Machine Learning Implementation Security in the Wild 🌴

Denis Kolegov, Anton Nikolaev

Speakers

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  - Principal security researcher at Bi.Zone
  - Ph.D., associate professor at Tomsk State University
  - https://twitter.com/dnkolegov
- Anton
  - Security developer at Bi.Zone
  - Sibears CTF team player

Intro

AISec Project

sdnewhop.github.io/AISec/

github.com/sdnewhop/AISec/

medium.com/hackingodyssey

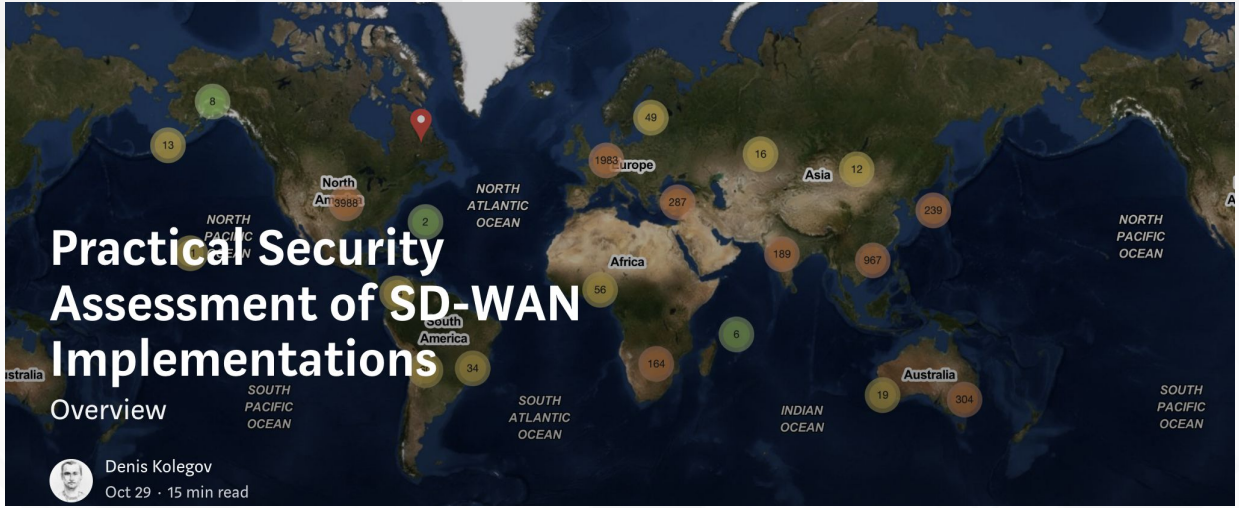
Contributors:

- Sergey Gordeychik
- Anton Nikolaev
- Denis Kolegov
- Maria Nedyak
- Roman Palkin

medium.com/hackingodyssey

hackingodyssey

20xx: A hacking odyssey



AISec Upcoming Talks

ZeroNights 2019

Maria Nedyak (@mariya_ns)
"Hacking Medical Imaging with DICOM"

Roman Palkin (@chicken_2007)
"Malign Machine Learning Models"

Disclaimer 1/2

- This talk is by Anton and Denis
- We don't speak for our employers
- All the opinions and information here are of our responsibility

Disclaimer 2/2

This talk focuses on the implementation security aspects of ML and does not targets its specific issues such as:

1. Data poisoning attacks
2. Privacy-stealing attacks
3. Privacy-leakage attacks
4. Adversarial attacks
5. Black-box model extraction attacks
6. Physical attacks

Cloud Text-to-Speech

Text-to-speech conversion powered by machine learning.

TRY IT FREE

VIEW DOCUMENTATION

OpenCV.js Demos

- Video processing (asm.js)
- Video processing (wasm)
- Face detection (asm.js)
- Face detection (wasm)

face-api.js playground

Speech KITT

A flexible GUI for interacting with Speech Recognition

Speech KITT makes it easy to add a GUI to sites using Speech Recognition. Whether you are using annyang, a different library or webkitSpeechRecognition directly, KITT will take care of the GUI.

Speech KITT provides a gra for the user to start or stop Speech Recognition and see its also help guide the user on how to interact with your site using th uctions and sample commands. It can even be used to carry a na user, asking questions the user can answer with his voic questions.

erested In

VOICE NG YOUR SITE

WITH OF CODE?

annyang! SpeechRecognition that just works

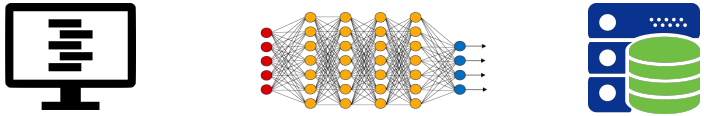
annyang is a tiny javascript library that lets your visitors control your site with voice commands.
annyang supports multiple languages, has no dependencies, weighs just 2kb and is free to use.

JS

Software Layers on Machine Learning Systems

Applications

Program logic **Model** **Data**



Frameworks

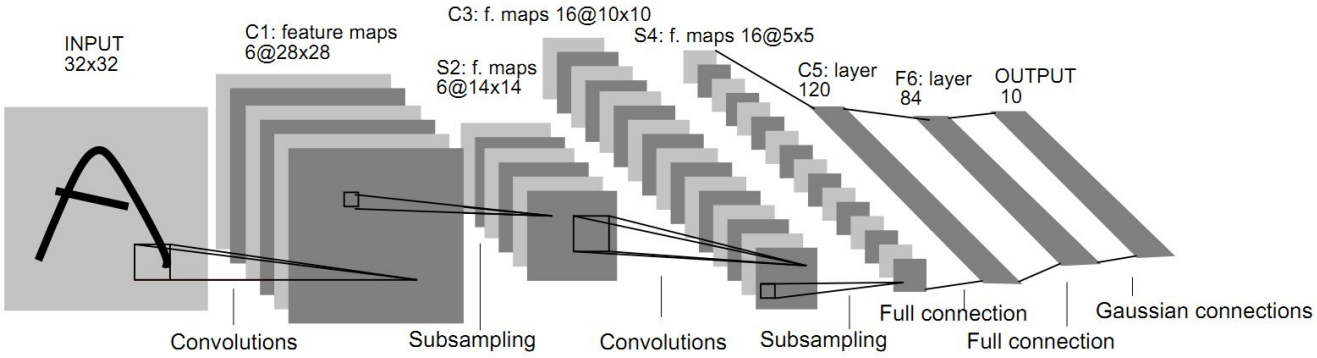
TensorFlow PyTorch Caffe

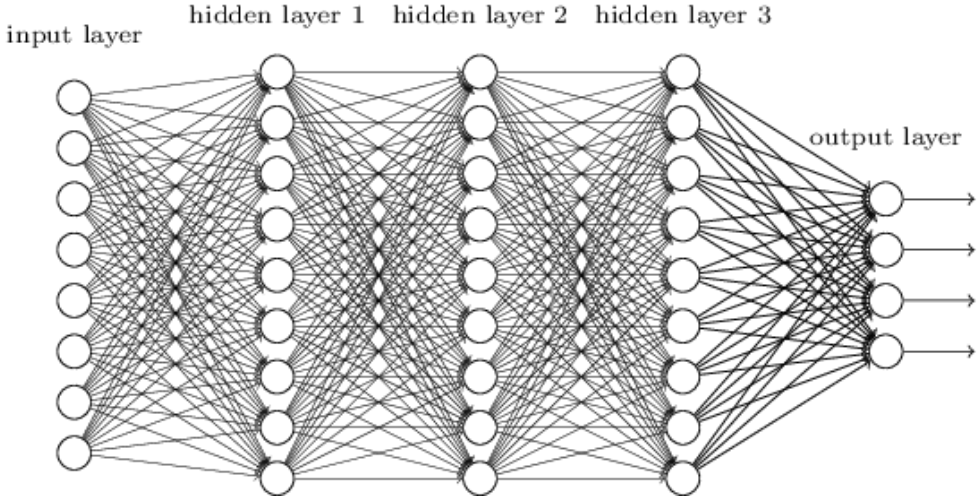
Caffe2 mxnet Chainer

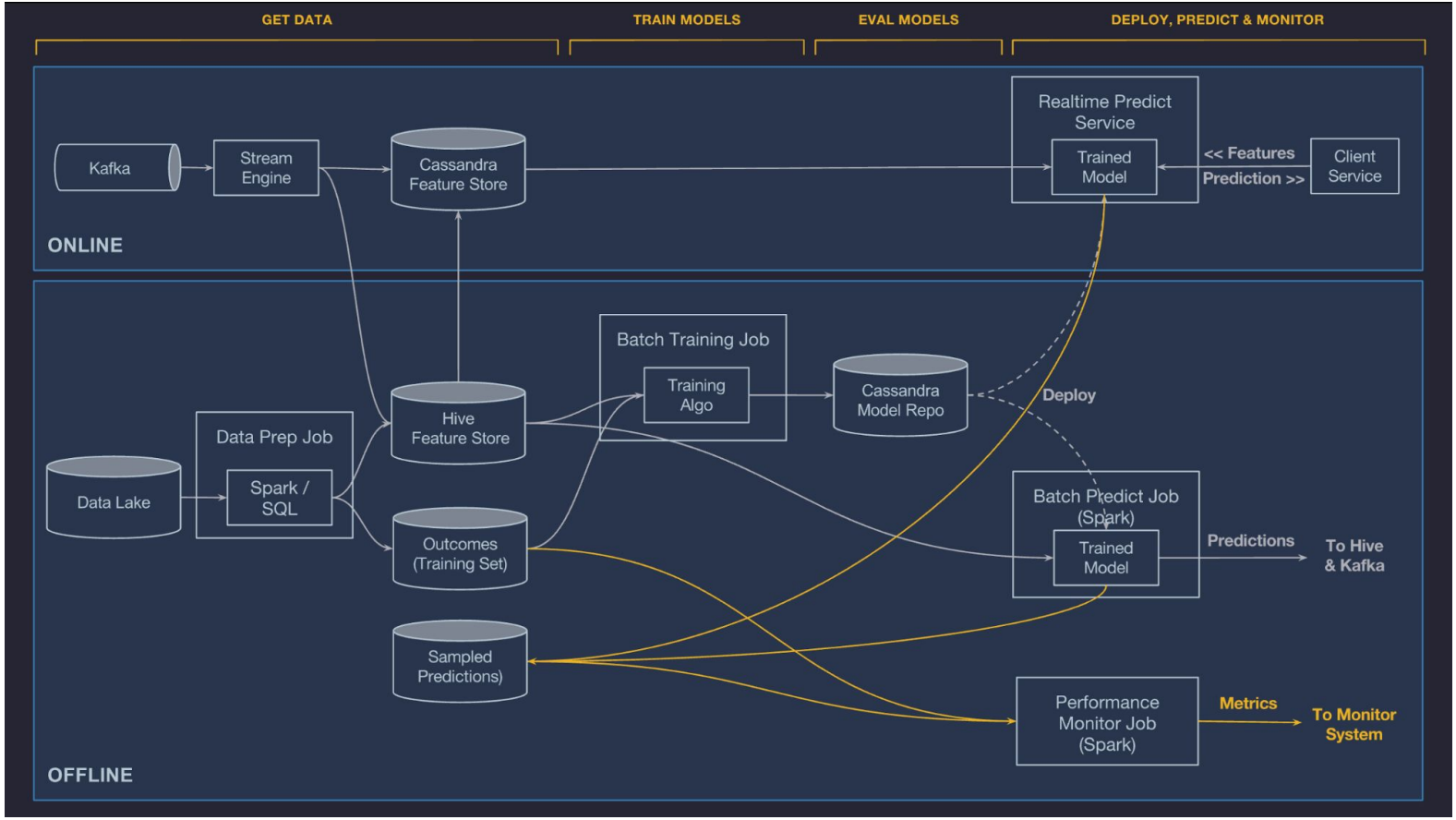
Framework Dependencies

NumPy OpenCV zlib

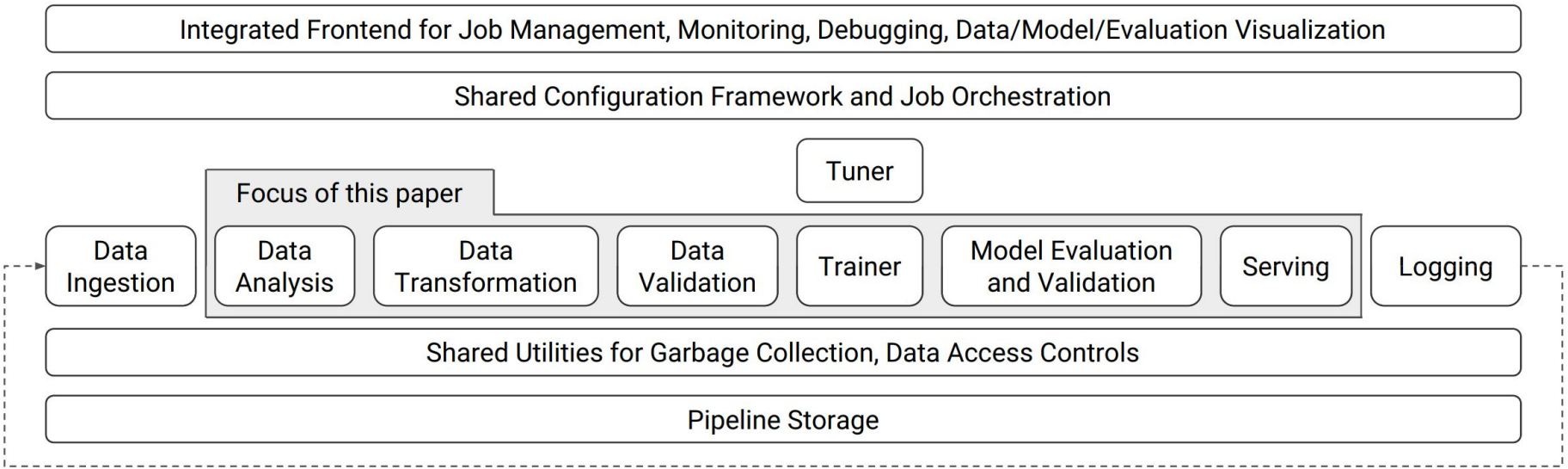
Kang Li, “Exposing Vulnerabilities in Deep Learning Frameworks.”


INPUT
32x32
C1: feature maps
6@28x28
S2: f. maps
6@14x14
C3: f. maps 16@10x10
S4: f. maps 16@5x5
C5: layer
120
F6: layer
84
OUTPUT
10
Convolutions
Subsampling
Convolutions
Subsampling
Full connection
Full connection
Gaussian connections

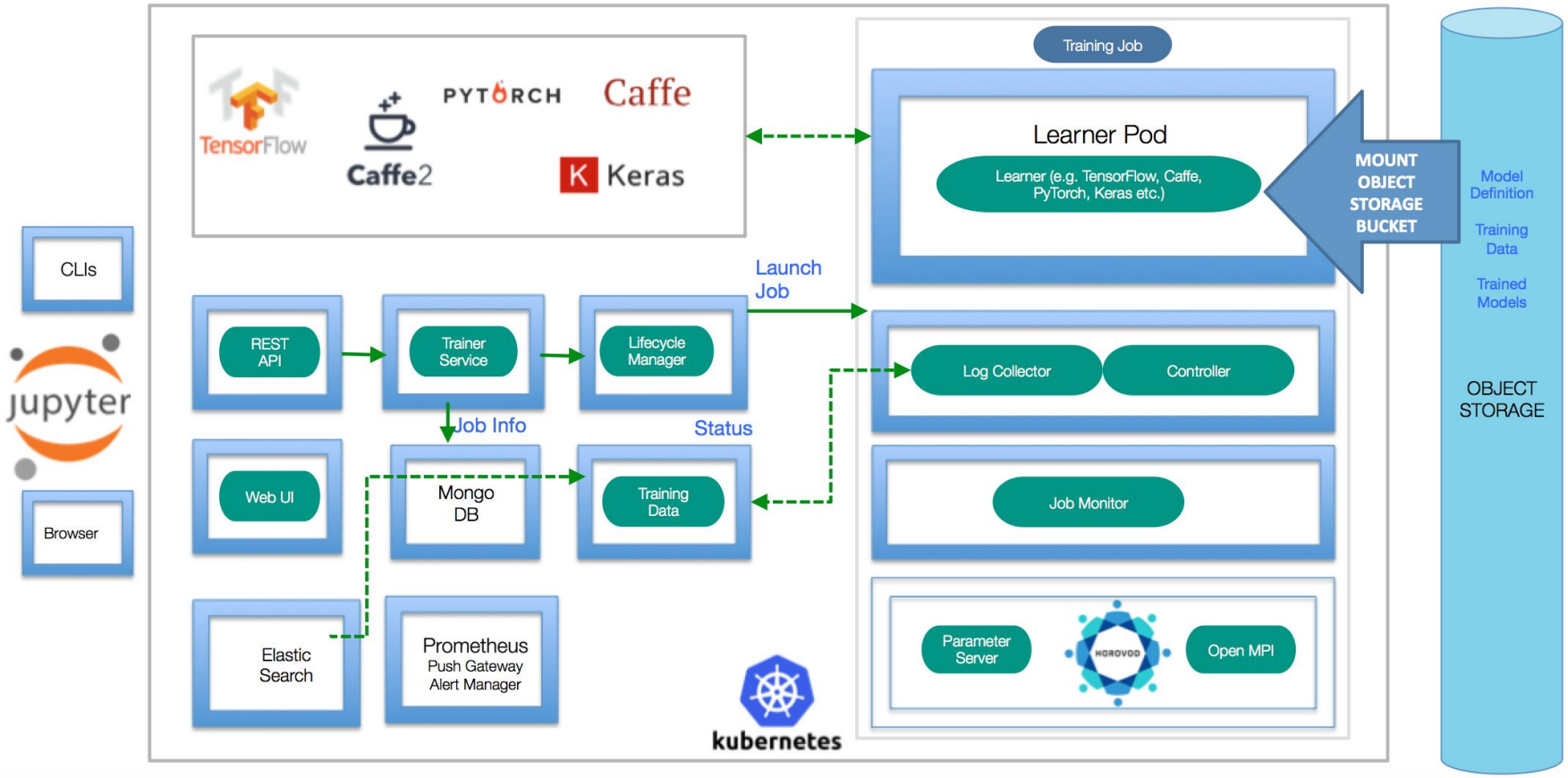

input layer
hidden layer 1
hidden layer 2
hidden layer 3
output layer



https://github.com/1duo/awesome-ai-infrastructures



https://github.com/1duo/awesome-ai-infrastructures



https://github.com/1duo/awesome-ai-infrastructures

Machine Learning Frameworks

TensorFlow

PyTorch

Caffe

Caffe2

mxnet

Chainer

Keras

theano

Cognitive Toolkit

Frameworks Complexity and Dependencies

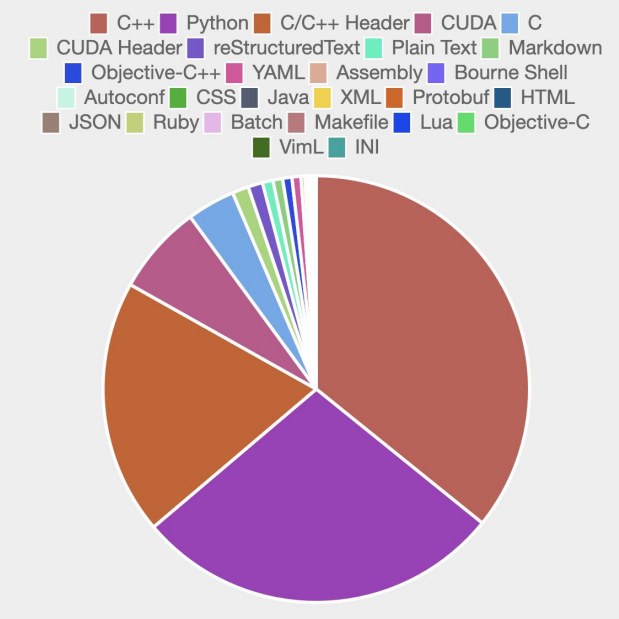
Framework	Files	Lines (all)	Lines of Code
Caffe	576	107.928	80.526
TensorFlow	11.219	3.310.964	2.465.296
PyTorch	5.451	1.141.599	903.697

Frame es

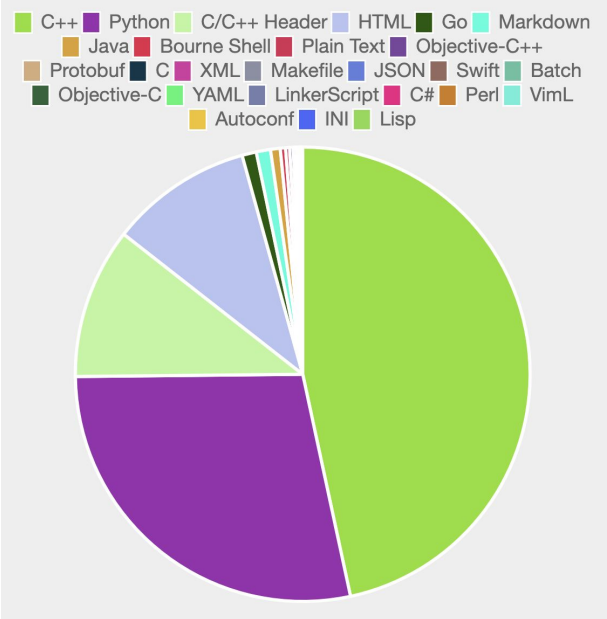
```
name                                                      summary
--------------------------------------------------------  ------------------------------------------------------------------------------
tensorflow                                                TensorFlow is an open source machine learning framework for everyone.
├── absl-py>=0.7.0                                        Abseil Python Common Libraries, see https://github.com/abseil/abseil-py.
│   └── six                                               Python 2 and 3 compatibility utilities
├── astor>=0.6.0                                          Read/rewrite/write Python ASTs
├── gast==0.2.2                                           Python AST that abstracts the underlying Python version
├── google-pasta>=0.1.6                                   pasta is an AST-based Python refactoring library
│   └── six                                               Python 2 and 3 compatibility utilities
├── grpcio>=1.8.6                                         HTTP/2-based RPC framework
│   └── six>=1.5.2                                        Python 2 and 3 compatibility utilities
├── keras-applications>=1.0.8                             Reference implementations of popular deep learning models
│   ├── h5py                                              Read and write HDF5 files from Python
│   │   ├── numpy>=1.7                                    NumPy is the fundamental package for array computing with Python.
│   │   └── six                                           Python 2 and 3 compatibility utilities
│   └── numpy>=1.9.1                                      NumPy is the fundamental package for array computing with Python.
├── keras-preprocessing>=1.0.5                            Easy data preprocessing and data augmentation for deep learning models
│   ├── numpy>=1.9.1                                      NumPy is the fundamental package for array computing with Python.
│   └── six>=1.9.0                                        Python 2 and 3 compatibility utilities
├── numpy<2.0,>=1.16.0                                    NumPy is the fundamental package for array computing with Python.
├── opt-einsum>=2.3.2                                     Optimizing numpys einsum function
│   └── numpy>=1.7                                        NumPy is the fundamental package for array computing with Python.
├── protobuf>=3.6.1                                       Protocol Buffers
│   ├── setuptools                                        Easily download, build, install, upgrade, and uninstall Python packages
│   └── six>=1.9                                          Python 2 and 3 compatibility utilities
├── six>=1.10.0                                           Python 2 and 3 compatibility utilities
├── tensorboard<2.1.0,>=2.0.0                             TensorBoard lets you watch Tensors Flow
│   ├── absl-py>=0.4                                      Abseil Python Common Libraries, see https://github.com/abseil/abseil-py.
│   │   └── six                                           Python 2 and 3 compatibility utilities
│   ├── google-auth-oauthlib<0.5,>=0.4.1                  Google Authentication Library
│   │   ├── google-auth                                   Google Authentication Library
│   │   │   ├── cachetools<3.2,>=2.0.0                    Extensible memoizing collections and decorators
│   │   │   ├── pyasn1-modules>=0.2.1                     A collection of ASN.1-based protocols modules.
│   │   │   │   └── pyasn1<0.5.0,>=0.4.6                  ASN.1 types and codecs
│   │   │   ├── rsa<4.1,>=3.1.4                           Pure-Python RSA implementation
│   │   │   │   └── pyasn1>=0.1.3                         ASN.1 types and codecs
│   │   │   ├── setuptools>=40.3.0                        Easily download, build, install, upgrade, and uninstall Python packages
│   │   │   └── six>=1.9.0                                Python 2 and 3 compatibility utilities
│   │   └── requests-oauthlib>=0.7.0                      OAuthlib authentication support for Requests.
│   │       ├── oauthlib>=3.0.0                           A generic, spec-compliant, thorough implementation of the OAuth request-signing logic
│   │       └── requests>=2.0.0                           Python HTTP for Humans.
│   │           ├── certifi>=2017.4.17                    Python package for providing Mozilla's CA Bundle.
│   │           ├── chardet<3.1.0,>=3.0.2                 Universal encoding detector for Python 2 and 3
│   │           ├── idna<2.9,>=2.5                        Internationalized Domain Names in Applications (IDNA)
│   │           └── urllib3!=1.25.0,!=1.25.1,<1.26,>=1.21.1  HTTP library with thread-safe connection pooling, file post, and more.
│   ├── google-auth<2,>=1.6.3                             Google Authentication Library
│   │   ├── cachetools<3.2,>=2.0.0                        Extensible memoizing collections and decorators
│   │   ├── pyasn1-modules>=0.2.1                         A collection of ASN.1-based protocols modules.
│   │   │   └── pyasn1<0.5.0,>=0.4.6                      ASN.1 types and codecs
│   │   ├── rsa<4.1,>=3.1.4                               Pure-Python RSA implementation
│   │   │   └── pyasn1>=0.1.3                             ASN.1 types and codecs
```

Frameworks by Language Segments

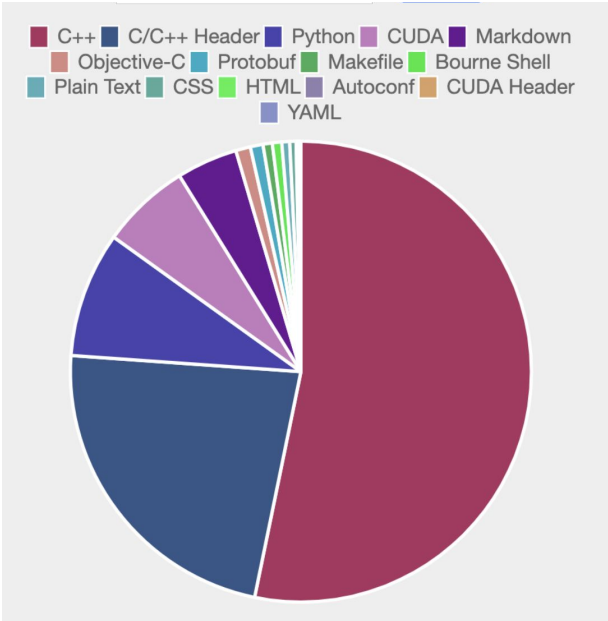
Pytorch



TensorFlow



Caffe



Common Vulnerabilities Found in TensorFlow

CVE	Vulnerability Type	Publish Date	Score	Description
CVE-2019-9635	**DoS**	2019-04-24	**4.3**	NULL pointer dereference in Google TensorFlow before 1.12.2 could cause a denial of service via an invalid GIF file.
CVE-2018-10055	**Overflow**	2019-04-24	**5.8**	Invalid memory access and/or a heap buffer overflow in the TensorFlow XLA compiler in Google TensorFlow before 1.7.1 could cause a crash or read from other parts of process memory via a crafted configuration file.
CVE-2018-8825	**Overflow (Code execution)**	2019-04-23	**6.8**	Google TensorFlow 1.7 and below is affected by: Buffer Overflow. The impact is: execute arbitrary code (local).
CVE-2018-7577	**Crash**	2019-04-24	**5.8**	Memcpy parameter overlap in Google Snappy library 1.1.4, as used in Google TensorFlow before 1.7.1, could result in a crash or read from other parts of process memory.
CVE-2018-7576	**Context-dependent (Null Pointer)**	2019-04-23	**4.3**	Google TensorFlow 1.6.x and earlier is affected by: Null Pointer Dereference. The type of exploitation is: context-dependent.
CVE-2018-7575	**Overflow**	2019-04-24	**7.5**	Google TensorFlow 1.7.x and earlier is affected by a Buffer Overflow vulnerability. The type of exploitation is context-dependent.
CVE-2018-7574	**Context-dependent (Null Pointer)**	2019-04-24	**5.8**	Google TensorFlow 1.6.x and earlier is affected by a Null Pointer Dereference vulnerability. The type of exploitation is: context-dependent.

Common Bugs Found in ML Frameworks and Dependencies

ML Framework	dep. packages	CVE-ID	Potential Threats
TensorFlow	numpy	CVE-2017-12852	DOS
TensorFlow	wave.py	CVE-2017-14144	DOS
Caffe	libjasper	CVE-2017-9782	Heap Overflow
Caffe	openEXR	CVE-2017-12596	Crash
Caffe/Torch	opencv	CVE-2017-12597	Heap Overflow
Caffe/Torch	opencv	CVE-2017-12598	Crash
Caffe/Torch	opencv	CVE-2017-12599	Crash
Caffe/Torch	opencv	CVE-2017-12600	DOS
Caffe/Torch	opencv	CVE-2017-12601	Crash

ML Framework	dep. packages	CVE-ID	Potential Threats
Caffe/Torch	opencv	CVE-2017-12602	DOS
Caffe/Torch	opencv	CVE-2017-12603	Crash
Caffe/Torch	opencv	CVE-2017-12604	Crash
Caffe/Torch	opencv	CVE-2017-12605	Crash
Caffe/Torch	opencv	CVE-2017-12606	Crash
Caffe/Torch	opencv	CVE-2017-14136	Integer Overflow

Qixue Xiao, Kang Li, Deyue Zhang, Weilin Xu,
"Security Risks in Deep Learning Implementations"
https://arxiv.org/abs/1711.11008

Architecture Blocks

- API Endpoints
- Training Systems
- Visualization Systems
- Infrastructure Services
- Baseboard Management Controllers
- Job and Message Queues
- Databases

TensorFlow Distributed Server + Nmap = ?

```
2019-11-03 22:14:49.809579: I tensorflow/core/distributed_runtime/rpc/grpc_channel.cc:250] Initialize
 GrpcChannelCache for job local -> {0 -> localhost:2222, 1 -> localhost:2223}
2019-11-03 22:14:49.810038: I tensorflow/core/distributed_runtime/rpc/grpc_server_lib.cc:365] Started
 server with target: grpc://localhost:2222
Starting server #0
2019-11-03 22:14:49.810084: I tensorflow/core/distributed_runtime/rpc/grpc_server_lib.cc:369] Server
already started (target: grpc://localhost:2222)
```

TensorFlow Distributed Server + Nmap = ?

```
2019-11-03 22:14:49.809579: I tensorflow/core/distributed_runtime/rpc/grpc_channel.cc:250] Initialize
 GrpcChannelCache for job local -> {0 -> localhost:2222, 1 -> localhost:2223}
2019-11-03 22:14:49.810038: I tensorflow/core/distributed_runtime/rpc/grpc_server_lib.cc:365] Started
 server with target: grpc://localhost:2222
Starting server #0
2019-11-03 22:14:49.810084: I tensorflow/core/distributed_runtime/rpc/grpc_server_lib.cc:369] Server
already started (target: grpc://localhost:2222)
[1]    28510 segmentation fault  python3 server.py 0
(venv) ➜  tensorflow-distributed-server
```

```
..ibuted-server (zsh)
➜  tensorflow-distributed-server nmap localhost -p 2222
Starting Nmap 7.80 ( https://nmap.org ) at 2019-11-03 22:16 +07
Nmap scan report for localhost (127.0.0.1)
Host is up (0.00016s latency).
Other addresses for localhost (not scanned): ::1

PORT     STATE SERVICE
2222/tcp open  EtherNetIP-1

Nmap done: 1 IP address (1 host up) scanned in 0.07 seconds
➜  tensorflow-distributed-server
```

What Does it Mean?

Machine Learning applications and related infrastructure (servers, wrappers, handlers) are vulnerable to different kinds of vulnerabilities: crashes, denial of service, integer and heap overflows, etc.

What Does it Mean?

Machine Learning applications and related infrastructure (servers, wrappers, handlers) are vulnerable to different kinds of vulnerabilities: crashes, denial of service, integer and heap overflows, etc.

And let's not forget about control interfaces!

The Identified Issues

1. A huge number of the interfaces of various ML frameworks are open and accessible from the Internet
2. Most of them don't have authentication and/or access control mechanisms
3. Default credentials are not changed
4. Multiple common low-hanging fruit vulnerabilities (web, memory corruption, etc.) both on server- and client-side

The P

1. A hu cessible from
2. Mos s
3. Defa
4. Com d clier

How to Find ML Frameworks and Applications?

Search Engines

Search Engi

intitle:"Kubeflow Central Dashboard"

All | Images | News | Videos | Maps | More | Settings | Tools

Page 3 of about 214 results (0.27 seconds)

Kubeflow Central Dashboard
[redacted].205.58
Kubeflow Central Dashboard.

Notebook Servers - Kubeflow Central Dashboard
[redacted].165.144 › jupyter
Kubeflow Central Dashboard.

Name - Kubeflow Central Dashboard
[redacted].165.144 › jupyter › new
CPU / RAM. Specify the total amount of CPU and RAM reserved by your Notebook Server. For CPU-intensive workloads, you can choose more than 1 CPU (e.g. ...

Artifact Store - Kubeflow Central Dashboard
[redacted].165.144 › metadata
Kubeflow Central Dashboard.

Namespace memberships - Kubeflow Central Dashboard
[redacted].com › jupyter › new
Kubeflow Central Dashboard.

Pipelines
[redacted].145.65 › pipeline
... 8:45:25 AM. [Sample] Basic - Exit Handler. A pipeline that downloads a message and prints it out. Exit Handler will run at the end. For source code, refer to ...

Search Engines

How can we search deeper?

Search Engines

FOFA

SHODAN

censys

ZoomEye

Special Engines and Applications

"tfjs@1.0.0" Search

Need more results? Try internal pages search. query syntax

9 web pages in 2.56 s.

URLs CSV CSV+snippets

Rank	Url	Snippets
>30M	[redacted]	***/npm/@tensorflow/**tfjs@1.0.0**/dist/tf.min.js"></s
>30M	[redacted]	***/npm/@tensorflow/**tfjs@1.0.0**"></script> <script
>30M	[redacted]	***/npm/@tensorflow/**tfjs@1.0.0**/dist/tf.min.js"></s
>30M	[redacted]	***/npm/@tensorflow/**tfjs@1.0.0**/dist/tf.min.js"></s
>30M	[redacted]	***/npm/@tensorflow/**tfjs@1.0.0**/dist/tf.min.js"></s
>30M	[redacted]	***/npm/@tensorflow/**tfjs@1.0.0**/dist/tf.min.js"></s
	[redacted]	***/npm/@tensorflow/**tfjs@1.0.0**/dist/tf.min.js"></s
	[redacted]	***/npm/@tensorflow/**tfjs@1.0.0**/dist/tf.min.js" typ
	[redacted]	***/npm/@tensorflow/**tfjs@1.0.0**/dist/tf.min.js'></s

https://publicwww.com/

Special Engines and Applications

searchcode

tf.min.js | search

About 3,481 results: "tf.min.js"

Page 1 of 50

Previous | Next

Filter Results

Remove | Apply

Sources

- Bitbucket 2250
- Github 988
- Google Code 411
- CodePlex 47
- GitLab 25
- Sourceforge 10
- Fedora Project 3

Languages

Filter Languages

- Javascript 1488
- HTML 991
- PHP 565
- Portable Object 200
- Python 127
- vim script 80
- Lisp 56
- Bourne Shell 22
- diff 21
- C# 21
- Java 16

Makefile in ningapp-topfriends https://github.com/ning/ningapp-topfriends.git | 27 lines | make

```
2. CSSOPT = --type css
3. JSOPT = --type js
10. CSSSRC = css/smoothness/jquery-ui-1.7.2.custom.css css/style.css
11. CSSDEST = style.min.css
12.
13. JSSRC = tf.js
14. JSDEST = tf.min.js
15.
17.
18. ${GADGETDEST}: ${GADGETSRC} ${CSSDEST} ${JSDEST}
23.
24. ${JSDEST}: ${JSSRC}
25.         cat ${JSSRC} | ${YUIBIN} ${JSOPT} > ${JSDEST}
26.
```

app.min.js in habitrpg-mobile https://github.com/jiixing/habitrpg-mobile.git | 61661 lines | Javascript

```
1. /*!
2.  * ionic.bundle.js is a concatenation of:
3.  * ionic.js, angular.js, angular-animate.js,
4.  * angular-sanitize.js, angular-ui-router.js,
5.  * and ionic-angular.js
6.  */
15.  *
16.  * By @maxlynch, @benjsperry, @adamdbradley <3
645.    // find what eventtypes we add listeners to
646.    ionic.Gestures.event.determineEventTypes();
769.    /**
770.     * enable of disable hammer.js detection
913.     * we have different events for each device/browser
914.     * determine what we need and set them in the ionic.Gestures.EVEN
915.     */
```

https://searchcode.com/

Special Engines and Applications

#	Bucket	Filename	Size
1	[redacted]s3.amazonaws.com	.guild/runs/2e7fbb1649f211e8bab6ee60f17f85c9/0/saved_model.pb	116.47kB
2	[redacted]s3.amazonaws.com	.guild/runs/446f0cbe49b211e88d80ee60f17f85c9/0/saved_model.pb	35.37kB
3	[redacted]s3.amazonaws.com	tensorflow/inception-v1/model/pipeline_tfserving/0/saved_model.pb	1.63MB
4	[redacted]s3.amazonaws.com	tensorflow/linear-v1/model/pipeline_tfserving/1518648395/saved_model.pb	10.84kB
5	[redacted]s3.amazonaws.com	tensorflow/mnist-v1/model/pipeline_tfserving/0/saved_model.pb	35.37kB
6	[redacted]s3.amazonaws.com	tensorflow/mnist-v2/model/pipeline_tfserving/0/saved_model.pb	116.47kB
7	[redacted]s3.amazonaws.com	tensorflow/mnist-v3/model/pipeline_tfserving/1519517992/saved_model.pb	33.37kB
8	[redacted]s3.amazonaws.com	web_model/tensorflowjs_model.pb	1.45kB
9	[redacted]-test.s3.amazonaws.com	web_model/tensorflowjs_model.pb	1.43kB

https://buckets.grayhatwarfare.com/

Main Search Problem

How to combine all possible variations of results from different search engines and special applications?

Main Search Problem(s)

How to combine all possible variations of results from different search engines and special applications?

Moreover, how to make additional checks on them?

Main Search Problem(s)

1. How to search through different systems?
2. How to combine results from Shodan and Censys?
3. How to search for public exploits?
4. How to run custom scripts on them?
5. How to initiate ports and services scanning?
6. How to find information about vulnerabilities?
7. How to brute for SNMP public and private strings while scanning the hosts?
8. How to search hosts with some indirect methods and implicit properties?

“Cure for Everything”

grinder

🔎 Python framework to automatically discover and enumerate hosts from different back-end systems (Shodan, Censys)

python | nmap | vulnerability-scanners | python-framework | shodan-api | vulners | censys-api

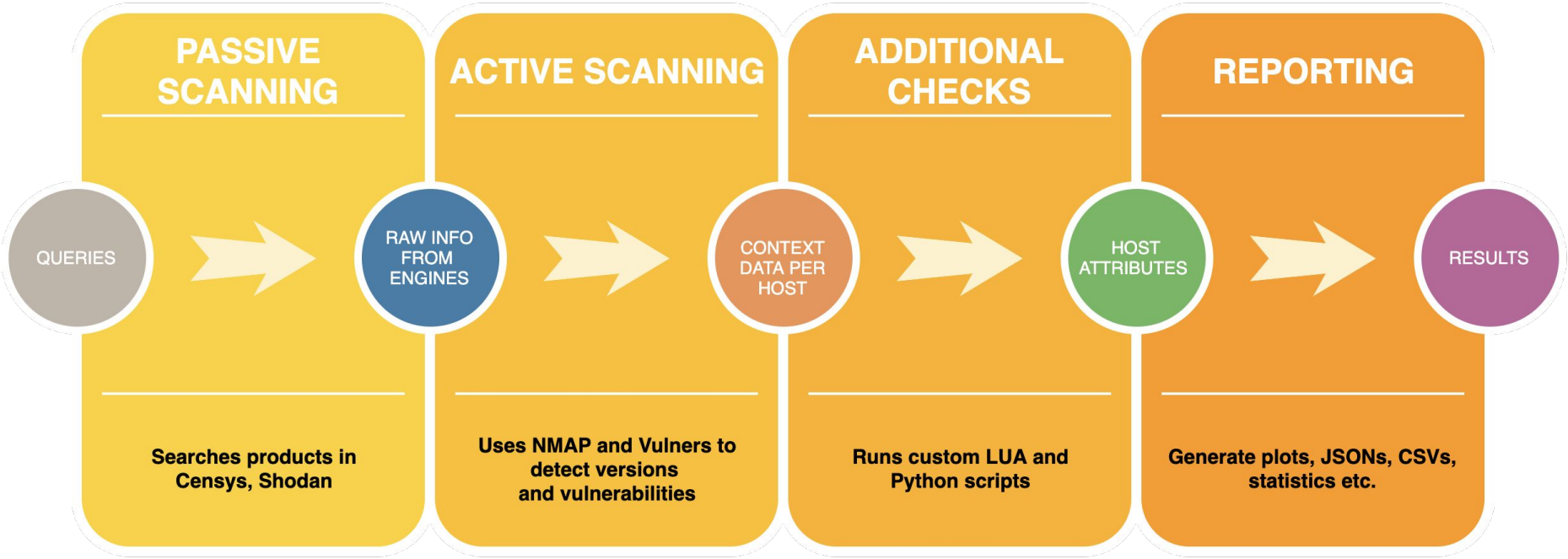
Python | GPL-2.0 | 8 | 31 | 0 | 3 | Updated yesterday

github.com/sdnewhop/grinder

1. bash

```
usage: grinder.py [-h] [-r] [-u] [-q QUERIES_FILE] [-sk SHODAN_KEY] [-cu]
                  [-cp] [-ci CENSYS_ID] [-cs CENSYS_SECRET] [-cm CENSYS_MAX]
                  [-nm] [-nw NMAP_WORKERS] [-vs] [-vw VULNERS_WORKERS]
                  [-c CONFIDENCE] [-v [VENDORS [VENDORS ...]]] [-ml MAX_LIMIT]

The Grinder framework was created to automatically enumerate and fingerprint
different hosts on the Internet using different back-end systems

optional arguments:
  -h, --help            show this help message and exit
  -r, --run             Run scanning
  -u, --update-markers  Update map markers
  -q QUERIES_FILE, --queries-file QUERIES_FILE
                        JSON File with Shodan queries
  -sk SHODAN_KEY, --shodan-key SHODAN_KEY
                        Shodan API key
  -cu, --count-unique   Count unique entities
  -cp, --create-plots   Create graphic plots
  -ci CENSYS_ID, --censys-id CENSYS_ID
                        Censys API ID key
  -cs CENSYS_SECRET, --censys-secret CENSYS_SECRET
                        Censys API SECRET key
  -cm CENSYS_MAX, --censys-max CENSYS_MAX
                        Censys default maximum results quantity
  -nm, --nmap-scan      Initiate Nmap scanning
  -nw NMAP_WORKERS, --nmap-workers NMAP_WORKERS
                        Number of Nmap workers to scan
  -vs, --vulners-scan   Initiate Vulners API scanning
  -vw VULNERS_WORKERS, --vulners-workers VULNERS_WORKERS
                        Number of Vulners workers to scan
  -c CONFIDENCE, --confidence CONFIDENCE
                        Set confidence level
  -v [VENDORS [VENDORS ...]], --vendors [VENDORS [VENDORS ...]]
                        Set list of vendors to search from queries file
  -ml MAX_LIMIT, --max-limit MAX_LIMIT
                        Maximum number of unique entities in plots and results
```

Grinder's Workflow



Detects Vulnerabilities


```
"product": "TensorBoard",
"vendor": "Google Brain Tensorboard",
"query": "\"2016 The TensorFlow Authors\"",
"port": 8888,
"proto": "22/ssh",
"ip": [redacted]
"lat": 49.405,
"lng": 11.1617,
"country": "Germany",
"vulnerabilities": {
    "shodan_vulnerabilities": {},
    "vulners_vulnerabilities": {
        "CVE-2018-20852": "https://vulners.com/cve/CVE-20
        "CVE-2019-9947": "https://vulners.com/cve/CVE-201
        "CVE-2018-14647": "https://vulners.com/cve/CVE-20
        "CVE-2014-4616": "https://vulners.com/cve/CVE-201
        "CVE-2019-9636": "https://vulners.com/cve/CVE-201
        "CVE-2019-9740": "https://vulners.com/cve/CVE-201
        "CVE-2019-9948": "https://vulners.com/cve/CVE-201
        "CVE-2018-1061": "https://vulners.com/cve/CVE-201
        "CVE-2018-1060": "https://vulners.com/cve/CVE-201
    }
},
```

```
"tcp": {
    "8888": {
        "state": "open",
        "reason": "syn-ack",
        "name": "http",
        "product": "Werkzeug httpd",
        "version": "0.12.2",
        "extrainfo": "Python 2.7.12",
        "conf": "10",
        "cpe": "cpe:/a:python:python:2.7.12",
        "script": {
            "http-title": "TensorBoard"
        }
    }
}
```

Searches Exploits

```
Vulners: Collect all software exploits...
 - Software: cpe:/a:igor_sysoev:nginx:1.10.3, available databases: []
 - Software: cpe:/a:python:python:2.7.12, available databases: ['NVD']
 - Software: cpe:/a:openresty:ngx_openresty:1.15.8.1, available databases: []
 - Software: cpe:/a:igor_sysoev:nginx:1.17.3, available databases: []
 - Software: cpe:/a:python:python:3.7.3, available databases: ['NVD']
 - Software: cpe:/a:php:php:7.3.9, available databases: []
 - Software: cpe:/a:apache:http_server:2.4.25, available databases: ['NVD']
```

Searches Exploits

```
Vulners: Collect all
 - Software: cpe:/a:
 - Software: cpe:/a:
 - Software: cpe:/a:
 - Software: cpe:/a:
 - Software: cpe:/a:
 - Software: cpe:/a:
 - Software: cpe:/a:
```

cpe:/a:python:python:2.7.12 bulletinFamily:exploit type:exploitdb

SEARCH PRODUCTS STATS TEAM BLOG

CVE-2018-14647
2018-09-25 00:29:00
CVSS 5.0 5.1

Python's elementtree C accelerator failed to initialise Expat's hash salt during initialization. This could make it easy to conduct denial of service attacks against Expat by constructing an XML document that would cause pathological hash collis...

41

CVE-2018-1061
2018-06-19 12:29:00
CVSS 5.0 6.2

python before versions 2.7.15, 3.4.9, 3.5.6rc1, 3.6.5rc1 and 3.7.0 is vulnerable to catastrophic backtracking in the difflib.IS_LINE_JUNK method. An attacker could use this flaw to cause denial of...

75

CVE-2018-1060
2018-06-18 14:29:00
CVSS 5.0 6.1

python before versions 2.7.15, 3.4.9, 3.5.6rc1, 3.6.5rc1 and 3.7.0 is vulnerable to catastrophic backtracking in pop3lib's apop() method. An attacker could use this flaw to cause denial of...

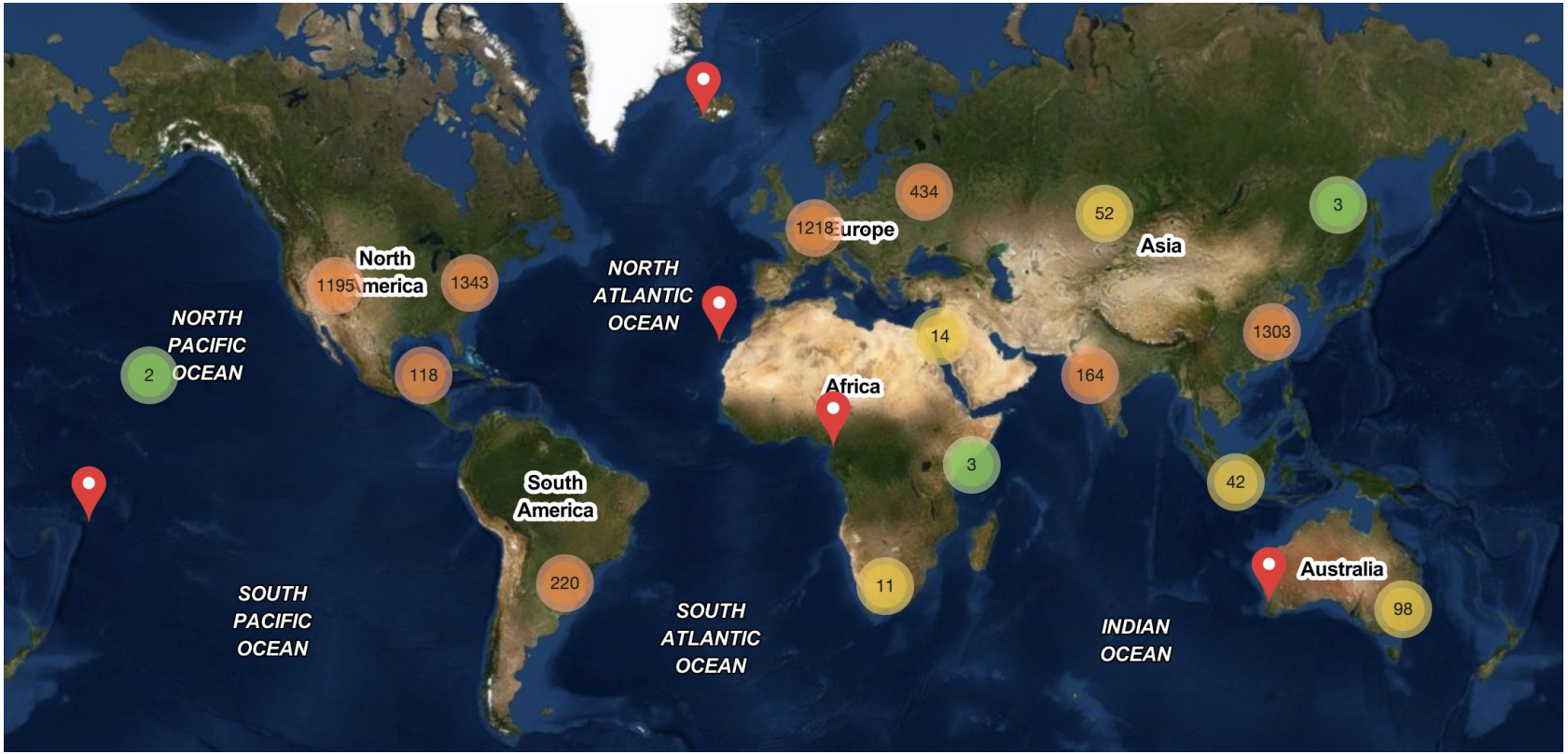
82

AI/ML Software Coverage

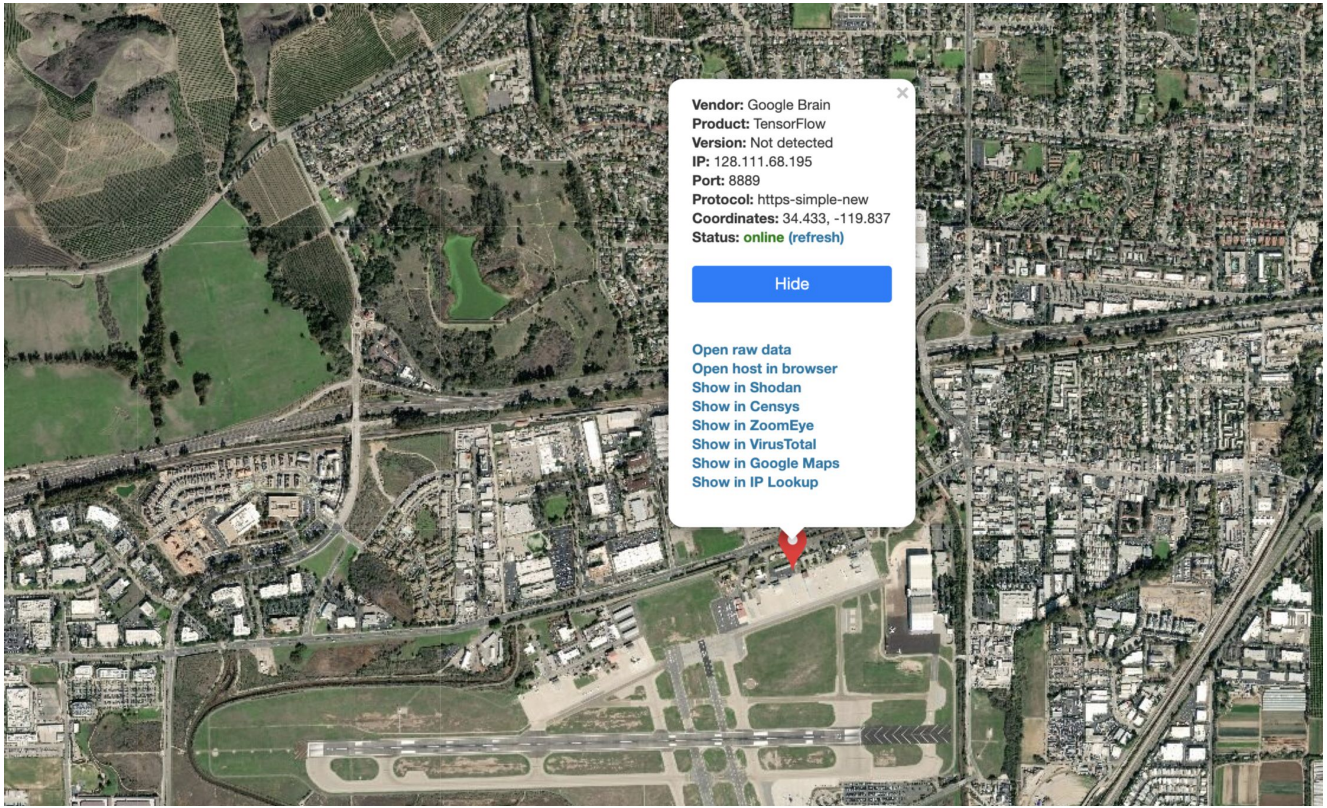
- Frameworks
  - TensorFlow
  - NVIDIA DIGITS
  - Caffe
  - TensorBoard
  - Tensorflow.js
  - brain.js
  - Predict.js
  - ml5.js
  - Keras.js
  - Figue.js
  - Natural.js
  - neataptic.js
  - ml.js
  - Clusterfck.js
  - Neuro.js
  - Deeplearn.js
  - Convnet.js
  - Synaptic.js
  - Apache mxnet
- Databases with ML Content
  - Elasticsearch with ML data
  - MongoDB with ML data
  - Docker API with ML data
- Databases
  - Elasticsearch
  - Kibana (Elasticsearch Visualization Plugin)
  - Gitlab
  - Samba
  - Rsync
  - Riak
  - Redis
  - Redmon (Redis Web UI)
  - Cassandra
  - Memcached
  - MongoDB
  - PostgreSQL
  - MySQL
  - Docker API
  - CouchDB
- Job and Message Queues
  - Alibaba Group Holding AI Inference
  - Apache Kafka Consumer Offset Monitor
  - Apache Kafka Manager
  - Apache Kafka Message Broker
  - RabbitMQ Message Broker
  - Celery Distributed Task Queue
  - Gearman Job Queue Monitor
- Interactive Voice Response (IVR)
  - ResponsiveVoice.JS
  - Inference Solutions
- Speech Recognition
  - Speech.js
  - dictate.js
  - p5.speech.js
  - artyom.js
  - SpeechKITT
  - annyang

… and many more

Results


North America
1195
1343
118
NORTH PACIFIC OCEAN
2
NORTH ATLANTIC OCEAN
1218
Europe
434
52
Asia
3
14
1303
164
Africa
3
42
South America
220
11
Australia
98
SOUTH PACIFIC OCEAN
SOUTH ATLANTIC OCEAN
INDIAN OCEAN

Results


Vendor: Google Brain
Product: TensorFlow
Version: Not detected
IP: 128.111.68.195
Port: 8889
Protocol: https-simple-new
Coordinates: 34.433, -119.837
Status: online (refresh)
Hide
Open raw data
Open host in browser
Show in Shodan
Show in Censys
Show in ZoomEye
Show in VirusTotal
Show in Google Maps
Show in IP Lookup

Results

All the latest results can be found here:

sdnewhop.github.io/AISec/

This results including:

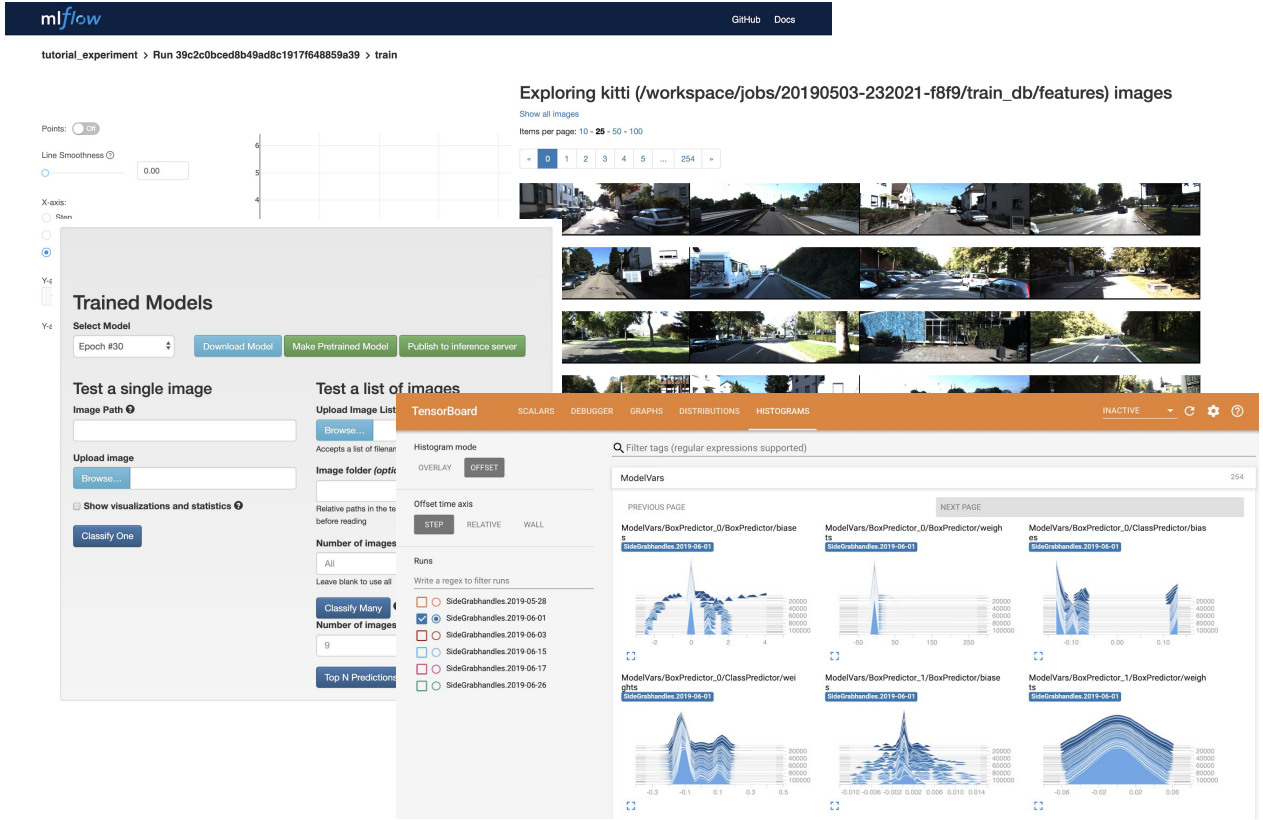
- Dozens of dorks for Shodan and Censys
- Interactive map (both online and offline with REST API)
- Statistics about services, ports, products, and vendors
- Statistics about vulnerabilities and exploits

Management Systems

ML Management Systems

- Training systems
  - NVIDIA DIGITS
  - MLFlow
- Visualization and tracking systems
  - TensorBoard
- Baseboard Management Controllers
  - DGX-1 Management Controller
  - DGX-2 Management Controller

Control Interfaces



NVIDIA DIGITS

NVIDIA. HIGH PERFORMANCE COMPUTING

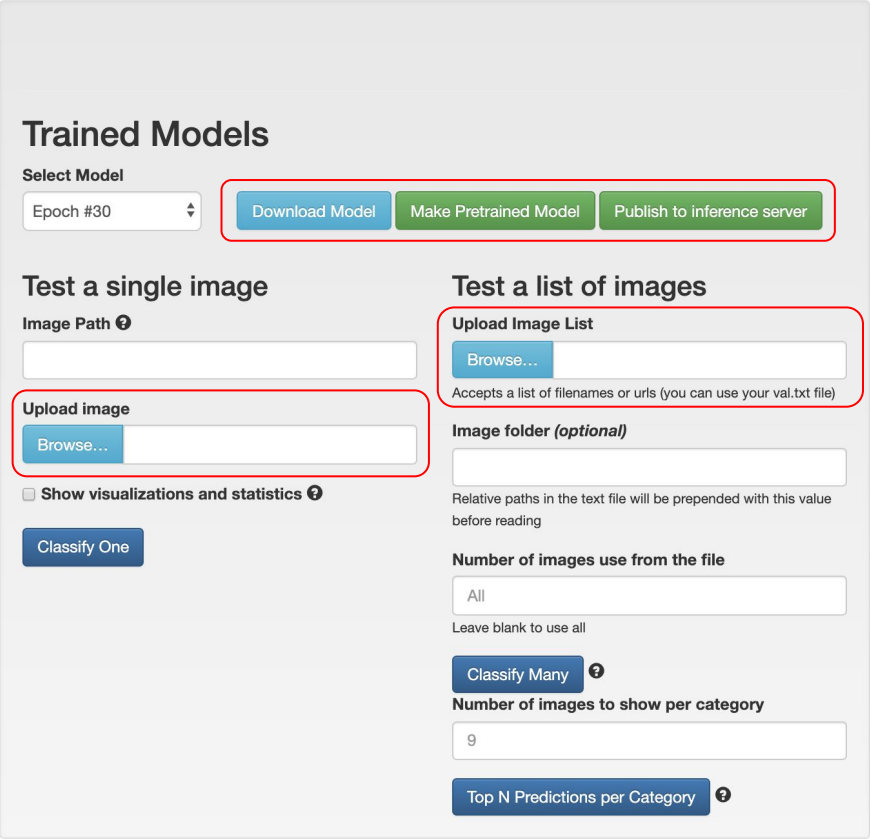
NVIDIA DIGITS

Interactive Deep Learning GPU Training System

What's New in DIGITS 6

- Interactively train models using TensorFlow and visualize model architecture using TensorBoard
- Integrate custom plug-ins for importing special data formats such as DICOM used in medical imaging
- Pre-trained UNET model added to the DIGITS model store for image segmentation of medical images

NVIDIA DIGITS



NVIDIA DIGITS

Group Jobs: ☑

Images

Delete Group

Filter

name	framework	username	has_labels	status	elapsed	submitted
Ungrouped						
VGG-16	caffe	nomoney	✖	Done	0s	Jul 13, 19
	tensorflow	nomoney	✖	Done	0s	Jul 13, 19
	caffe	nomoney	✖	Done	0s	Jul 13, 19
	tensorflow	nomoney	✖	Done	0s	Jul 13, 19
	caffe	nomoney	✖	Done	0s	Jul 13, 19
	tensorflow	nomoney	✖	Done	0s	Jul 13, 19
	caffe	nomoney	✖	Done	0s	Jul 13, 19
	caffe	nomoney	✔	Done	0s	Jul 13, 19

Job Directory

/home/nomoney/digits/digits/jobs/20190715-012323-861d

Disk Size

6.74 GB

Network

network.py

Raw tensorflow output

tensorflow_output.log

NVIDIA DIGITS

tensorflow_output.log

```
WARNING: Logging before flag parsing goes to stderr.
W0715 01:23:25.997982 140038327420672 deprecation_wrapper.py:119] From /home/nomoney/digits/digits/tools/tensorflow/main.py:743: The name tf.app.run is deprecated. Please
tf.compat.v1.app.run instead.
I0715 01:23:25.998847 140038327420672 main.py:417] Train batch size is 16 and validation batch size is 16
I0715 01:23:25.998908 140038327420672 main.py:421] Training epochs to be completed for each validation : 1
I0715 01:23:25.999357 140038327420672 main.py:425] Training epochs to be completed before taking a snapshot : 1.0
I0715 01:23:25.999517 140038327420672 main.py:429] Model weights will be saved as snapshot_<EPOCH>_Model.ckpt
I0715 01:23:25.999675 140038327420672 main.py:442] Loading mean tensor from /home/nomoney/digits/digits/jobs/20190714-234820-4d43/mean.binaryproto file
I0715 01:23:26.007992 140038327420672 main.py:448] Loading label definitions from /home/nomoney/digits/digits/jobs/20190714-234820-4d43/labels.txt file
I0715 01:23:26.008080 140038327420672 main.py:454] Found 2 classes
I0715 01:23:26.009743 140038327420672 tf_data.py:221] Found 46 images in db /home/nomoney/digits/digits/jobs/20190714-234820-4d43/train_db
W0715 01:23:26.009926 140038327420672 deprecation.py:323] From /home/nomoney/digits/digits/tools/tensorflow/tf_data.py:472: string_input_producer (from
tensorflow.python.training.input) is deprecated and will be removed in a future version.
Instructions for updating:
Queue-based input pipelines have been replaced by `tf.data`. Use `tf.data.Dataset.from_tensor_slices(string_tensor).shuffle(tf.shape(input_tensor,
out_type=tf.int64)[0]).repeat(num_epochs)`. If `shuffle=False`, omit the `.shuffle(...)`.
W0715 01:23:26.013044 140038327420672 deprecation.py:323] From /home/nomoney/venv/local/lib/python2.7/site-packages/tensorflow/python/training/input.py:278: input_producer
from tensorflow.python.training.input) is deprecated and will be removed in a future version.
Instructions for updating:
Queue-based input pipelines have been replaced by `tf.data`. Use `tf.data.Dataset.from_tensor_slices(input_tensor).shuffle(tf.shape(input_tensor, out_type=tf.int64)[0]).re
(num_epochs)`. If `shuffle=False`, omit the `.shuffle(...)`.
W0715 01:23:26.013463 140038327420672 deprecation.py:323] From /home/nomoney/venv/local/lib/python2.7/site-p
from tensorflow.python.training.input) is deprecated and will be removed in a future version.
Instructions for updating:
Queue-based input pipelines have been replaced by `tf.data`. Use `tf.data.Dataset.from_tensors(tensor).repea
W0715 01:23:26.015187 140038327420672 deprecation.py:323] From /home/nomoney/venv/local/lib/python2.7/site-p
tensorflow.python.ops.variables) is deprecated and will be removed in a future version.
Instructions for updating:
```

Logs are available

NVIDIA DIGITS

tensorflow_output.log

```
WARNING: Logging before flag parsing goes to stderr
W0715 01:23:25.997982 140038327420672 deprecation_w
tf.compat.v1.app.run instead.
I0715 01:23:25.998847 140038327420672 main.py:417]
I0715 01:23:25.998908 140038327420672 main.py:421]
I0715 01:23:25.999357 140038327420672 main.py:425]
I0715 01:23:25.999517 140038327420672 main.py:429]
I0715 01:23:25.999675 140038327420672 ...v:442
I0715 01:23:26.007992 140038327420672 ...448]
I0715 01:23:26.008080 140038327420 ...54]
I0715 01:23:26.009743 140038327420 ...22
W0715 01:23:26.009926 140038327420 ...p
tensorflow.python.training.input)
Instructions for updating:
Queue-based input pipelines have b
out_type=tf.int64)[0]).repeat(num_
W0715 01:23:26.013044 140038327420 ...
from tensorflow.python.training.inpu
Instructions for updating:
Queue-based input pipelines have be
(num_epochs)`. If `shuffle=False`,
W0715 01:23:26.013463 140038327420 ...
from tensorflow.python.training.input
Instructions for updating:
Queue-based input pipelines have been re
W0715 01:23:26.015187 140038327420672 dep
tensorflow.python.ops.variables) is deprec
Instructions for updating:
```

network.py

```
# Preferred settings for this model is:
# Base Learning Rate = 0.001
# Crop Size = 224

from model import Tower
from utils import model_property
import tensorflow as tf
import tensorflow.contrib.slim as slim
import utils as digits


class UserModel(Tower):

    @model_property
    def inference(self):
        x = tf.reshape(self.x, shape=[-1, self.input_shape[0], self.input_shape[1], self.input_shape[2]])
        with slim.arg_scope([slim.conv2d, slim.fully_connected],
                            weights_initializer=tf.contrib.layers.xavier_initializer(),
                            weights_regularizer=slim.l2_regularizer(1e-6)):
            model = slim.conv2d(x, 96, [11, 11], 4, padding='VALID', scope='conv1')
            model = slim.max_pool2d(model, [3, 3], 2, scope='pool1')
            model = slim.conv2d(model, 256, [5, 5], 1, scope='conv2')
            model = slim.max_pool2d(model, [3, 3], 2, scope='pool2')
            model = slim.conv2d(model, 384, [3, 3], 1, scope='conv3')
            model = slim.conv2d(model, 384, [3, 3], 1, scope='conv4')
            model = slim.conv2d(model, 256, [3, 3], 1, scope='conv5')
            model = slim.max_pool2d(model, [3, 3], 2, scope='pool5')
            model = slim.flatten(model)
            model = slim.fully_connected(model, 4096, activation_fn=None, scope='fc1')
            model = slim.dropout(model, 0.5, is_training=self.is_training, scope='do1')
            model = slim.fully_connected(model, 4096, activation_fn=None, scope='fc2')
            model = slim.dropout(model, 0.5, is_training=self.is_training, scope='do2')
            model = slim.fully_connected(model, self.nclasses, activation_fn=None, scope='fc3')
        return model

    @model_property
    def loss(self):
        model = self.inference
        loss = digits.classification_loss(model, self.y)
        accuracy = digits.classification_accuracy(model, self.y)
        self.summaries.append(tf.summary.scalar(accuracy.op.name, accuracy))
        return loss

```

Model architecture too

NVIDIA DIGITS

Exploring kitti (/workspace/jobs/20190503-232021-f8f9/train_db/features) images

Show all images

Items per page: 10 - **25** - 50 - 100

« 0 1 2 3 4 5 ... 254 »

And the train data with images

SHODAN

http.html:"/static/js/digits.js"

Explore | Downloads | Reports | Pricing | Enterprise Access

Exploits | Maps | Share Search | Download Results | Create Report

TOTAL RESULTS

55

TOP COUNTRIES

United States	13
China	12
Korea, Republic of	10
Taiwan	5
Germany	4

TOP SERVICES

Synology	31
HTTP	17
AndroMouse	3
NAS Web Interfaces	1
HTTP (8080)	1

TOP ORGANIZATIONS

Amazon.com	6
Universitaet Ulm	3
Korea Telecom	3
Taiwan Academic Network	2
Shanghai JiaoTong University	2

TOP PRODUCTS

nginx	16

New Service: Keep track of what you have connected to the Internet. Check out Shodan Monitor

DIGITS

51.83.15.26
ip-51-83-15.eu
OVH SAS
Added on 2019-11-01 21:26:26 GMT
France
Technologies: jQuery Sparklines

```
HTTP/1.1 200 OK
Content-Type: text/html; charset=utf-8
Content-Length: 44067
Date: Fri, 01 Nov 2019 21:26:26 GMT
```

DIGITS

169.44.201.108
6c.c9.2ca9.ip4.static.sl-reverse.com
SoftLayer Technologies
Added on 2019-11-03 08:07:25 GMT
United States
Technologies: jQuery Sparklines

```
HTTP/1.1 200 OK
Content-Type: text/html; charset=utf-8
Content-Length: 44113
Date: Sun, 03 Nov 2019 08:05:04 GMT
```

DIGITS

175.193.50.185
Korea Telecom
Added on 2019-11-05 03:02:05 GMT
Korea, Republic of, Seoul
Technologies: jQuery Sparklines

```
HTTP/1.1 200 OK
Server: nginx/1.10.3 (Ubuntu)
Date: Tue, 05 Nov 2019 03:02:04 GMT
Content-Type: text/html; charset=utf-8
Content-Length: 42821
Connection: keep-alive
```

DIGITS

202.120.39.167
Shanghai JiaoTong University
Added on 2019-11-01 22:56:33 GMT
China, Shanghai
Technologies:

```
HTTP/1.1 200 OK
Content-Type: text/html; charset=utf-8
Content-Length: 4378480
Date: Fri, 01 Nov 2019 22:56:32 GMT
```

Небезопасно — [redacted]/models/20190807-113653-

DIGITS | Generic Image Model | Login | Info | About

coco-dog-detectnet

Owner: hekun

Clone Job | Delete Job

Job Directory
/jobs/20190807-113653-bf61
Disk Size
160 MB
Network (train/val)
train_val.prototxt
Network (deploy)
deploy.prototxt
Network (original)
original.prototxt
Solver
solver.prototxt
Raw caffe output
caffe_output.log
Pretrained Model
/data/digits/bvlc_googlenet.caffemodel
Visualizations
Tensorboard

Dataset

coco-dog

Done Aug 07, 11:32:11 AM

- DB backend: lmdb
- Create train_db DB
  - **Entry Count:** 3855
  - **Feature shape** (3, 640, 640)
  - **Label shape** (1, 52, 16)
- Create val_db DB
  - **Entry Count:** 1969
  - **Feature shape** (3, 640, 640)
  - **Label shape** (1, 51, 16)

Job Status Done

- Initialized at Aug 07, 11:36:53 AM (1 second)
- Running at Aug 07, 11:36:54 AM (1 hour, 38 minutes)
- Done at Aug 07, 01:15:28 PM (Total - 1 hour, 38 minutes)

Train Caffe Model Done

Related jobs

Generic Dataset

coco-dog Done

Notes

Login Mechanism

DIGITS

Login Info About

Home

1/1 GPU available

No Jobs Running

Datasets (2) Models (1) Pretrained Models (0)

New Model

Images

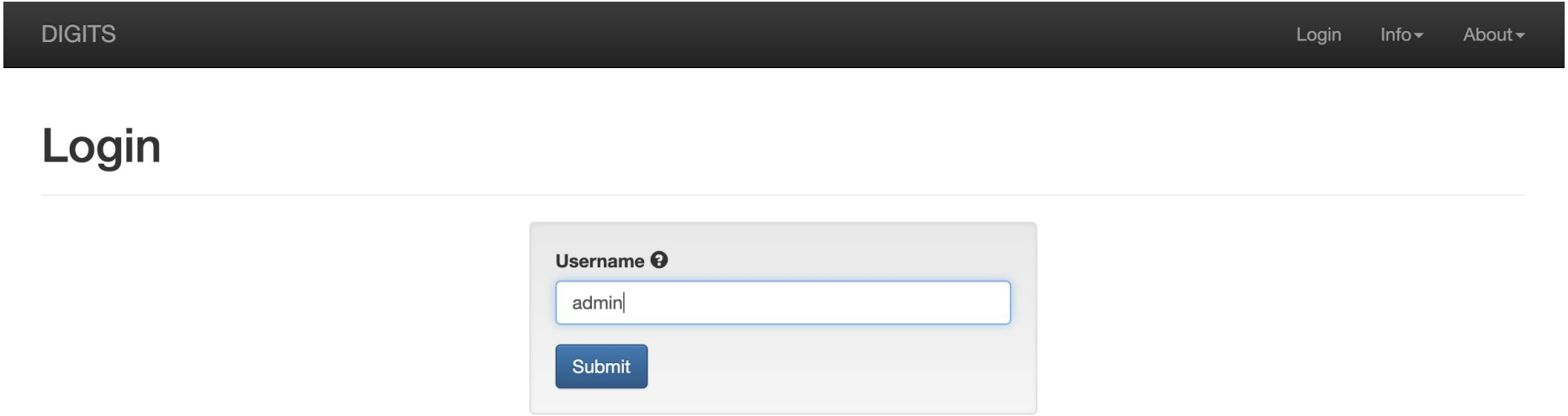
Group Jobs:

Delete Group

Filter

name	extension	framework	status	elapsed	submitted
Ungrouped					
coco-dog-detectnet	image-object-detection	caffe	Done	2h	Aug 7, 19

Login Mechanism



Login Mechanism

DIGITS

admin (Logout) Info About

Home

1/1 GPU available

No Jobs Running

Datasets (2) Models (1) Pretrained Models (0)

New Model

Images

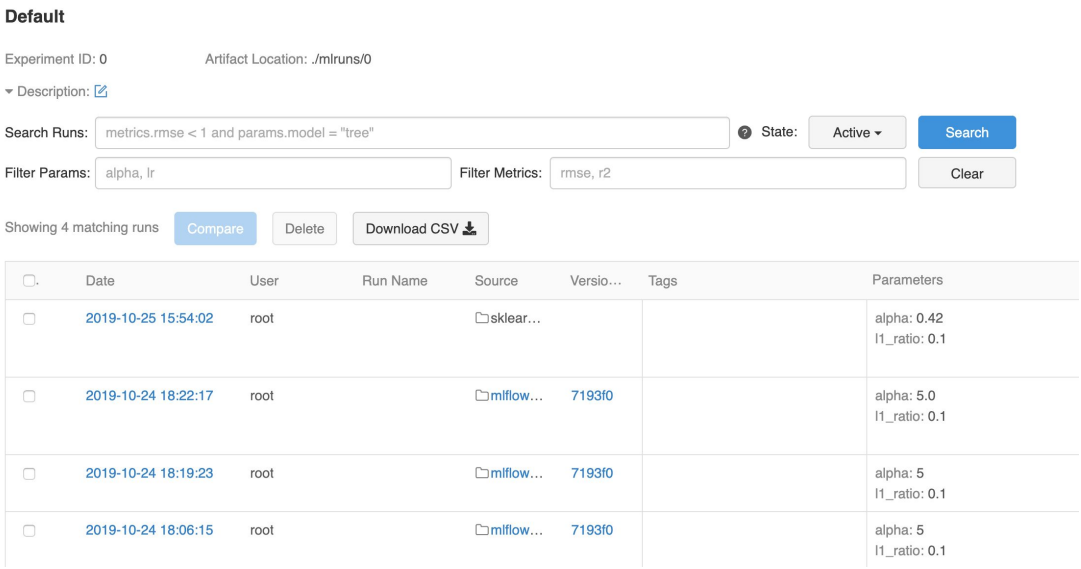
Group Jobs:

Delete Group

Filter

name	extension	framework	status	elapsed	submitted
Ungrouped					
coco-dog-detectnet	image-object-detection	caffe	Done	2h	Aug 7, 19

MLFlow



MLflow is an open source platform for managing the end-to-end machine learning lifecycle. It tackles three primary functions:

- Tracking experiments to record and compare parameters and results (MLflow Tracking).
- Packaging ML code in a reusable, reproducible form in order to share with other data scientists or transfer to production (MLflow Projects).
- Managing and deploying models from a variety of ML libraries to a variety of model serving and inference platforms (MLflow Models).

MLFlow

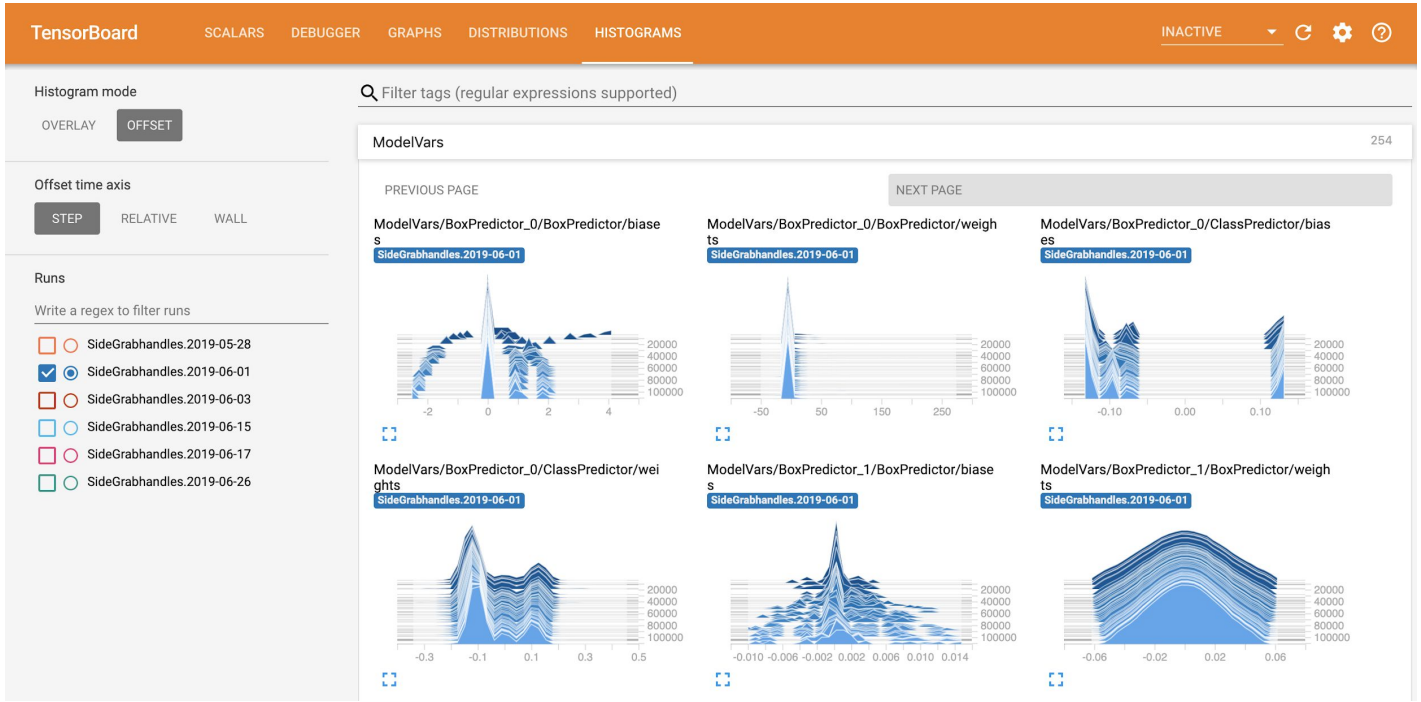
Artifacts

- models
  - MLmodel
  - conda.yaml
  - model.h5
- output
- script
  - __init__.py
  - dev
  - recipe
  - service
    - .ipynb_checkpoints
    - Dockerfile
    - build_and_push.sh
    - manage_serving
      - .ipynb_checkpoints
      - deploy_model.py
    - serve_project
- scripts-out

Full Path: /home/ds6/submarine-project/experiment/mlflow/mlruns/1/c30e51a6a5b14af98efacfb6f62298be/artifacts/script/service/manage_serving/deploy_model.py
Size: 2.56KB

```
# environment
#pip install sagemaker
#conda install -c anaconda requests
import sagemaker as sage
from sagemaker import get_execution_role
from sagemaker.estimator import Estimator

from pctcloud.data_connector import S3Connector as s3_connector
from chestxray import sagemaker_config as config

submarine_project_s3 = s3_connector(config_path=config.db_config_path, db_slug='submarine_project_s3')

###################
# Define IAM role #
###################



######################
# Create the session #
######################
algorithm_name = 'chestxray-cpu'
sess = sage.Session()
account = sess.boto_session.client('sts').get_caller_identity()['Account']
region = sess.boto_session.region_name
image = ecr_image = '{}.dkr.ecr.{}.amazonaws.com/{}:latest'.format(account, region, algorithm_name)
```

TensorBoard



TensorBoard

Branch: master ▾ | tensorboard / tensorboard / plugins / | Create new file | Upload files | Find file | History

jameswex What-If Tool progress bar and attribution sorting updates (#2892) — Latest commit da9ca84 7 hours ago

..		
audio	Properly handle bad requests to plugin data endpoints (#2611)	2 months ago
beholder	cleanup: use http_util.Respond (#2731)	last month
core	csp: make it globally configurable (#2756)	26 days ago
custom_scalar	Properly handle bad requests to plugin data endpoints (#2611)	2 months ago
debugger	[tensor-widget] Add colormap selection and Ctrl/Alt/Shift+wheel zoomi...	16 days ago
distribution	Promote `FrontendMetadata` from `namedtuple` to struct (#2606)	2 months ago
graph	Expose graph plugin name (#2751)	27 days ago
histogram	Place histogram bucketing logic on CPU explicitly when using TPUStrat...	2 days ago
hparams	Fix minor internal build/test failure in tf_hparams tracker (#2877)	2 days ago
image	Properly handle bad requests to plugin data endpoints (#2611)	2 months ago
interactive_inference	What-If Tool progress bar and attribution sorting updates (#2892)	7 hours ago
mesh	Revert "build: disable mesh summary v2 test (#2625)" (#2639)	23 days ago
pr_curve	core: avoid extra network request upon run selection (#2817)	13 days ago
profile	colab: use proxyPort for dynamic plugin (#2798)	15 days ago
projector	csp: fix bugs and properly treat projector (#2775)	21 days ago
scalar	core: avoid extra network request upon run selection (#2817)	13 days ago
text	Promote `FrontendMetadata` from `namedtuple` to struct (#2606)	2 months ago

TensorBoard

TensorFlow Debugger

`tfdbg` is a specialized debugger for TensorFlow. It lets you view the internal structure and states of running TensorFlow graphs during training and inference, which is difficult to debug with general-purpose debuggers such as Python's `pdb` due to TensorFlow's computation-graph paradigm.

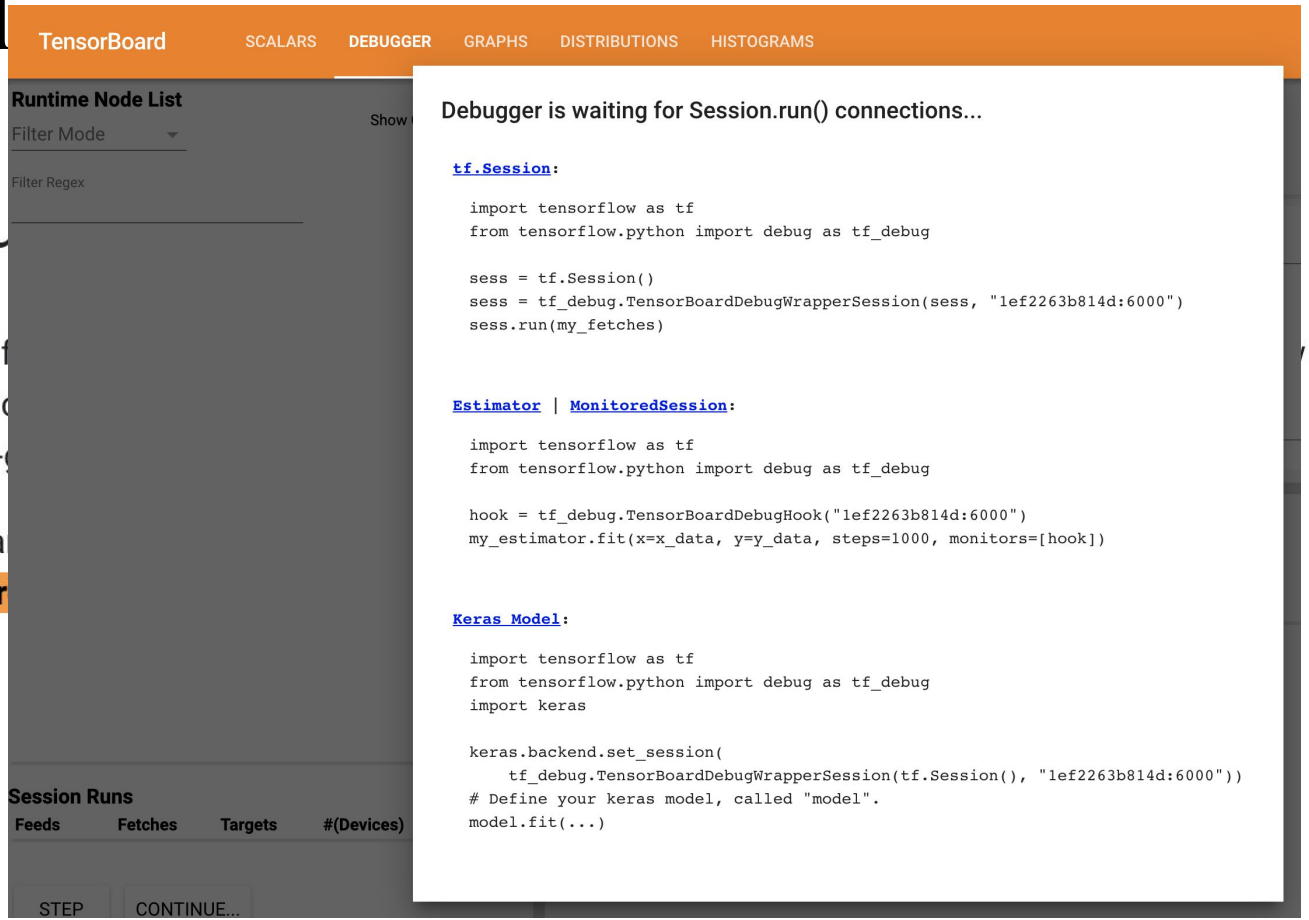
This guide focuses on the command-line interface (CLI) of `tfdbg`. For guide on how to use the graphical user interface (GUI) of tfdbg, i.e., the **TensorBoard Debugger Plugin**, please visit its README.

TensorBoard

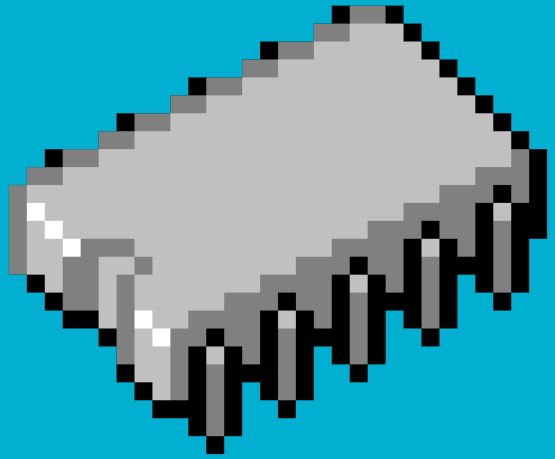
TensorFlow Debu

`tfdbg` is a specialized debugger f
graphs during training and inferenc
due to TensorFlow's computation-

This guide focuses on the comma
(GUI) of tfdbg, i.e., the **TensorBoar**



Baseboard Management Controllers



NVIDIA DGX-1 BMC

The NVIDIA® DGX-1™ Deep Learning System is the world's first purpose-built system for deep learning with fully integrated hardware and software that can be deployed quickly and easily.

1.1. Using the DGX-1: Overview

The NVIDIA DGX-1 comes with a base operating system consisting of an Ubuntu OS, Docker, Docker Engine Utility for NVIDIA GPUs, and NVIDIA drivers. Ths system is designed to run a number of NVIDIA-optimized deep learning framework applications packaged in Docker containers. You can use your own scheduling and management software to run jobs, and also build and run your own applications on the DGX-1.

NVIDIA DGX-1 BMC

The NVIDIA® DGX-1™
for deep learning with
quickly and easily.

NVIDIA

NVIDIA DGX-1

DU-08033-001 _v23 | October 2019

User Guide

of an Ubuntu OS,
ers. Ths system is
nework applications
nd management
on the DGX-1.

NVIDIA DGX-1 BMC Default Credentials

Be sure to set IPMI to *Preserve* in order to preserve your BMC login credentials. If you fail to do this, the BMC username/password will be set to qct.admin/ qct.admin. If this happens, then be sure to enter the BMC dashboard and go to Configuration->Users to add a new user account and disable the qct.admin account after updating the BMC.

Also, we can try next SNMP community strings as defaults:

- qct.public
- qct.private

an.nikolaev@MacBook-Pro-Anton: ~ (zsh)

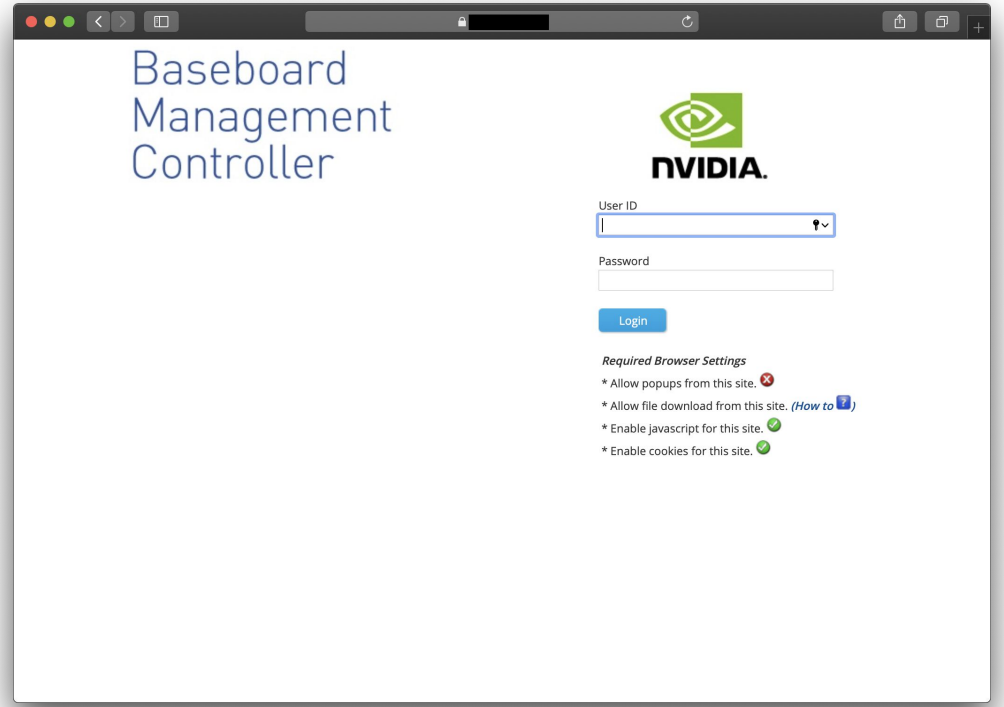
39% 38% 0.0 kB↓ 0.0 kB↑ 05.11, 7:28 PM

```
→  ~ snmpwalk -v 2c -c qct.private [redacted]
SNMPv2-MIB::sysDescr.0 = STRING: Linux QCTD8C4970CCA4B 3.14.17-ami #1 Sat Sep 30 14:19:55 CST 2017 armv5tejl
SNMPv2-MIB::sysObjectID.0 = OID: NET-SNMP-MIB::netSnmpAgentOIDs.10
DISMAN-EVENT-MIB::sysUpTimeInstance = Timeticks: (293712831) 33 days, 23:52:08.31
SNMPv2-MIB::sysContact.0 = STRING: root@
SNMPv2-MIB::sysName.0 = STRING: QCTD8C4970CCA4B
SNMPv2-MIB::sysLocation.0 = STRING: Unknown
SNMPv2-MIB::sysORLastChange.0 = Timeticks: (167) 0:00:01.67
SNMPv2-MIB::sysORID.1 = OID: SNMP-FRAMEWORK-MIB::snmpFrameworkMIBCompliance
SNMPv2-MIB::sysORID.2 = OID: SNMP-MPD-MIB::snmpMPDCompliance
SNMPv2-MIB::sysORID.3 = OID: SNMP-USER-BASED-SM-MIB::usmMIBCompliance
SNMPv2-MIB::sysORID.4 = OID: SNMPv2-MIB::snmpMIB
SNMPv2-MIB::sysORID.5 = OID: TCP-MIB::tcpMIB
SNMPv2-MIB::sysORID.6 = OID: IP-MIB::ip
SNMPv2-MIB::sysORID.7 = OID: UDP-MIB::udpMIB
SNMPv2-MIB::sysORID.8 = OID: SNMP-VIEW-BASED-ACM-MIB::vacmBasicGroup
SNMPv2-MIB::sysORDescr.1 = STRING: The SNMP Management Architecture MIB.
SNMPv2-MIB::sysORDescr.2 = STRING: The MIB for Message Processing and Dispatching.
SNMPv2-MIB::sysORDescr.3 = STRING: The management information definitions for the SNMP User-based Security Model.
SNMPv2-MIB::sysORDescr.4 = STRING: The MIB module for SNMPv2 entities
SNMPv2-MIB::sysORDescr.5 = STRING: The MIB module for managing TCP implementations
SNMPv2-MIB::sysORDescr.6 = STRING: The MIB module for managing IP and ICMP implementations
SNMPv2-MIB::sysORDescr.7 = STRING: The MIB module for managing UDP implementations
SNMPv2-MIB::sysORDescr.8 = STRING: View-based Access Control Model for SNMP.
SNMPv2-MIB::sysORUpTime.1 = Timeticks: (40) 0:00:00.40
SNMPv2-MIB::sysORUpTime.2 = Timeticks: (40) 0:00:00.40
SNMPv2-MIB::sysORUpTime.3 = Timeticks: (40) 0:00:00.40
SNMPv2-MIB::sysORUpTime.4 = Timeticks: (60) 0:00:00.60
çSNMPv2-MIB::sysORUpTime.5 = Timeticks: (60) 0:00:00.60
SNMPv2-MIB::sysORUpTime.6 = Timeticks: (165) 0:00:01.65
SNMPv2-MIB::sysORUpTime.7 = Timeticks: (165) 0:00:01.65
```

BMC Default SNMP strings

```
⌥⌘1  an.nikolaev@MacBook-Pro-Anton: ~/Downloads/BMC-snmpwalk-update-results/resu...
39%                    39%                    05.11, 7:31 PM
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.11.1 = STRING: "NVIDIA"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.11.2 = STRING: "NVIDIA"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.11.3 = STRING: "NVIDIA"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.11.4 = STRING: "NVIDIA"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.11.5 = STRING: "NVIDIA"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.12.1 = STRING: "DGX-1 with V100"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.12.2 = STRING: "DGX-1 with V100"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.12.3 = STRING: "DGX-1 with V100"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.12.4 = STRING: "DGX-1 with V100"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.12.5 = STRING: "DGX-1 with V100"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.13.1 = STRING: "1S2WU9Z0STB"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.13.2 = STRING: "N/A"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.13.3 = STRING: "N/A"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.13.4 = STRING: "N/A"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.13.5 = STRING: "N/A"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.14.1 = STRING: "v1.0"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.14.2 = STRING: "v1.0"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.14.3 = STRING: "v1.0"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.14.4 = STRING: "v1.0"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.14.5 = STRING: "v1.0"
SNMPv2-SMI::enterprises.7244.1.2.1.3.6.1.15.1 = STRING: "QTFCOU8010083"
```

NVIDIA DGX-1 BMC Interface



Open Databases with ML Data

Elasticsearch ML data

9200
tcp
http-simple-new

Elastic Version: 6.8.0

```
HTTP/1.1 200 OK
content-type: application/json; charset=UTF-8
content-length: 493
```

4.0 GB	1 Nodes
Cluster Name	elasticsearch
Status	yellow
Number of Indices	73

```
HTTP/1.1 200 OK
content-type: application/json; charset=UTF-8
content-length: 493
```

```
Elastic Indices:
    filebeat-6.8.0-2019.08.15
    ml-logs-2019-07-04
    ml-logs-2019-08-23
    my_index
    ml-logs-2019-08-11
    ml-logs-2019-08-10
    ml-logs-2019-08-13
    .kibana_1
    ml-logs-2019-07-...
```

```
Elastic Indices:
    filebeat-6.8.0-2019.08.15
    ml-logs-2019-07-04
    ml-logs-2019-08-23
    my_index
    ml-logs-2019-08-11
    ml-logs-2019-08-10
    ml-logs-2019-08-13
    .kibana_1
    ml-logs-2019-07-29
    ml-logs-2019-08-14
    ml-logs-2019-07-06
    ml-logs-2019-07-24
    ml-logs-2019-07-21
    ml-logs-2019-07-20
    ml-logs-2019-07-23
    ml-logs-2019-07-22
    ml-logs-2019-07-10
    metricbeat-6.8.0-2019.08.22
    metricbeat-6.8.0-2019.08.21
    ml-logs-2019-06-29
    ml-logs-2019-08-12
    ml-logs-2019-07-15
    ml-logs-2019-07-16
    ml-logs-2019-07-17
    ml-logs-2019-07-18
    ml-logs-2019-07-19
```


```
{
    "name": "_KWPAUi",
    "cluster_name": "elasticsear
    "cluster_uuid": "-7tyf-mCSNC
    "version": {
        "number": "6.8.0",
        "build_flavor": "default'
        "build_type": "deb",
        "build_hash": "65b6179",
        "build_date": "2019-05-15T20:06:13.172855Z",
        "build_snapshot": false,
        "lucene_version": "7.7.0",
        "minimum_wire_compatibility_version": "5.6.0",
        "minimum_index_compatibility_version": "5.0.0"
    },
    "tagline": "You Know, for Search"
}
```

MongoDB Datasets Data

28.0 GB	4 Databases

Database Name	Size
datasets	28.0 GB
admin	112.0 kB
local	84.0 kB
config	60.0 kB

MongoDB Server Information


```
{
    "metrics": {
        "commands": {
            "updateUser": {
                "failed": 0,
                "total": 0
            },
            "killAllSessions": {
                "failed": 0,
                "total": 0
            },
            "dropRole"...
```

```
{
    "totalSize": 30076915712.0,
    "ok": 1.0,
    "databases": [
        {
            "sizeOnDisk": 114688.0,
            "collections": [],
            "name": "admin",
            "empty": false
        },
        {
            "sizeOnDisk": 61440.0,
            "collections": [],
            "name": "config",
            "empty": false
        },
        {
            "sizeOnDisk": 30076653568.0,
            "collections": [],
            "name": "datasets",
            "empty": false
        },
        {
            "sizeOnDisk": 86016.0,
            "collections": [],
            "name": "local",
            "empty": false
        }
    ]
},
```

MongoDB Datasets Data

```
> show dbs
admin      0.000GB
config     0.000GB
datasets  29.360GB
local      0.000GB
> use datasets
switched to db datasets
> show collections
fs.chunks
fs.files
images
scenes
test
> db.scenes.find().limit(5);
{ "_id" : ObjectId("5ca076463c1864186221d843"), "geo" : { "country" : "Russia", "region" : null, "city" : "Mo
{ "_id" : ObjectId("5ca076463c1864186221d844"), "geo" : { "country" : "Russia", "region" : null, "city" : "Mo
{ "_id" : ObjectId("5ca076463c1864186221d845"), "geo" : { "country" : "Belgium", "region" : null, "city" : "G
{ "_id" : ObjectId("5ca076463c1864186221d846"), "geo" : { "country" : "Czech_Republic", "region" : null, "cit
{ "_id" : ObjectId("5ca076463c1864186221d847"), "geo" : { "country" : "Czech_Republic", "region" : null, "cit
> db.images.find().limit(1);
{ "_id" : ObjectId("5ca220b63c18643d15a6d979"), "image_id" : ObjectId("5ca220b53c18643d15a6d977"), "image_nam
"xmin" : 115.50024000000002, "xmax" : 178.50024, "ymin" : 105.3336, "ymax" : 165.3336 }, { "xmin" : 613.12464
99, "xmax" : 496.125, "ymin" : 333.33311999999995, "ymax" : 479.99999999999994 }, { "xmin" : 23.6253600000000
 : 139.3332, "ymax" : 239.33304 }, { "xmin" : 52.87499999999999, "xmax" : 340.31268, "ymin" : 218.66688000000
" : 437.33328 }, { "xmin" : 277.31304, "xmax" : 345.93768, "ymin" : 111.99983999999999, "ymax" : 173.33327999
 { "xmin" : 385.87536, "xmax" : 514.68768, "ymin" : 144.66672, "ymax" : 240.66672 }, { "xmin" : 458.43768, "x
max" : 303.75, "ymin" : 93.33312000000001, "ymax" : 141.33311999999998 } ], "metadata" : {  }, "scene_id" : 0
>
```


```
> show dbs
admin      0.000GB
config     0.000GB
datasets  29.360GB
local      0.000GB
> use datasets
switched to db datasets
> show collections
fs.chunks
fs.files
images
scenes
test
```

Running Containers

Running Docker Containers with ML Frameworks

2375
tcp
http-simple-new

Docker Version: 18.09.2

```
HTTP/1.1 404 Not Found
Content-Type: application/json
Date: Sun, 01 Sep 2019 21:10:17 GMT
Content-Length: 29
```

```
Docker Containers:
        Image: mxschen/ai-proxy:latest
        Command: /ai-serving/bin/proxy

        Image: auto_pilot_w_proxy:c5
        Command: /container/container_entry.sh pytorch-container /container/server.py

        Image: mxschen/ai-proxy:latest
        Command: /ai-serving/bin/proxy

        Image: auto_pilot_w_proxy:c3
        Command: /container/container_entry.sh tensorflow-container /container/server.py

        Image: mxschen/ai-proxy:latest
        Command: /ai-serving/bin/proxy

        Image: mxschen/ai-proxy:latest
        Command: /ai-serving/bin/proxy

        Image: auto_pilot_w_proxy:c1
        Command: /container/container_entry.sh tensorflow-container /container/server.py
```

Running Docker Containers with ML Frameworks

- **GET /containers/json**
  to list all of the containers
- **GET /images/json**
  to list all of the images
- **GET /containers/(id or name)/logs**
  to export logs
- **GET/containers/(id or name)/export**
  to fully export some container by id


```
[
  {
    "Id": "6486172d69aec4bfc49d2a1e29925cc2cc0ef7513df8aa3561b620c213d5e0b5",
    "Names": [
      "/tensorrt"
    ],
    "Image": "nvcr.io/nvidia/tensorflow:19.07-py3",
    "ImageID": "sha256:a9c6af3f3056e8bbc13dee8d676bba6f55a750f36abd76d6944b0fc36ad1f709",
    "Command": "/usr/local/bin/nvidia_entrypoint.sh bash",
    "Created": 1571408583,
    "Ports": [
      {
        "IP": "0.0.0.0",
        "PrivatePort": 6006,
        "PublicPort": 6006,
        "Type": "tcp"
      },
      {
        "PrivatePort": 6064,
        "Type": "tcp"
      },
      {
        "IP": "0.0.0.0",
        "PrivatePort": 8888,
        "PublicPort": 8888,
        "Type": "tcp"
      }
    ],
```


Medical Imaging

NVIDIA AI Annotation Assistance API

NVIDIA AIAA Server documentation

REDACTED
gps.topo.auth.gr
Aristotle University of Thessaloniki
Added on 2019-10-02 01:47:28 GMT
Greece, Thessaloníki
Technologies:

```
HTTP/1.0 200 OK
Content-Length: 153094
Content-Type: text/html; charset=utf-8
Last-Modified: Mon, 19 Aug 2019 20:57:10 GMT
Cache-Control: max-age=43200, public
Expires: Wed, 02 Oct 2019 13:47:27 GMT
ETag: "1566248230.0-153094-234361760"
Server: Werkzeug/0.15.5 Python/3.5.2
Date: Wed, 02 O...
```

NVIDIA AI Annotation Assistance API

NVIDIA AIAA Server documentation

REDACTED
gps.topo.auth.gr
Aristotle University of Thessaloniki
Added on 2019-10-
Greece, The
Technologies:

HTTP/1.0 200 OK
Content-Length: 153094

AI Annotation Assistance server API

1.0.0 OAS3

/docs/openapi.yaml

NVIDIA Deep Learning for Medical Imaging. Artificial Intelligence Annotation Assistance server API specification. This specification defines inference and smart polygon API. Try/Visualize APIs

API (v1)

GET	/v1/models	Retrieve the list of available models
POST	/v1/dextr3d	Request Annotation on 3D NIFTI image
POST	/v1/segmentation	Request Segmentation on 3D NIFTI image
POST	/v1/mask2polygon	Convert a 3D mask into slices of 2D polygons
POST	/v1/fixpolygon	Adjust polygons to a better-fit 2D/3D polygons

NVIDIA AIAA


```
[
  {
    "roi": [
      128,
      128,
      128
    ],
    "name": "annotation_ct_liver",
    "sigma": 3,
    "version": "1",
    "labels": [
      "liver"
    ],
    "description": "A pre-trained model for volumetric (3D) annotation of the liver in portal venous phase CT image",
    "type": "annotation",
    "internal name": "annotation_ct_liver",
    "padding": 20
  },
```

What is the problem here?

In some cases, medical ML frameworks and AI systems are connected with PACS servers, which is a medical imaging and archiving technology.

How to retrieve information from PACS?

Q.4 DIMSE-C C-FIND Service		
Prev	Q Relevant Patient Information Query Service Class (Normative)	Next

Q.4 DIMSE-C C-FIND Service

The DIMSE-C C-FIND service is the operation by which relevant patient information is queried and provided.

How to retrieve information from PACS?

Q.4 DIMSE-C C-FIND Service		
Prev	Q Relevant Patient Information Query Service Class (Normative)	Next

Q.4 DIMSE-C C-FIND Service

The DIMSE-C C-FIND service is the operation by which relevant patient information is queried and provided.

C.2.2.2.4 Wild Card Matching		
Prev	C.2.2.2 Attribute Matching	Next

C.2.2.2.4 Wild Card Matching

If the Attribute is not a date, time, signed long, signed short, unsigned short, unsigned long, floating point single, floating point double, other byte string, other word string, unknown, Attribute tag, decimal string, integer string, age string or UID and the value specified in the request contains any occurrence of an "*" or a "?", then "*" shall match any sequence of characters (including a zero length value) and "?" shall match any single character. This matching is case sensitive, except for Attributes with an PN Value Representation (e.g., Patient Name (0010,0010)).

For Attributes with a PN value representation, including the case of extended negotiation of fuzzy semantic matching, wild card matching is implementation dependent and shall be specified in the conformance statement.

How to retrieve information from PACS?

Q.4 DIMSE-C C-FIND Service		
Prev	Q Relevant Patient Information Query Service Class (Normative)	Next

Q.4 DIMSE-C C-FIND Service

The DIMSE-C C-FIND service is the operation by which relevant patient information is queried and provided.

C.2.2.2.4 Wild Card Matching		
Prev	C.2.2.2 Attribute Matching	Next

C.2.2.2.4 Wild Card Matching

If the Attribute is not a date, time, signed long, signed short, unsigned short, unsigned long, floating point single, floating point double, other byte string, other word string, unknown, Attribute tag, decimal string, integer string, age string or UID and the value specified in the r
shall match any sequence of characters (including a zero length value) and "?" shall match ar
with an PN Value Representation (e.g., Patient Name (0010,0010)).

For Attributes with a PN value representation, including the case of extended negotiation of fuz
and shall be specified in the conformance statement.

```
C-FIND query status: 0xff00
(0008, 0000) Group Length                       UL: 44
(0008, 0052) Query/Retrieve Level               CS: 'PATIENT'
(0008, 0054) Retrieve AE Title                  AE: 'dicom\x00'
(0008, 0056) Instance Availability              CS: 'ONLINE'
(0010, 0000) Group Length                       UL: 60
(0010, 0010) Patient's Name                     PN: 'ARCHIPOVA G.V.'
(0010, 0020) Patient ID                         LO: '295'
(0010, 0030) Patient's Birth Date               DA: '19370113'
(0010, 0040) Patient's Sex                      CS: 'F'
C-FIND query status: 0xff00
(0008, 0000) Group Length                       UL: 44
(0008, 0052) Query/Retrieve Level               CS: 'PATIENT'
(0008, 0054) Retrieve AE Title                  AE: 'dicom\x00'
(0008, 0056) Instance Availability              CS: 'ONLINE'
(0010, 0000) Group Length                       UL: 76
(0010, 0010) Patient's Name                     PN: 'ARIKAINEN V.A.'
(0010, 0020) Patient ID                         LO: 'K26032.ARIKA.194701'
(0010, 0030) Patient's Birth Date               DA: '19470119'
(0010, 0040) Patient's Sex                      CS: 'M'
C-FIND query status: 0xff00
(0008, 0000) Group Length                       UL: 44
(0008, 0052) Query/Retrieve Level               CS: 'PATIENT'
(0008, 0054) Retrieve AE Title                  AE: 'dicom\x00'
(0008, 0056) Instance Availability              CS: 'ONLINE'
(0010, 0000) Group Length                       UL: 74
(0010, 0010) Patient's Name                     PN: 'ARKHIPENKO S.I.'
(0010, 0020) Patient ID                         LO: '1051820826000140'
(0010, 0030) Patient's Birth Date               DA: '19710823'
(0010, 0040) Patient's Sex                      CS: 'M'
C-FIND query status: 0xff00
(0008, 0000) Group Length                       UL: 44
(0008, 0052) Query/Retrieve Level               CS: 'PATIENT'
(0008, 0054) Retrieve AE Title                  AE: 'dicom\x00'
(0008, 0056) Instance Availability              CS: 'ONLINE'
(0010, 0000) Group Length                       UL: 76
(0010, 0010) Patient's Name                     PN: 'ARKHIPENKO T.F.'
(0010, 0020) Patient ID                         LO: '1118.ARKHI.193504'
(0010, 0030) Patient's Birth Date               DA: '19350425'
(0010, 0040) Patient's Sex                      CS: 'F'
C-FIND query status: 0xff00
(0008, 0000) Group Length                       UL: 44
(0008, 0052) Query/Retrieve Level               CS: 'PATIENT'
(0008, 0054) Retrieve AE Title                  AE: 'dicom\x00'
(0008, 0056) Instance Availability              CS: 'ONLINE'
(0010, 0000) Group Length                       UL: 74
```

We will receive a complete list of all patients

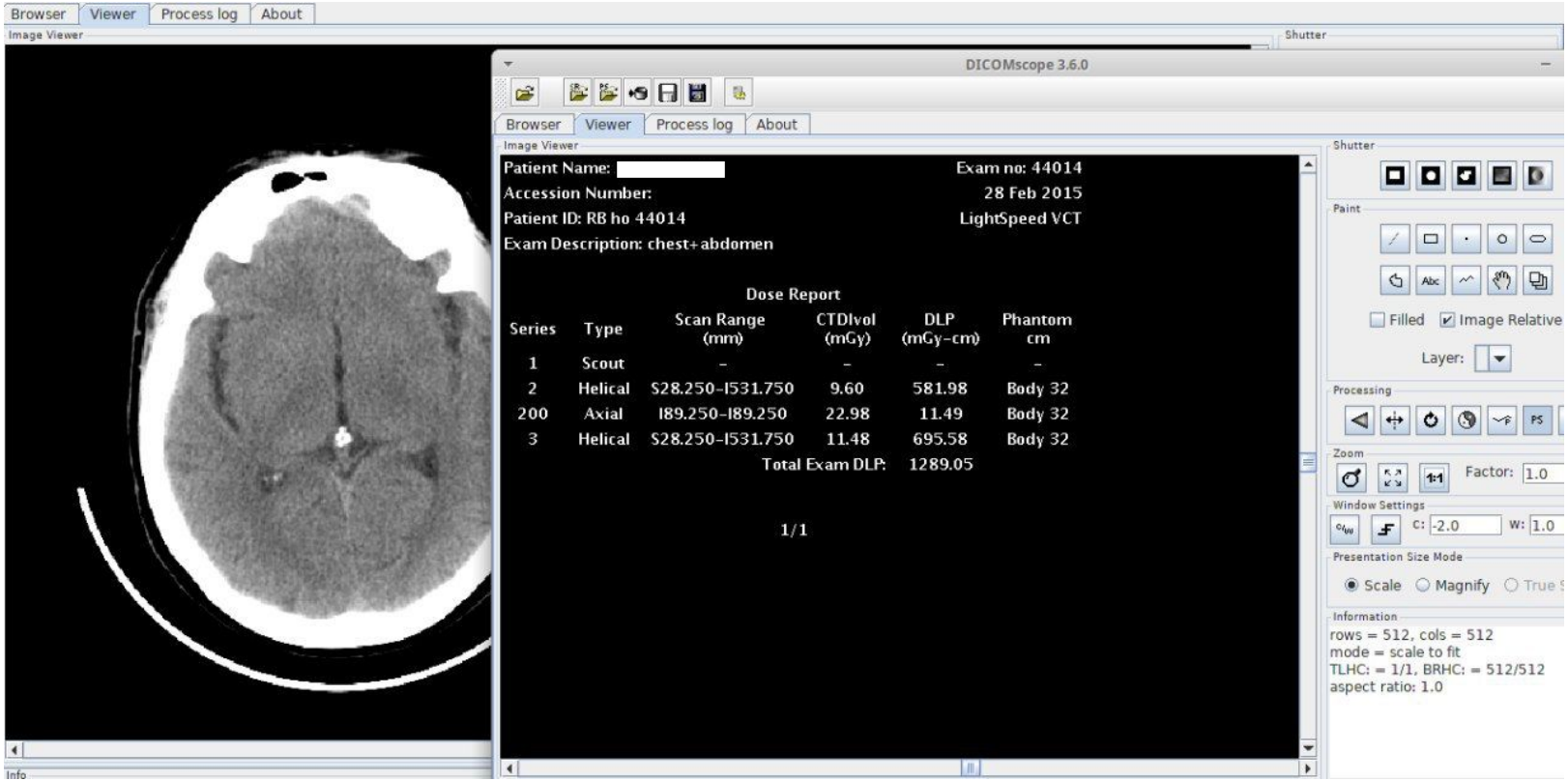
How to retrieve patient docs from PACS?

We can create a dataset that contains any unique patient data (for example, patient name, patient id and so on), and after that, we can get all the related results with C-GET request.

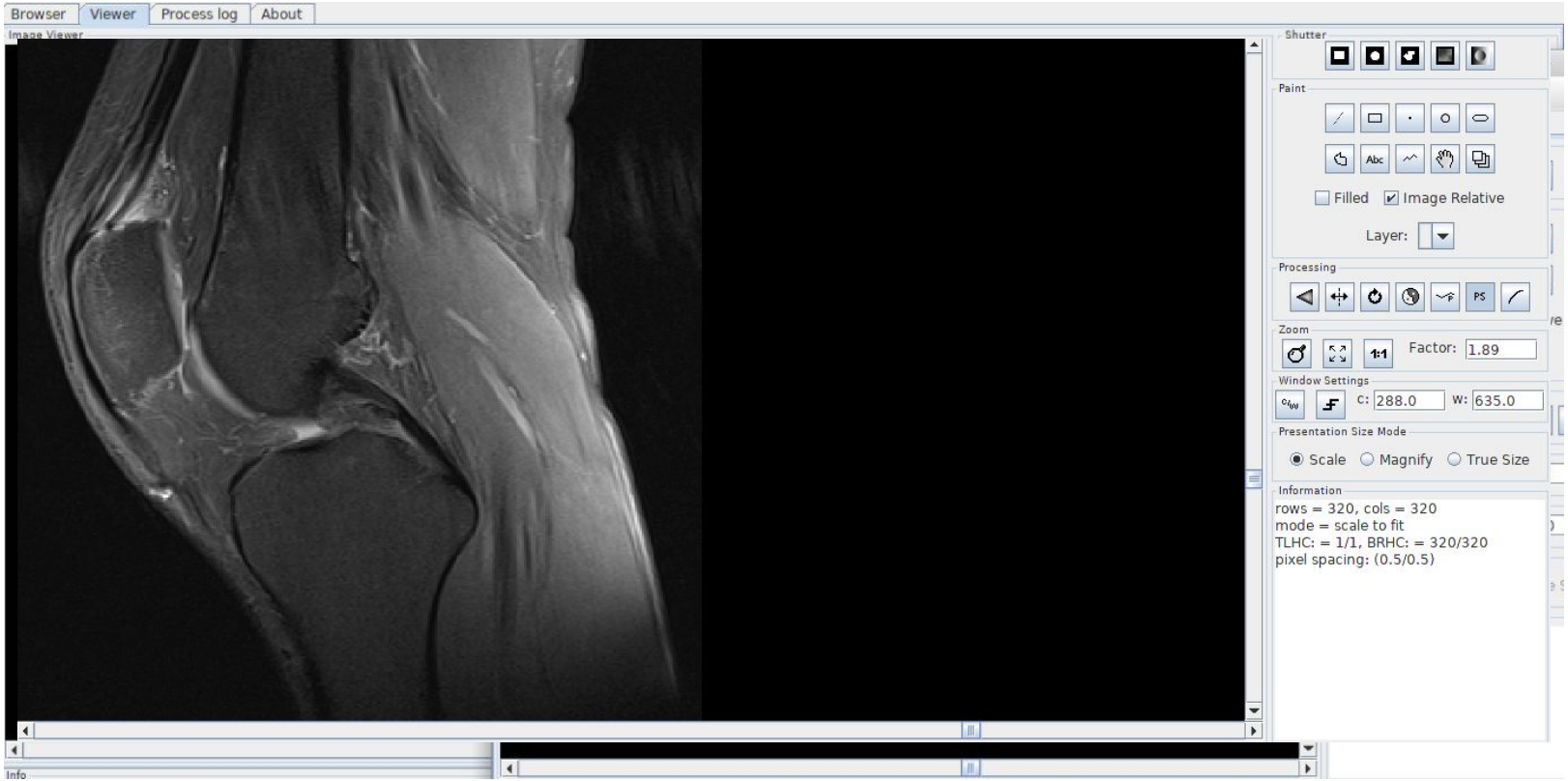
Dataset in DICOM format can be created with dcmodify from DCMTK:

dcmodify --create-file -i "(0010,0010)=PATIENT_NAME" query_file.dcm

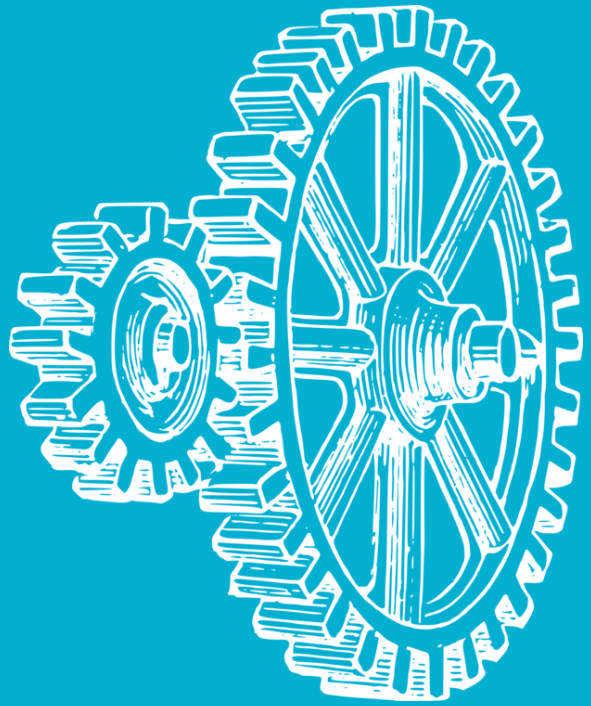
How to retrieve patient docs from PACS?



How to retrieve patient docs from PACS?



Infrastructure Services



Kubeflow

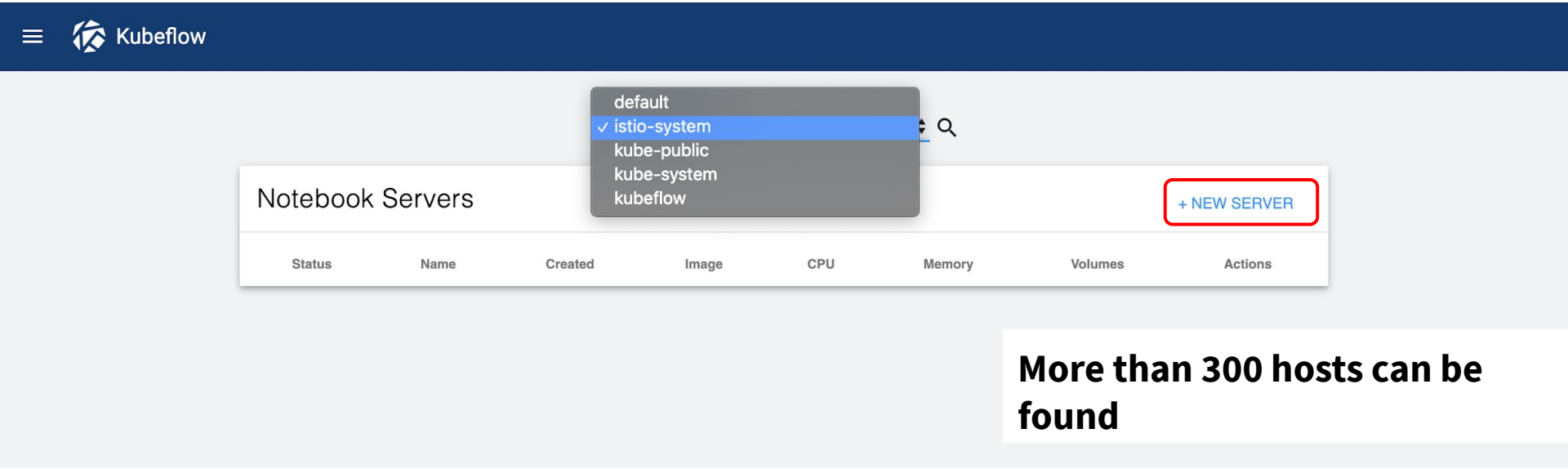
Documentation / About / Kubeflow

Kubeflow

Quickly get running with your ML Workflow

The Kubeflow project is dedicated to making deployments of machine learning (ML) workflows on Kubernetes simple, portable and scalable. Our goal is not to recreate other services, but to provide a straightforward way to deploy best-of-breed open-source systems for ML to diverse infrastructures. Anywhere you are running Kubernetes, you should be able to run Kubeflow.

Kubeflow



More than 300 hosts can be found

Kubeflow

New Notebook Server

Name

Specify the name of the Notebook Server and the Namespace it will belong to.

Notebook Server's Name
secureserver

Namespace
istio-system

Image

A starter Jupyter Docker Image with a baseline deployment and typical ML packages.

○ Standard ◉ Custom

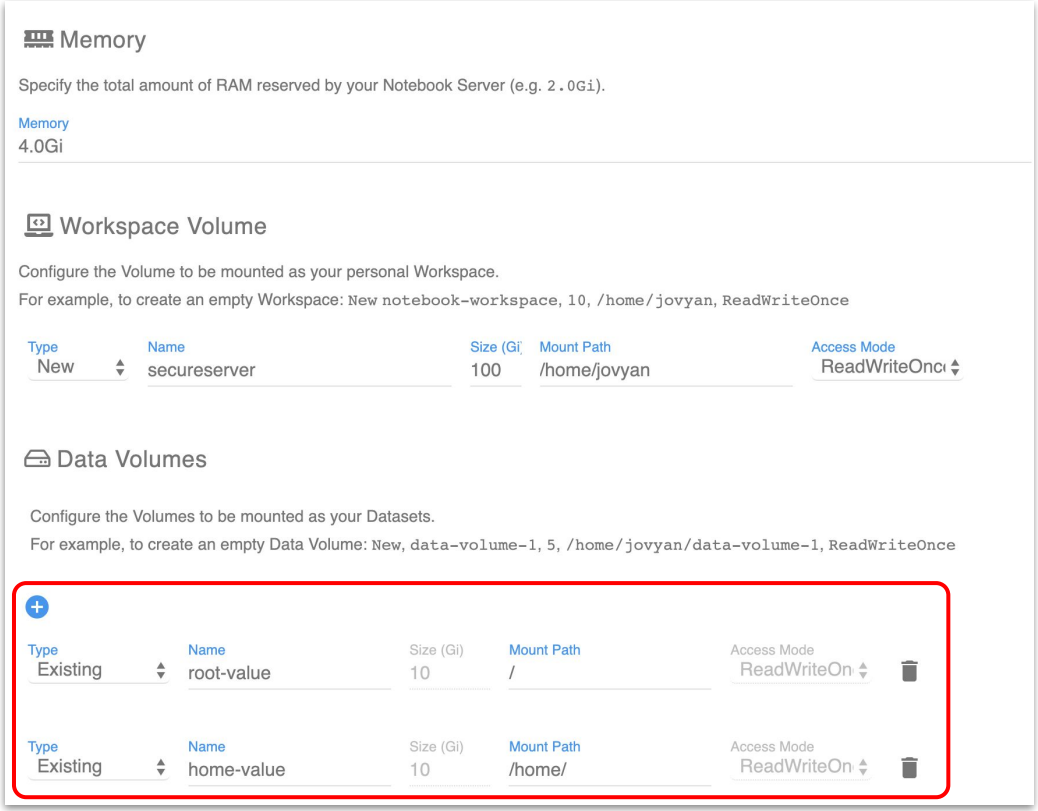
Custom Image
ubuntu:latest

CPU

Specify the total amount of CPU reserved by your Notebook Server. For CPU-intensive workloads, you can choose more than 1 CPU (e.g. `1.5`).

CPU
2.0

Kubeflow


Memory
Specify the total amount of RAM reserved by your Notebook Server (e.g. 2.0Gi).
Memory
4.0Gi
Workspace Volume
Configure the Volume to be mounted as your personal Workspace.
For example, to create an empty Workspace: New notebook-workspace, 10, /home/jovyan, ReadWriteOnce
Type
New
Name
secureserver
Size (Gi
100
Mount Path
/home/jovyan
Access Mode
ReadWriteOnc
Data Volumes
Configure the Volumes to be mounted as your Datasets.
For example, to create an empty Data Volume: New, data-volume-1, 5, /home/jovyan/data-volume-1, ReadWriteOnce
Type
Existing
Name
root-value
Size (Gi)
10
Mount Path
/
Access Mode
ReadWriteOn
Type
Existing
Name
home-value
Size (Gi)
10
Mount Path
/home/
Access Mode
ReadWriteOn

Kubeflow

jupyter Untitled Last Checkpoint: 10/06/2019 (autosaved)

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

Run Code

In [8]:
```
from __future__ import print_function

import tensorflow as tf
from tensorflow import keras

# Helper libraries
import numpy as np
import os
import subprocess
import argparse

# Reduce spam logs from s3 client
os.environ['TF_CPP_MIN_LOG_LEVEL']='3'

def preprocessing():
  fashion_mnist = keras.datasets.fashion_mnist
  (train_images, train_labels), (test_images, test_labels) = fashion_mnist.load_data()

  # scale the values to 0.0 to 1.0
  train_images = train_images / 255.0
  test_images = test_images / 255.0

  # reshape for feeding into the model
  train_images = train_images.reshape(train_images.shape[0], 28, 28, 1)
  test_images = test_images.reshape(test_images.shape[0], 28, 28, 1)
```

Kubeflow

jupyter Untitled Last Checkpoint: 10/06/2019 (autosaved)

jupyter

```
$ ls
bin  boot  dev  etc  home  lib  lib64  media  mnt  opt  proc  root  run  sbin  srv  sys  tf  tmp  usr  var
$ uname -a
Linux myjupyter-0 4.14.146-119.123.amzn2.x86_64 #1 SMP Mon Sep 23 16:58:43 UTC 2019 x86_64 x86_64 x86_64 GNU/Linux
$ lsb_release -a
No LSB modules are available.
Distributor ID: Ubuntu
Description:    Ubuntu 18.04.2 LTS
Release:        18.04
Codename:       bionic
$
```

```
(train_images, train_labels), (test_images, test_labels) = fashion_mnist.load_data()

# scale the values to 0.0 to 1.0
train_images = train_images / 255.0
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test_images = test_images.reshape(test_images.shape[0], 28, 28, 1)
```

Thank you for attention!
Any questions?

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@manmoleculo

github.com/sdnewhop/grinder

sdnewhop.github.io/AISec/