

AJNA



Receita Federal

Data Mining, Computer Vision and Machine Learning

Applied to Custom Risk Analysis, Surveillance and Operations

- Integrate Risk Analysis and Operations Center
 - Images central DataBase
 - Data and Images integration platform
- Workflow to access data and delivering computer vision models training and production
- UX for search and retrieval, data crossing, auditing, filtering and comparison

AJNA – The inspiration



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- Port of Santos: biggest in L.A.
- 25% of all Cargo imported and exported
- **5.000 containers a day, more than 2 million a year**
- More than **15 cargo/container terminals**
- Dozens of other types of cargo terminals
- **12 miles of ship pier**
- 4 cities, more than 50 miles of possible routes
- Just a few officers to cover all these
- Cargo smuggling, ripon/ripoff fraud, false documents, no physical presence or control, great distances to cover, many systems to access and places to search

AJNA – COV



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- COV – The technology help
 - Virtual presence
 - Remote verification
 - Traceability/Accountability and presence multiplication
 - Human risk minimizing: OCR, scanning, automatic systems
 - A central place to access images and different data sources
- It was an improvement, but there were lots of information and no time/human resources to explore it

AJNA = COV 4.0



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- Why do not use machines to do the hard work and select the most promising cases for officers??
- That's AJNA idea, presented and selected on "2017 RFB Inovation Contest"
- Simplified Workflow
 - Capture images and WMS information (real world)
 - Capture Custom DataBases (declared world)
 - Integrate
 - Make questions, prepare answers
 - Provide Customs Officers (Augmented IA/Centaur)

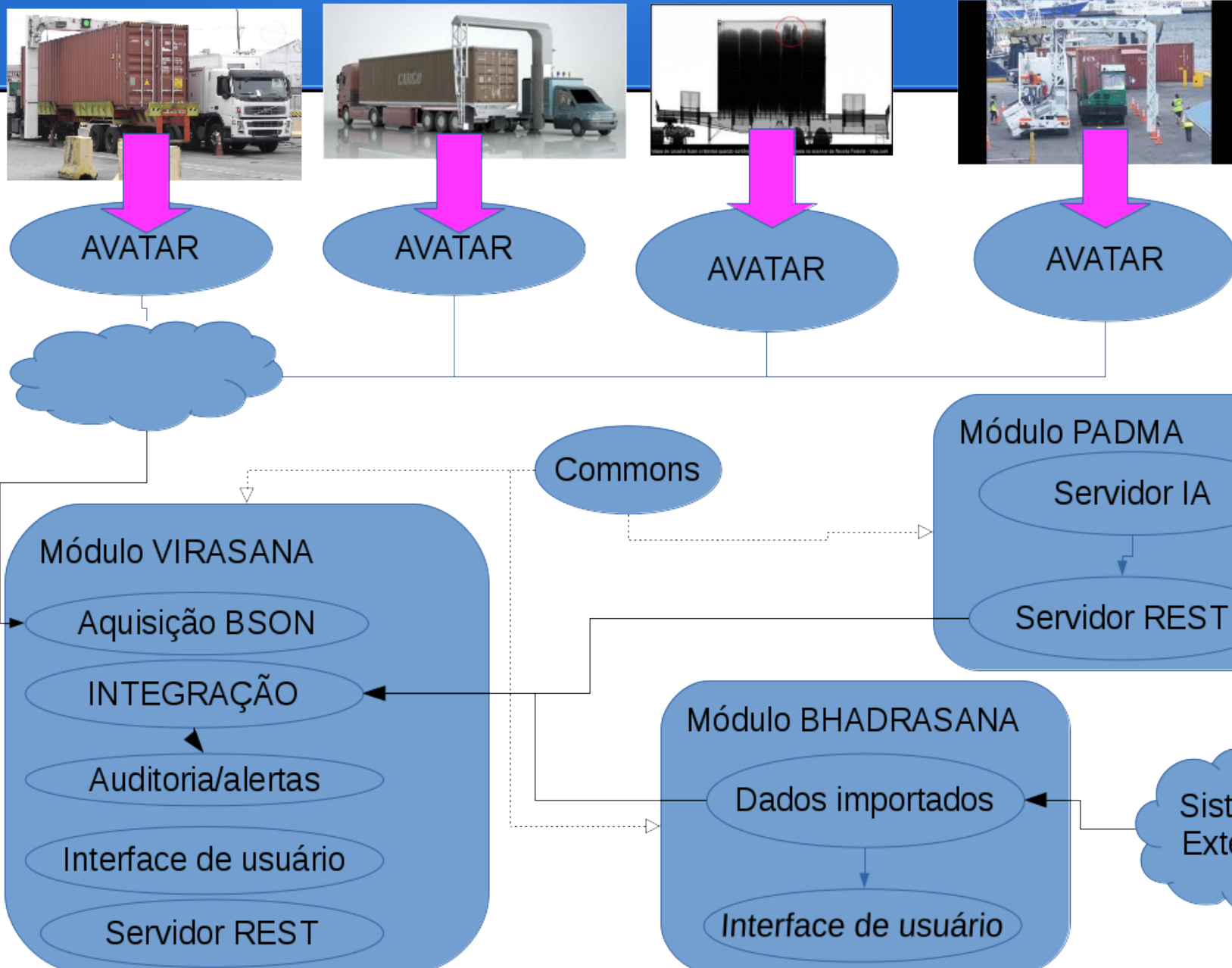


THE TRUTH IS
OUT THERE

AJNA - Architecture

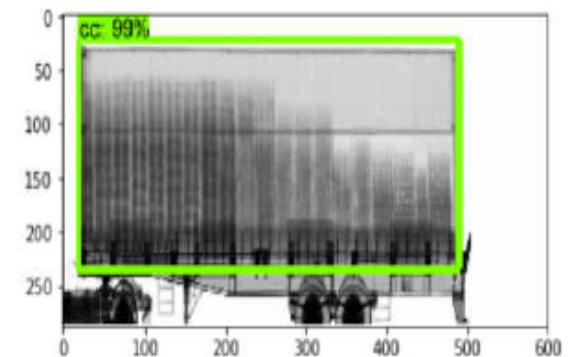
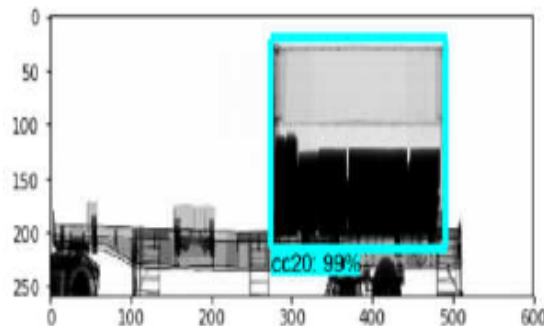
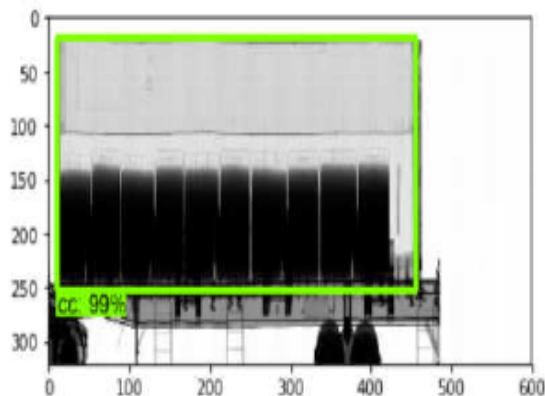
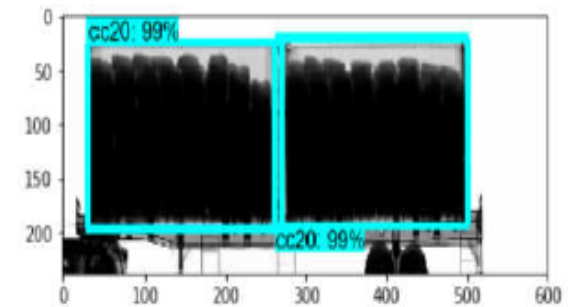
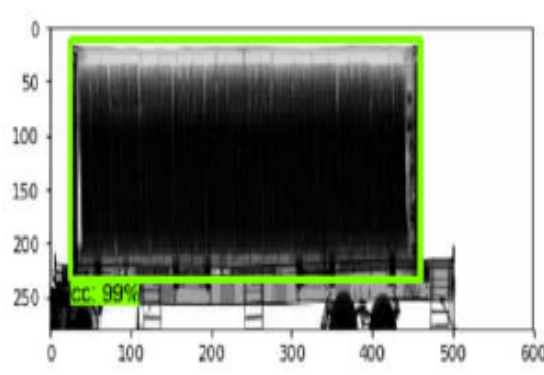
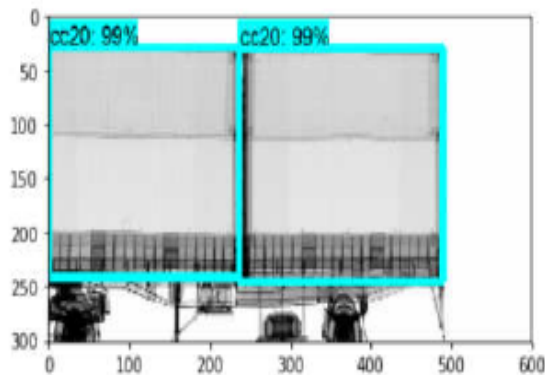


Força Federal



2018 - AJNA

Automatic analysis of images of container scanning, image search, data crossing and indication of anomalies.



2018 - Sistema AJNA



Data crossing, auditing, image search and retrieval

Interface for the Sistema AJNA (Data crossing, auditing, image search and retrieval).

Fields for search criteria:

- Número do contêiner: [Empty]
- Período de escaneamento da imagem: 01/07/2017 to 31/07/2017
- Com alerta?: [Empty]
- Filtrar: [Button]
- Página 1 de 1: [Navigation buttons: <, <<, >>, >]

Utilizar filtro especial de auditoria:

Contêineres informados como vazios mas detectados como não vazios (ordem decrescente de peso detectado) [Dropdown arrow]

OU Definir filtro personalizado:

Selecionar... [Dropdown arrow] Valor do parâmetro [Input] Adicionar [Button]

	Campo	Valor
Número informado do Contêiner	Nome do Arquivo	Data de Escaneamento
APRU6773160	2017072800261300KLS_stamp.jpg	2017-07-29 02:32:51.067000
MEDU3848975	20170719002621006ES_stamp.jpg	2017-07-19 18:00:08.150000
MWCU6956616	20170720002621000AS_stamp.jpg	2017-07-20 03:25:58.670000

Imagens (recortadas se disponível)

Imagens de contêineres:

- APRU6773160: [Image 1] [Image 2] Sem segundo contêiner
- MEDU3848975: [Image 1] [Image 2] Sem segundo contêiner
- MWCU6956616: [Image 1] [Image 2]

2018 - Sistema AJNA – visão computacional



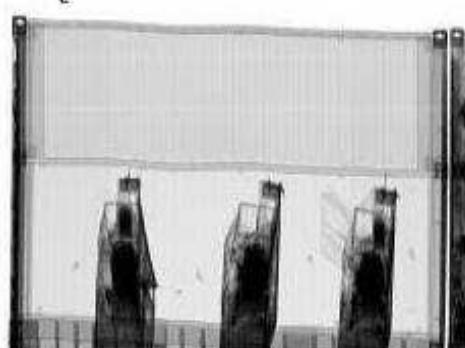
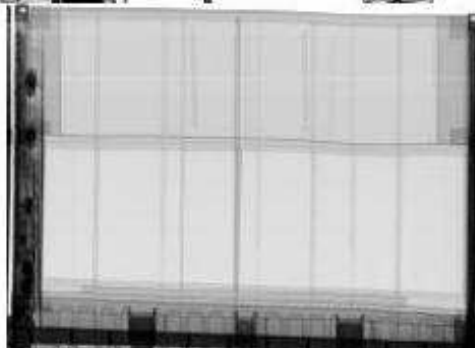
Automatic and manual image analysis

Resumo

Predições imagem

Listar todas as passagens por escâner

Buscar imagens similares



Número contêiner informado pelo
SUDU1087350

Data de escaneamento
2017-08-28 21:32

Data de Carregamento da image
2018-03-09 01:08

Nome Recinto
SANTOS BRASIL

Operação
Ici - Importação
CONTÊNER VAZIO

Manifesto - Escala
1517501869087 - 17000303229

Número contêiner - tara
sudu1087350 - 3000kg

Data e hora de atracação do Mar
28/08/2017 09:07:00

2018 - Sistema AJNA – visão computacional



Receita Federal

Similar image search and filtering

Página nº 1

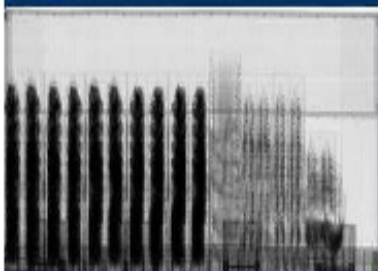


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Índice 0 de semelhança

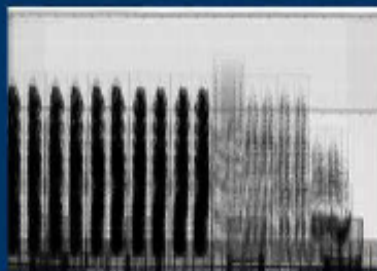


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Índice 1 de semelhança

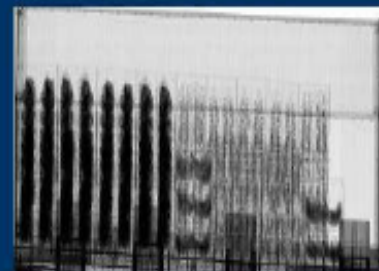


Imagem 5aac1c832a879552f4a12e166.
Índice 2 de semelhança



Imagem 5aabe1da2a879503d504c8e1.
Índice 3 de semelhança

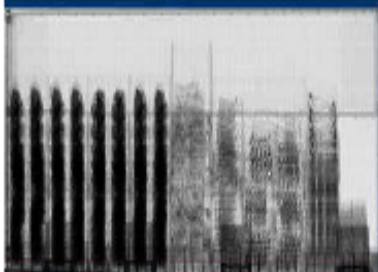


Imagem 5aac25e22a87952f4a13991d.
Índice 4 de semelhança

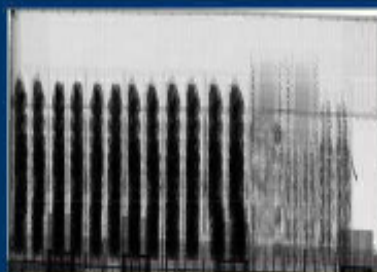


Imagem 5aa1dba42a8795025ab19af7.
Índice 5 de semelhança

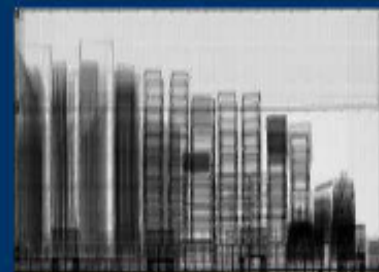


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Índice 6 de semelhança

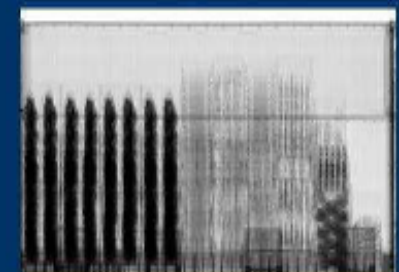
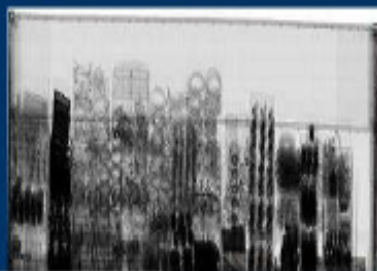
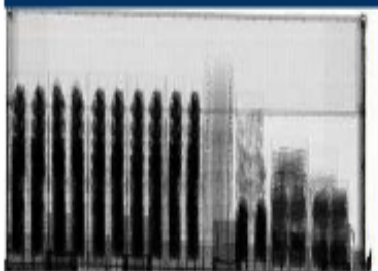
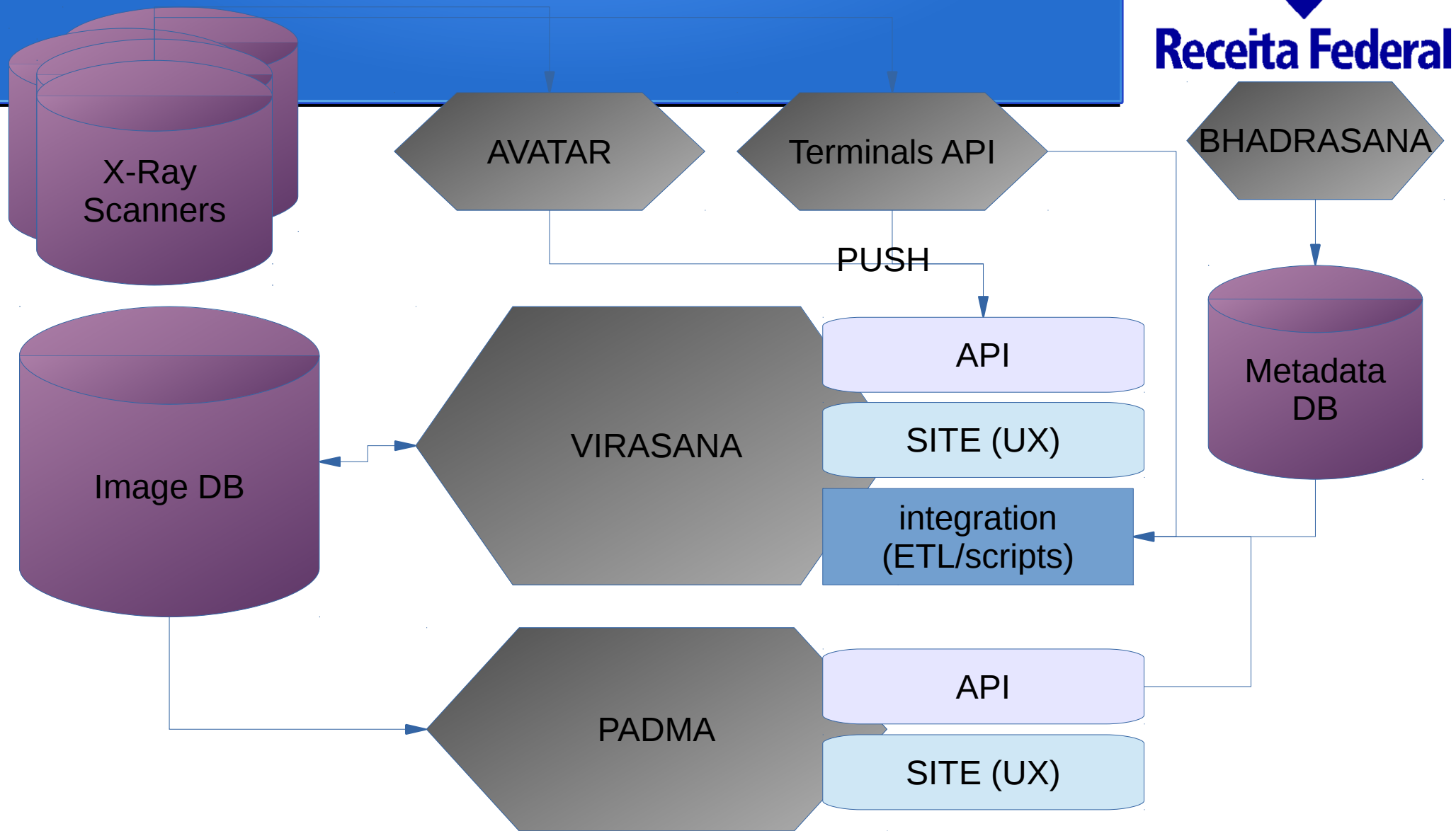


Imagem 5aaa55df2a87950616d6d862.
Índice 7 de semelhança



AJNA - Architecture



Arrows indicate information flow.

Information always flow in a “pull” way, this means, the system looks for information.

One exception is UPLOAD of AVATAR images, made in a “push”.