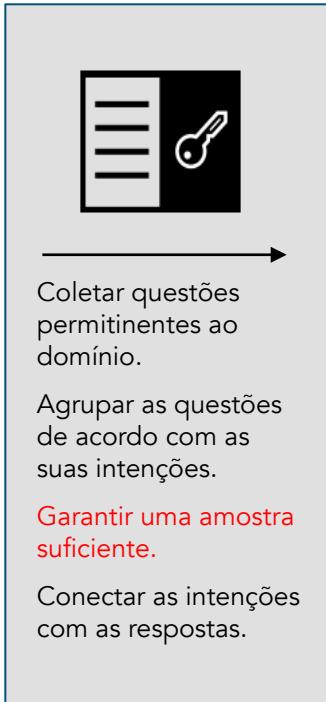
Conteúdo avaliação



A priori, o número mínimo de perguntas por agrupamento é dez (10)



Regras



| text | classes |
|---|--------------|
| Qual é a minha nota da prova? | nota |
| Qual é a minha nota? | nota |
| Qual é a nota do meu trabalho? | nota |
| Qual é a minha nota de Sistemas Inteligentes? | nota |
| Como fui na prova? | nota |
| Que nota eu tirei em estrutura de dados? | nota |
| E a minha nota? | nota |
| O que vai cair na prova? | conteudoAval |
| O que vai cair na prova de Estrutura de Dados? | conteudoAval |
| Como vai ser a prova de Sistemas Inteligentes? | conteudoAval |
| Qual é o conteúdo da prova? | conteudoAval |
| Qual será o conteúdo da prova? | conteudoAval |
| Onde eu encontro o material da disciplina de Sistemas Inteligentes? | material |
| Onde eu encontro os slides da disciplina? | material |
| Onde eu encontro os slides da matéria? | material |
| Onde está os slides da disciplina? | material |
| Onde está os slides da matéria? | material |
| Onde estão os slides da disciplina? | material |
| Onde estão os slides de Estrutura de Dados? | material |
| Quando vai ser a prova de Sistemas Inteligentes? | agenda |
| Quando devemos entregar o projeto? | agenda |
| Quando vai ser a apresentação do projeto da disciplina? | agenda |
| Teremos aula na próxima semana? | agenda |
| Quando começam as aulas? | agenda |
| Quando terminam as aulas? | agenda |
| Qual é a data de entrega do exercício programa? | agenda |
| Qual é a data de entrega do primeiro exercício programa? | agenda |

Criar o conjunto de treinamento



Coletar questões permitinientes ao domínio.

Agrupar as questões de acordo com as suas intenções.

Garantir uma amostra suficiente.

Conectar as intenções com as respostas.

Nota

Todas as notas de provas, testes e exercícios estão disponíveis no portal de notas: <http://portal.bandtec.com.br>

Conteúdo avaliação

Quer saber que conteúdo que vai cair na prova ou na avaliação continuada? Tudo que vimos até agora! Não sabe onde encontrar o material? Que tal perguntar ao meu assistente?

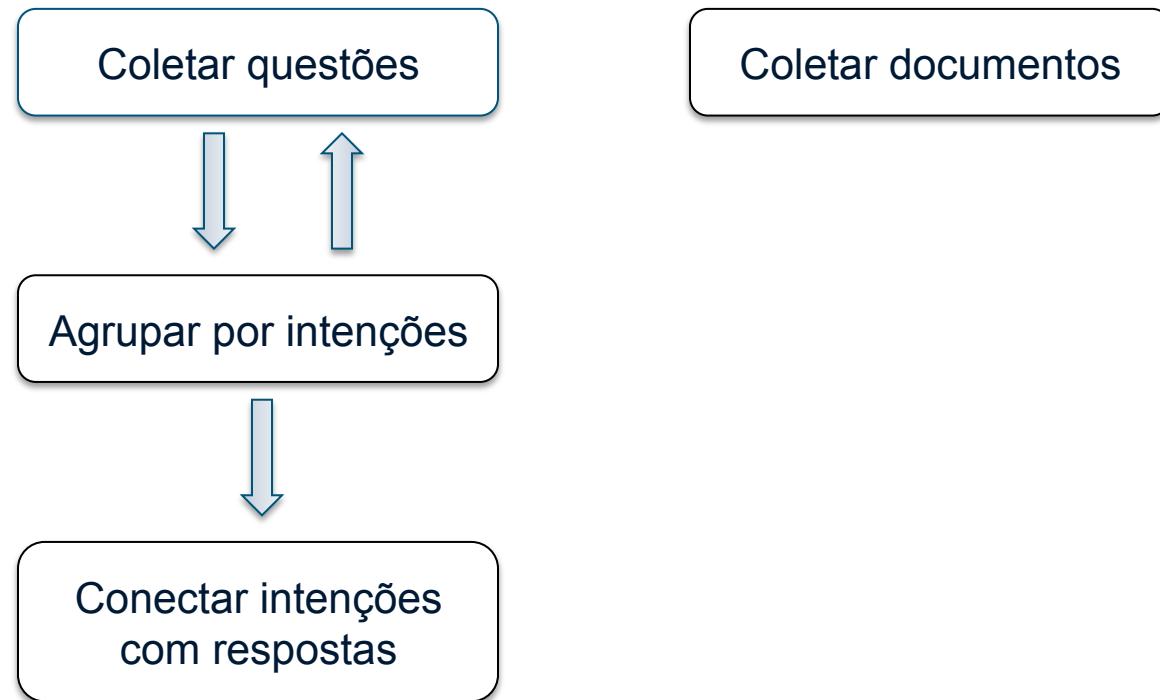
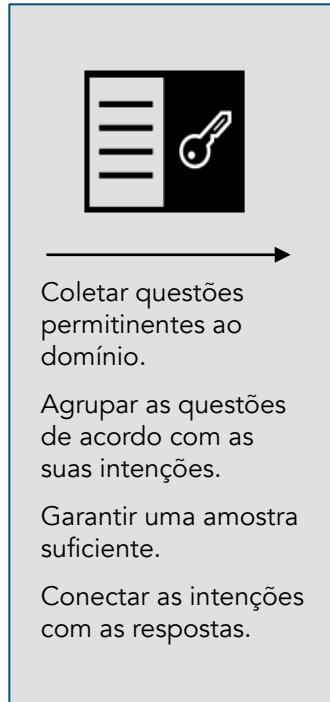
Agenda

Está com dúvidas com relação a agenda da disciplina? Que tal dar uma olhada nos calendários das disciplinas que estão em <http://sp.bandtec.com.br>?

Regras

As regras para cada disciplina podem ser encontradas nas suas respectivas ementas, que estão em <http://sp.bandtec.com.br>

Criar o conjunto de treinamento



Ferramenta para suportar o agrupamento por intenções



Bag.of.Soundex

Project: mloehmann01

add document | try a document

add document

send



Maria gosta de João e de Antônio

cluster-id: 27721a7470e
similarity: 46.43%
documents: 9
meaningfulness: 4.82



- Maria gosta de Antônio
- Maria gosta de João
- Maria gosta de João e de Antônio
- João gosta de Maria mas não gosta de Antônio
- Antônio gosta mesmo é de João, não de Maria
- Antonia gosta de João
- Maria gosta de João e de Antônio
- Maria Antonia gosta de João
- João Antonio gosta de Maria



Biscoito de chocolate não combina com cerveja

cluster-id: 18da2e4854a
similarity: 38.89%
documents: 4
meaningfulness: 2.44

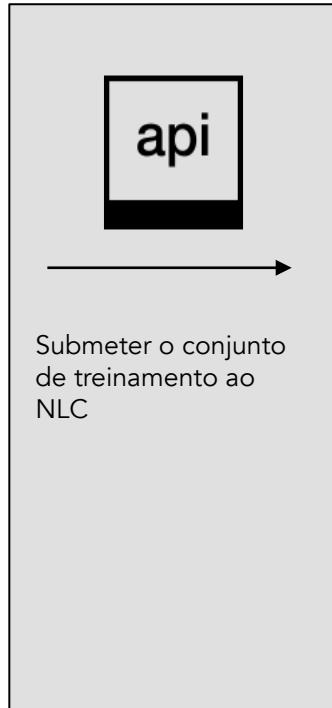


Minha mãe não faz comida pra mim

cluster-id: 167743cb1f3
similarity: 39.39%
documents: 4
meaningfulness: 2.42



Treinar o NLC



Etapas:

1. Cria uma instância do serviço NLC no Bluemix.
2. Copiar as credenciais (url, username e password) da instância.
3. Inicia o treinamento do classificador via uma chamada REST:

```
curl -u "<username>:<password>"  
-F training_data=@dados.csv  
-F training_metadata='{"language": "en", "name": "Classifica dados"}'  
"https://gateway.watsonplatform.net/natural-language-classifier/api/v1/classifiers"
```

Interface do Serviço NLC

natural-language-classifier : REST methods for IBM Natural Language Classifier

[Show/Hide](#)[List Operations](#)[Expand Operations](#)[Raw](#)**POST** /v1/classifiers

Creates a classifier with JSON data

POST /v1/classifiers

Creates a classifier with CSV data

GET /v1/classifiers

Retrieves the list of classifiers for the user

POST /v1/classifiers/{classifier_id}/classify

Returns label information for the input

GET /v1/classifiers/{classifier_id}/classify

Returns label information for the input

DELETE /v1/classifiers/{classifier_id}

Deletes a classifier

GET /v1/classifiers/{classifier_id}

Returns the training status of a classifier

Validação



Validar as respostas geradas pelo sistema.

Fazer análise de precisão, cobertura e acurácia.

Submetendo um texto ao classificador 0399F1-nlc-437:

```
curl -X POST -u "<username>:<password>"  
-H "Content-Type:application/json"  
-d "{\"text\":\"Vai ter aula hoje?\"}"  
"https://gateway.watsonplatform.net/natural-language-classifier/api/v1/classifiers/  
0399F1-nlc-437/classify"
```

Resposta:

```
{  
  "classifier_id": "0399F1-nlc-437",  
  "text": "Vai ter aula hoje?",  
  "top_class": "agenda",  
  "classes": [  
    {"class_name": "agenda", "confidence": 0.9824038458530916},  
    {"class_name": "outContext", "confidence": 0.006662883231573098},  
    {"class_name": "conteudoAval", "confidence": 0.0030952488883676504},  
    {"class_name": "material", "confidence": 0.0012244838893568255},  
    {"class_name": "regra", "confidence": 0.0012175455849405446},  
    {"class_name": "nota", "confidence": 0.0010762497225327208}  
}
```

NLC Manager

<http://nlctool.mybluemix.net/>

NLC Manager My Classifiers My Experiments Welcome, Thiago ! Logout Home About

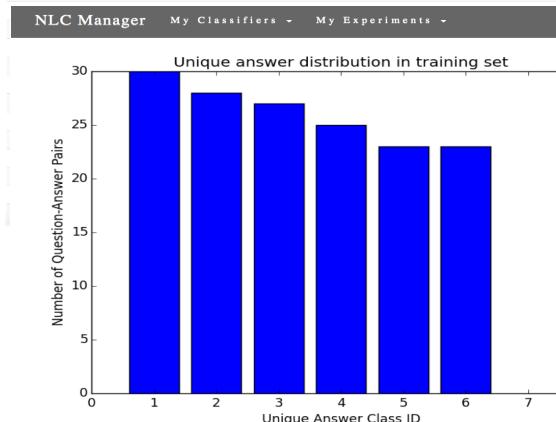
My Experiments

Evaluate your Natural Language Classifier

Experiment completed successfully! You can view your experiments [here](#).

Some details:

| Question | Real Class | Prediction | Confidence |
|---|------------|------------|-------------|
| Ele tem namorada? | outContext | outContext | 0.672102791 |
| Quem vai ganhar o jogo? | outContext | outContext | 0.679737373 |
| Hoje vai fazer sol? | outContext | outContext | 0.974411356 |
| Qual é a temperatura lá fora? | outContext | outContext | 0.877733272 |
| Qual é o telefone do professor? | outContext | outContext | 0.978853121 |
| Quando vai ser a apresentação do projeto? | agenda | agenda | 0.981293871 |
| Qual é a minha nota da prova de Estrutura de Dados? | nota | nota | 0.980084011 |



| ID | Class |
|----|--------------|
| 6 | conteudoAval |
| 5 | material |
| 4 | nota |
| 3 | agenda |
| 2 | regra |
| 1 | outContext |

NLC Manager My Classifiers My Experiments Welcome, Thiago ! Logout Home About

My Classifiers

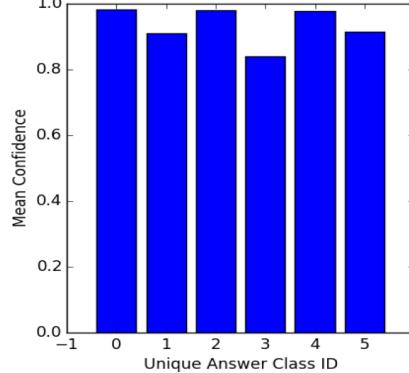
Ask questions to your Natural Language Classifier

NLC Manager My Classifiers My Experiments Confidence by Class

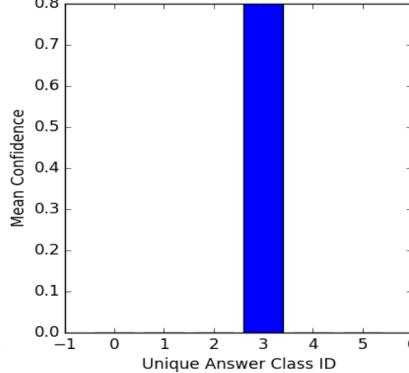
nota
agenda
material
outContext
conteudoAval
regra

Está com dúvida
0.183651742405

Confidence by Unique Answer Hits



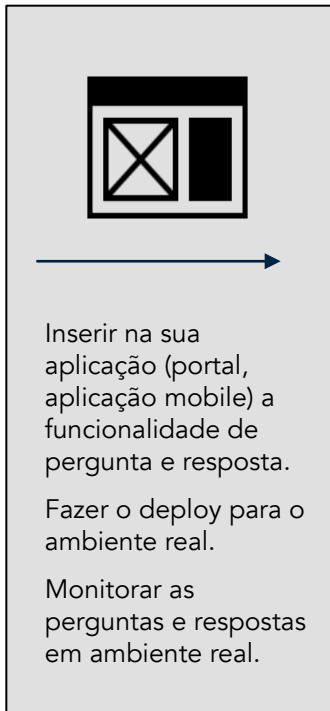
Confidence by Unique Answer Misses



ID Class Confidence

| Class | Hit | Miss |
|-------|--------------|--------------------|
| 1 | material | 0.9833137161358689 |
| 2 | outContext | 0.9110371864744827 |
| 3 | nota | 0.9801301290535316 |
| 4 | agenda | 0.8410113139494466 |
| 5 | regra | 0.9780146796509396 |
| 6 | conteudoAval | 0.9155872671906224 |

Criar a aplicação



professorBarth

Routes: professorbarth.mybluemix.net

GIT URL: <https://hub.jazz.net/git/fbarth/professorBarth> [EDIT CODE](#)

SDK FOR NODE.JS™

INSTANCES: 1 MEMORY QUOTA: 256 MB AVAILABLE MEMORY: 1.500 GB [SAVE](#) [RESET](#)

(MB per Instance)

[+ ADD A SERVICE OR API](#) [+ BIND A SERVICE OR API](#)

Natural Language Classifier
professorBarth standard

Show Credentials Docs

APP HEALTH [RESTART](#) [STOP](#)

Your app is running.

ACTIVITY LOG

8/14/15 fbarth@br.ibm.com started professorBarth app
8/14/15 fbarth@br.ibm.com stopped professorBarth app
8/14/15 fbarth@br.ibm.com updated professorBarth app

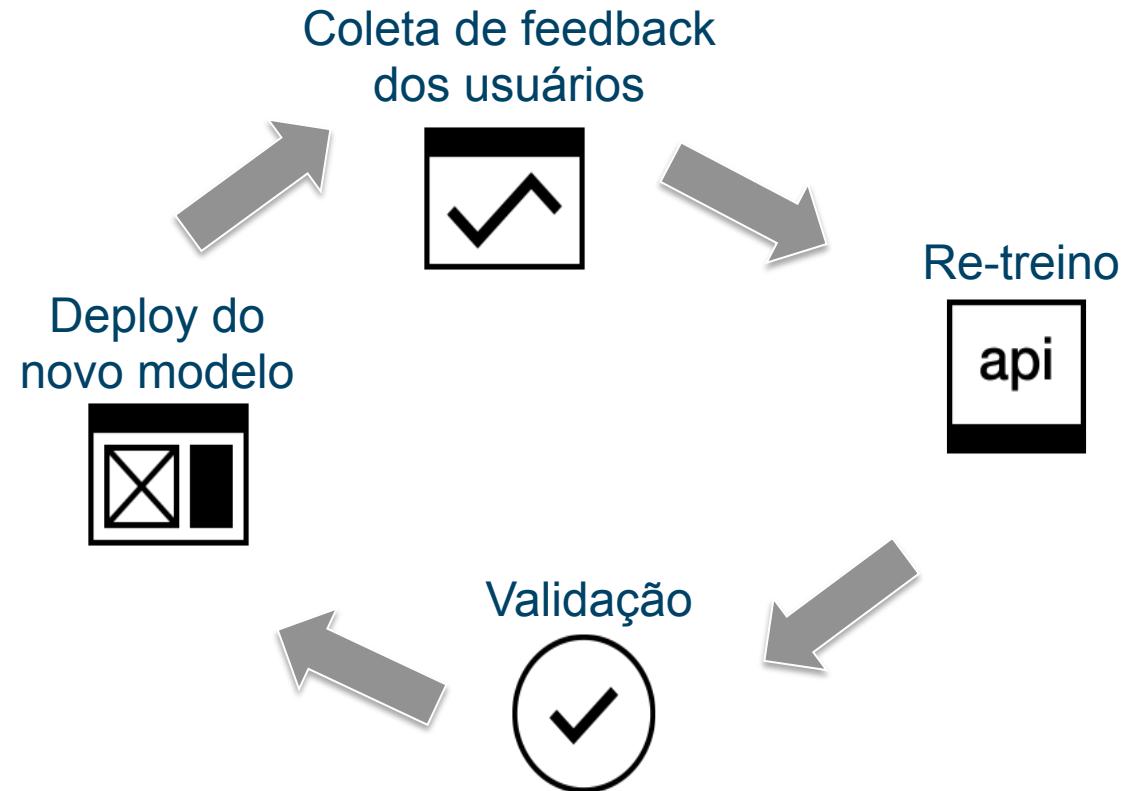
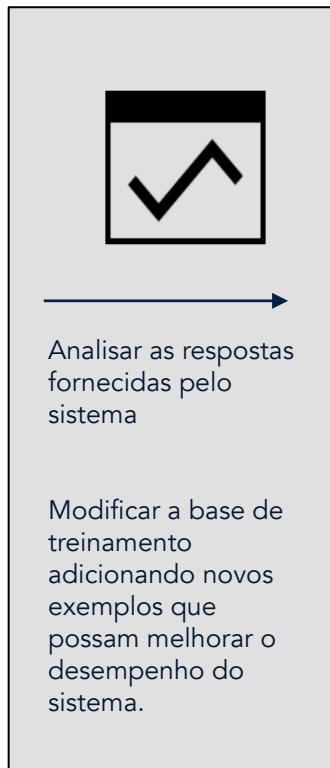
- memory to 256 MB
- modified environment

8/14/15 fbarth@br.ibm.com updated professorBarth app

- memory to 256 MB

[Estimate the cost of this app](#)

Melhorar o modelo



Considerações Finais

- Foi apresentado: o que é **computação cognitiva**, exemplos de aplicações e como desenvolver tais aplicações usando Bluemix.
- Papel do **Watson Group** para a Computação Cognitiva / IA: Passagem de sistemas experimentais para **aplicações reais** de larga escala com escopo bem delimitado.
- Papel do **Bluemix**: plataforma que permite o desenvolvimento rápido não só de aplicações cognitivas, mas também de ferramentas que dão suporte ao desenvolvimento.

Obrigado!

- Perguntas?
- fbarth@br.ibm.com