

QNAP

DiGiCOR

Container
Station

QNAP & AI

Artificial
Intelligence

QuAI AI Developer Package

Reasoning



Everyone is talking about AI



"IF ONE PERSON COULD PUSH A BUTTON AND TURN OUT EVERYTHING WE TURN OUT NOW, IS THAT GOOD FOR THE WORLD OR BAD FOR THE WORLD?"

-Warren Buffett, CEO

Warren Buffett and Bill Gates think it's 'crazy' to view job-stealing robots as bad

Catherine Clifford | 9:24 AM ET Fri, 3 Feb 2017

Apple, Samsung, LG 'double down' on AI

By Kyle Wiggers — Posted on January 24, 2017 8:06 am

"Artificial intelligence would be the ultimate version of Google. The ultimate search engine would understand everything on the web. It would understand exactly what you wanted, and it would give you the right thing. We're nowhere near doing that now. However, we're getting incrementally closer to that, and that is basically what we work on"

Elon Musk: 'Robots will be able to do everything better than us'

Catherine Clifford | 12:23 PM ET Mon

"AI is going to disrupt every single business app – whether it's a vertical industry like banking, retail and health care, or a horizontal business process like sales, marketing and customer support"

- Harry Shum, Microsoft Executive VP, AI and Research

"WITH AI ESPECIALLY, I AM REALLY OPTIMISTIC."

-Mark Zuckerberg, founder and CEO of Facebook

SYDNEY, Australia, July 18, 2017

Gartner Says AI Technologies Will Be in Almost Every New Software Product by 2020



QuAI

The AI Era is here...





AI/ML/DL: the buzzwords...

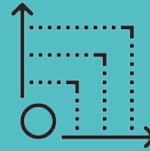
AI



Artificial Intelligence

Artificial intelligence is a branch of science which is into making machines think like humans.

ML



Machine Learning

Machine Learning is a collection of algorithms that can learn from and make predictions based on recorded data, optimize a given utility function under uncertainty, extract hidden structures from data, and classify data into concise descriptions.

DL



Deep Learning

Deep Learning is a branch of machine learning that involves layering algorithms in an effort to gain greater understanding of the data.



Ride the AI wave with "QuAI" from QNAP

QuAI

AI Developer Package

Is intended for **data scientists and developers** to quickly build, train, and optimize their **AI Models** on QNAP NAS.



AI

+



QNAP NAS

=



QuAI



Who is it for ?

Data Scientists



Engineers



Students





Deep Learning Application Development Process

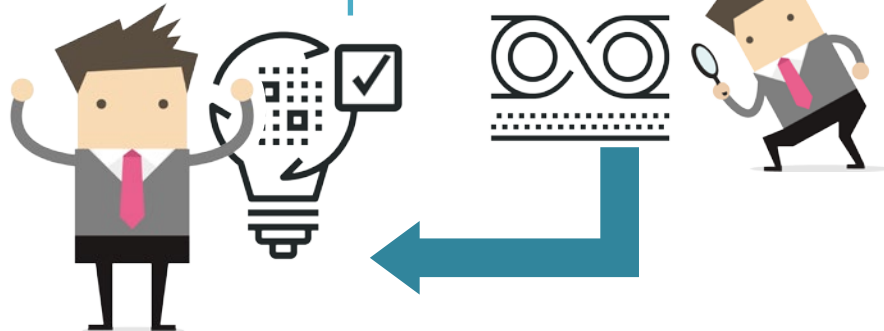
Data Scientist is presented with business goal



He puts together dataset and target to accomplish that business goal

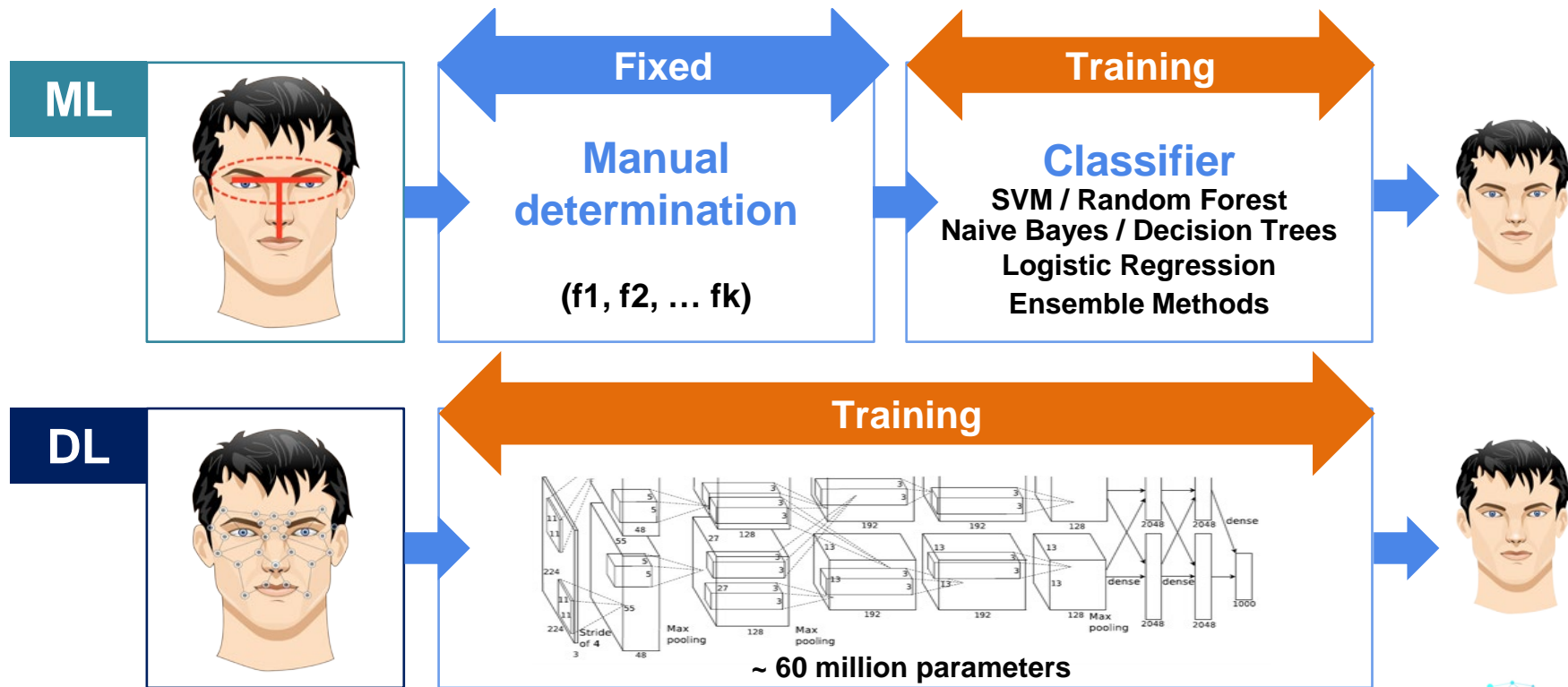


He goes through iterative process to build and optimize models/algorithms





What's the differences between ML and DL?

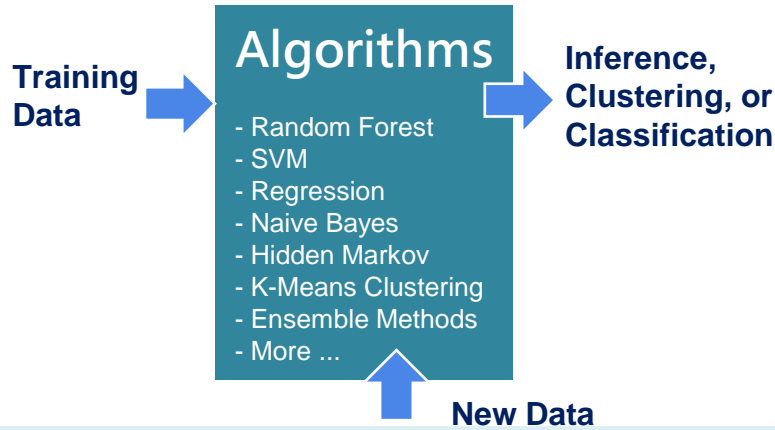


What is difference between classic ML and DL?



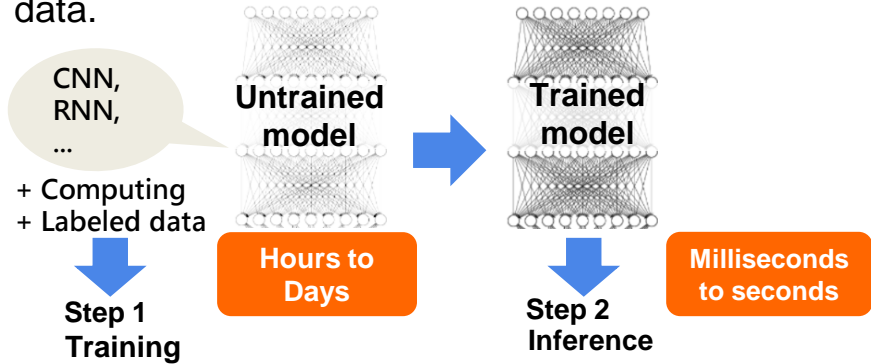
Machine Learning

Using optimized functions or algorithms to extract insights from data.



Deep Learning

Using massive labeled data sets to train deep (neural) graphs that can make inference about new data.



Sample DL application– Image Classification

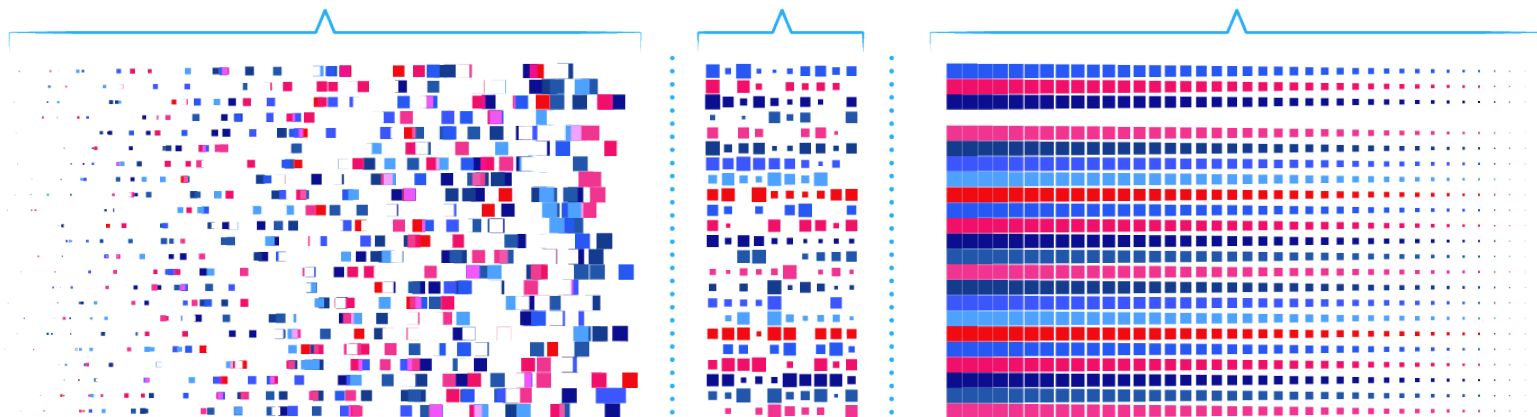


Typical training run

- Pick a DNN design.
- Input 100 million training images spanning 1,000 categories.

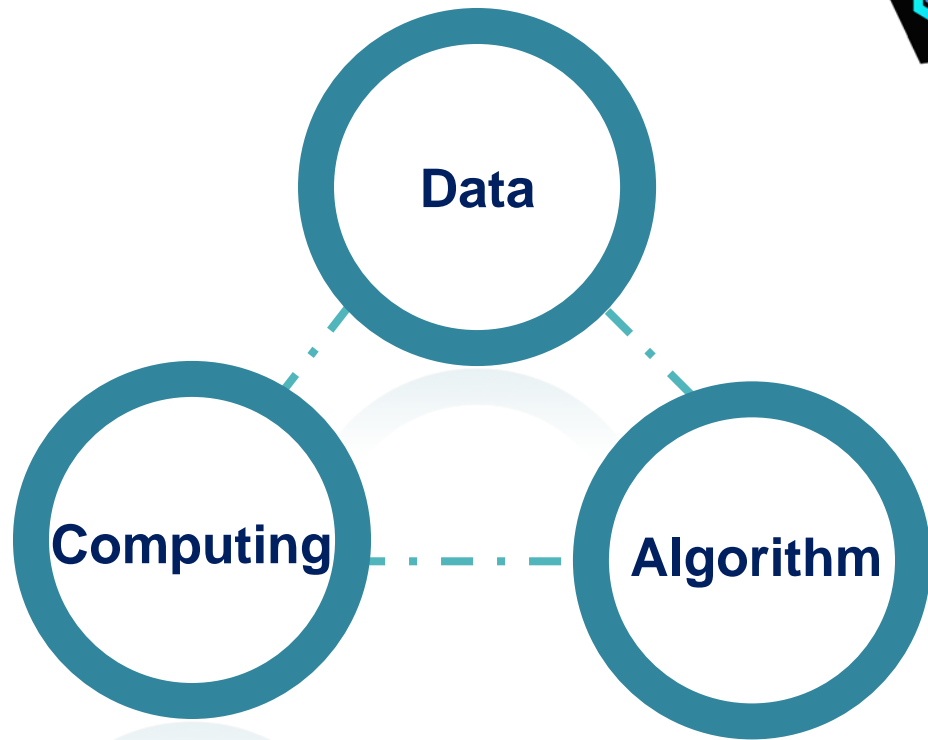
Test accuracy

If bad: modify DNN, fix training set or update training parameters.





Successful deep learning (training) depends on 3 key factors





Pain points for data scientists

1. Using laptops/desktops to develop their model, but storage and computing resources are limited. A workstation with GPU and storage is needed to train / validate their model.
2. Lack of knowledge to setup NVIDIA GPU drivers, containers, GPU passthrough, etc.
3. Lack of knowledge to setup data backup/sharing, network configurations, etc.

PAST

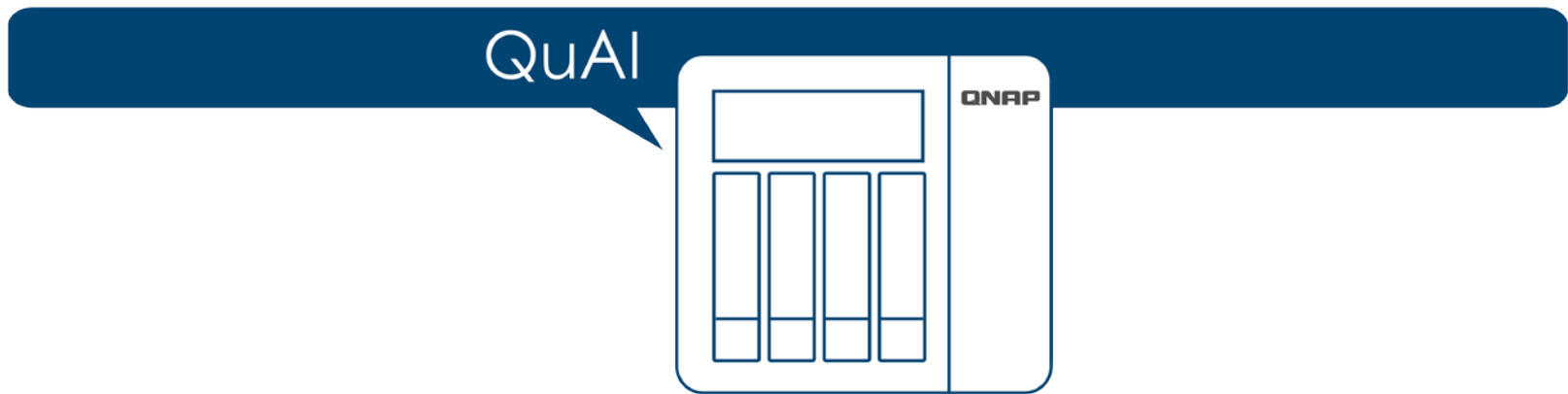
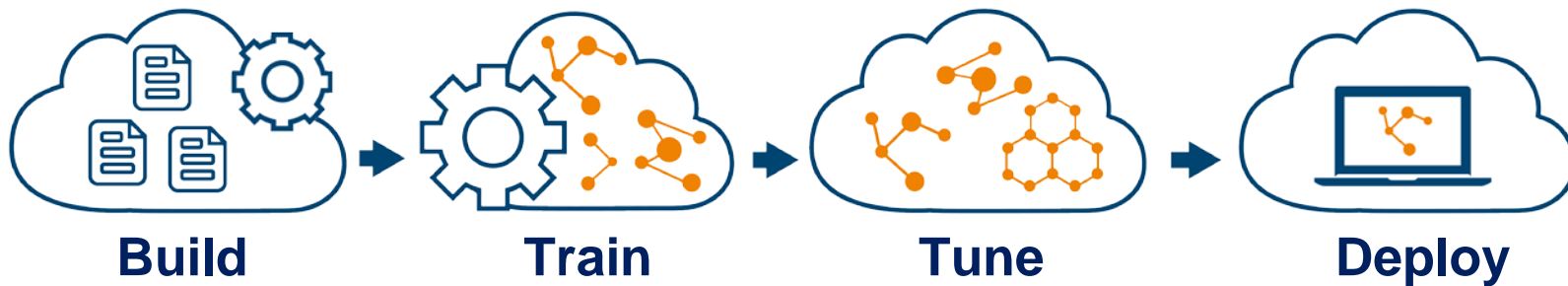


FUTURE





AI Development with QuAI





QTS 4.3.4 Adds Graphics Card Support



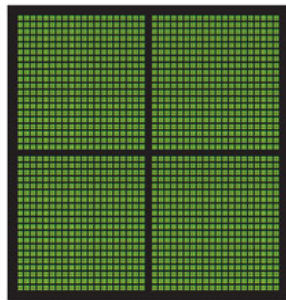


QuAI with GPU Accelerated Computing

- Fuel QuAI development with GPU-accelerated computing.
- QNAP NAS integrates the capabilities of a PCIe graphics card into QTS and in-turn to Container Station.
- With the power of modern graphics cards in QNAP NAS, performance of AI modeling can be greatly boosted.

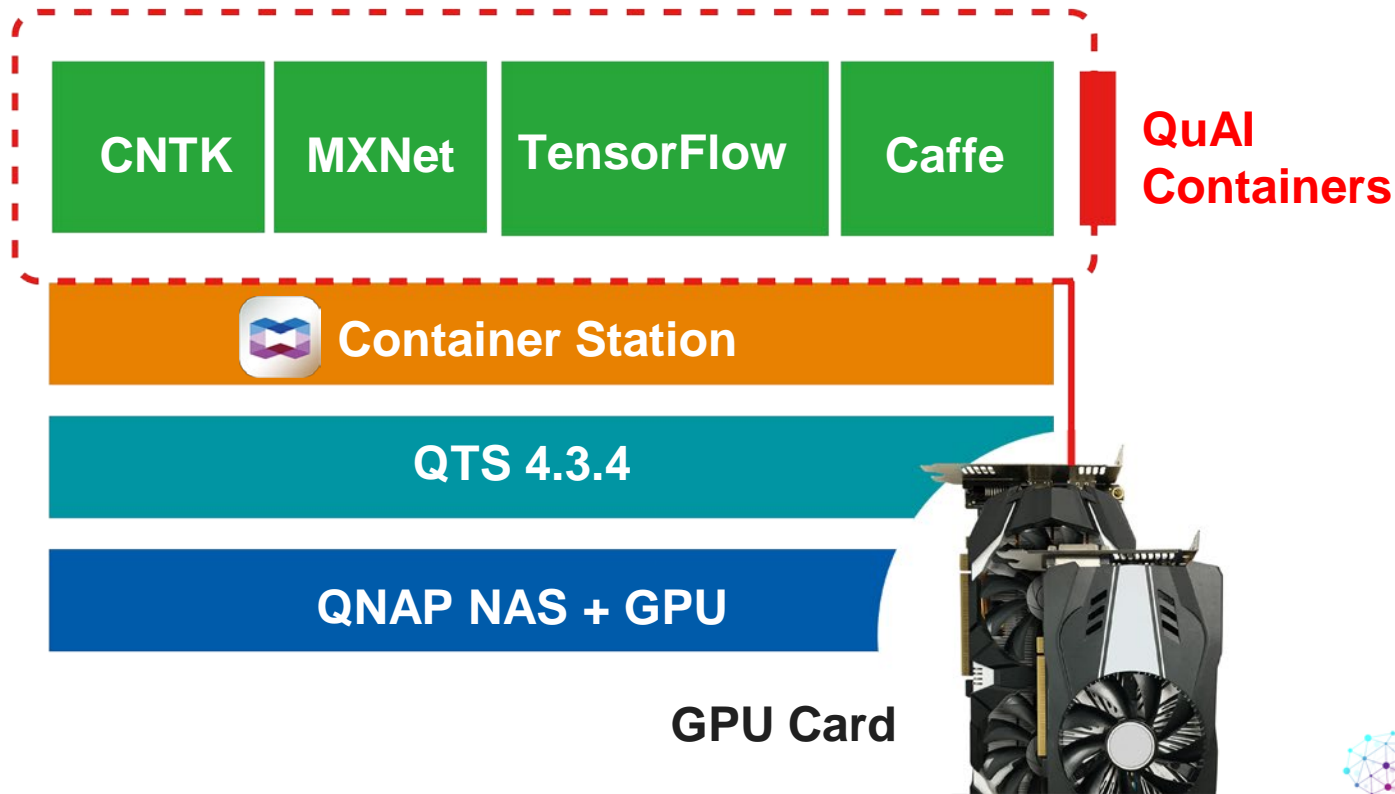


CPU
MULTIPLE CORES



GPU
THOUSANDS OF CORES

QuAI Architecture



Supports multiple frameworks/libraries





Get Started with QuAI

1

Install and run QuAI from App Center inside QTS.

2

Insert a compatible graphics card into the NAS.

3

Install drivers for the graphics card from App Center inside QTS.

5

Create the required framework containers in Container Station and start your first AI application.

4

Set the GPU allocation to QTS.



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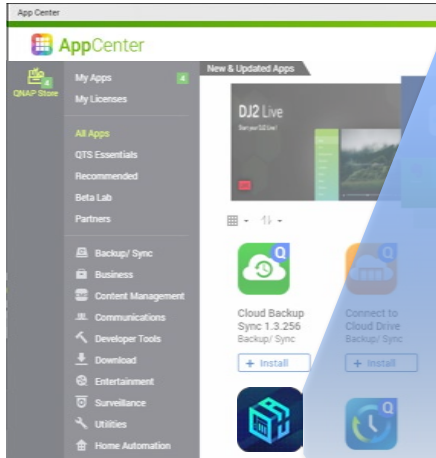
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Set the GPU allocation to QTS.

Install and run QuAI from App Center inside QTS



QuAI

- Overview
- GPU Setup
- Deep Learning
 - Caffe
 - Tensorflow
 - MXNet
 - CNTK

Overview

QuAI is QNAP's AI Developer Package, for data scientists and Engineers, to quickly build, train and optimize their AI Models, on top of QNAP NAS. Let's start with GPU Setup Wizard and then build your first deep learning model.

Graphics Card 01

Metric	Value
GPU	72%
Memory	34%
Temperature	32°
Fan Speed	300 rpm



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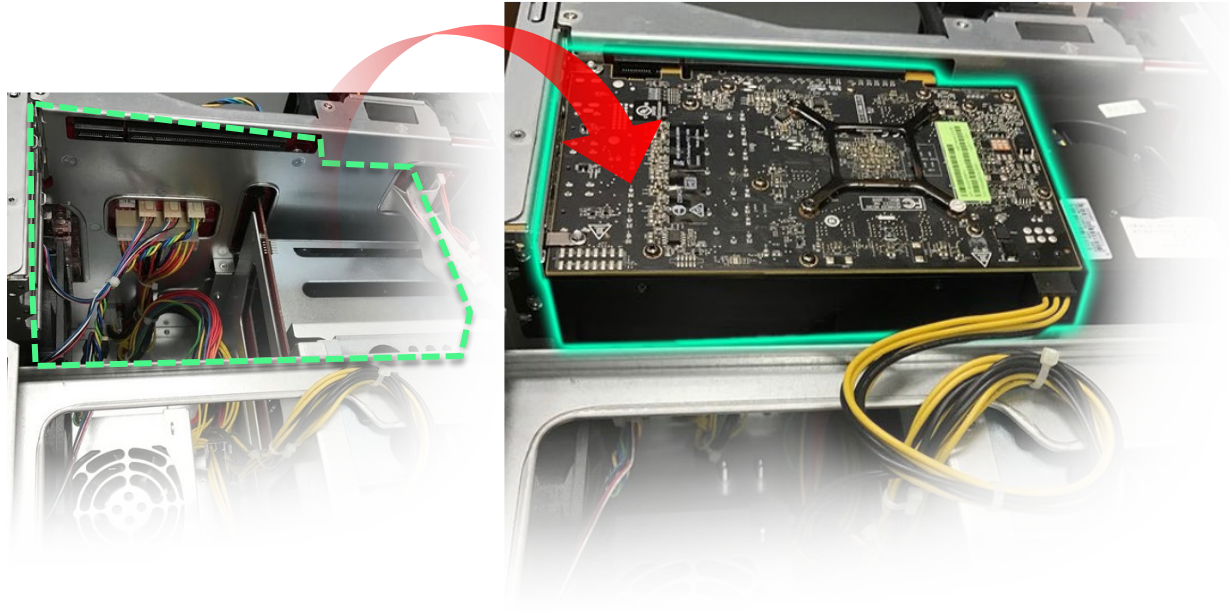
5

Create the required framework containers in Container Station and start your first AI application.

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Set the GPU allocation to QTS.

Insert a compatible* graphics card into NAS





Get Started with QuAI

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Install Graphics Card Drivers



The screenshot shows the QNAP App Center interface. On the left is a navigation sidebar with categories like 'My Apps', 'My Licenses', 'All Apps', and various utility categories. The main content area displays 'New & Updated Apps' with a featured banner for 'vyprvpn'. Below the banner, the 'NVIDIA GPU Driver 1.0 Utilities' application is listed. A magnifying glass is positioned over this application, providing a larger view of its details: the NVIDIA logo icon, the text 'NVIDIA GPU Driver 1.0 Utilities', and a prominent '+ Install' button.



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Set the GPU allocation to QTS.

Set GPU Allocation to QTS



Control Panel

← ControlPanel

- System
- Privilege
- Network & File Services
- Applications

- General Settings
- Storage & Snapshots
- Security
- Hardware
- Power
- Notification
- Firmware Update
- Backup / Restore
- External Device
- System Status
- System Logs
- Resource Monitor

General Audio Alert Smart Fan **Graphics Card**

You can install graphics cards on the expansion slots to increase the capacity for performing computations in certain applications. Additional graphics cards can be installed to increase the capacity that can be used by HD Station, Linux Station, and Virtualization Station. For details, go to [Compatibility list](#).

Manufacturer	Model	Memory usage	GPU usage	Fan speed	Temperature	Assign resources to
NVIDIA Corpor...	GP107 [GeForce G...	--	--	--	--	-- Virtualization Station HD Station / Linux Station / Hardware Transcoding

Apply All

Single selection only!

Resource allocation
For the GPU to be used with QTS, NVIDIA GPU Driver needs to be installed from App Center.



NVIDIA GPU Driver 1.0 Utilities



Get Started with QuAI

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Install and run QuAI from App Center inside QTS.

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Insert a compatible graphics card into the NAS.

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Install drivers for the graphics card from App Center inside QTS.

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Create the required framework containers in Container Station and start your first AI application.

4

Set the GPU allocation to QTS.

Create required framework containers in Container Station



The screenshot shows the Container Station web interface. A sidebar on the left contains navigation options: Management, Overview, Create (highlighted with a red circle '1'), Export, Logs, Preferences, Resource, Images, and Volume. The main content area features a search bar with 'AI' entered (highlighted with a red circle '2') and a '+ Create Application' button. Below the search bar, there are tabs for Recommended, Local, IoT, AI (selected), and Docker Hub. A list of application templates is displayed, with the 'CAFFE - GPU' template highlighted and its 'Create' button (highlighted with a red circle '3') visible. The CAFFE - GPU template description reads: 'CAFFE (Convolutional Architecture for Fast Feature Embedding) is a deep learning framework. This is official CAFFE image (GPU version). Version: gpu'. Other templates include 'CNTK - GPU' and 'CNTK - CPU', both with 'Install' buttons.

Application Name	Description	Version	Action
CAFFE - GPU	CAFFE (Convolutional Architecture for Fast Feature Embedding) is a deep learning framework. This is official CAFFE image (GPU version).	gpu	Create
CNTK - GPU	Microsoft Cognitive Toolkit (CNTK) is an open source deep-learning toolkit.	2.3-gpu-python3.5-cuda8...	Install
CNTK - CPU	Microsoft Cognitive Toolkit (CNTK) is an open source deep-learning toolkit.	2.3-cpu-python3.5	Install



Why QNAP NAS for AI?

- Keys are building, training and optimizing your AI models.
- Typically high performance workstations or public clouds are used for this process.
- Generally these elements are complemented by GPUs.

High Performance Workstations



Public Cloud Platforms



But are these the best solutions for AI development?

Why QNAP NAS for AI?



High Performance Workstations

- High TCO (total cost of ownership).
- Difficult to setup.
- Long time to configure AI frameworks.
- Not optimized to store and manage huge data.



Public Cloud

- Very complex pricing model.
- Difficult to transfer terabytes of data to public cloud to train AI models.
- Privacy might be an issue.



Why QNAP NAS for AI?

Low investments and high gains

- Relatively lower total cost of ownership, compared to workstations.
- One time cost against complex billing model of public cloud platforms.
- Higher cost efficiency with QNAP NAS.



It's FAST, it's EASY and It's QuAI

- QuAI helps setup AI environment in few quick and easy steps.
- Provides an advanced wizard for quick GPU configurations.
- It takes just few minutes, against few hours on workstations.

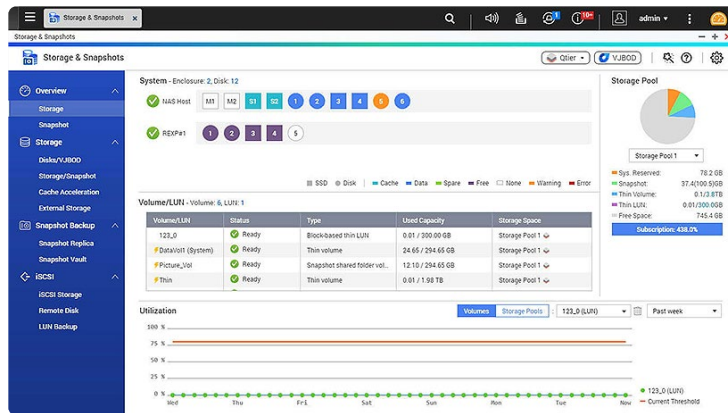




Why QNAP NAS for AI ?

Designed to manage huge data

- Unique and most sophisticated storage management capabilities with new **Storage and Snapshots Manager**.
- Provides almost unlimited storage.
- **Qtier** identifies hot and cold data through self-learning based on data access frequencies.

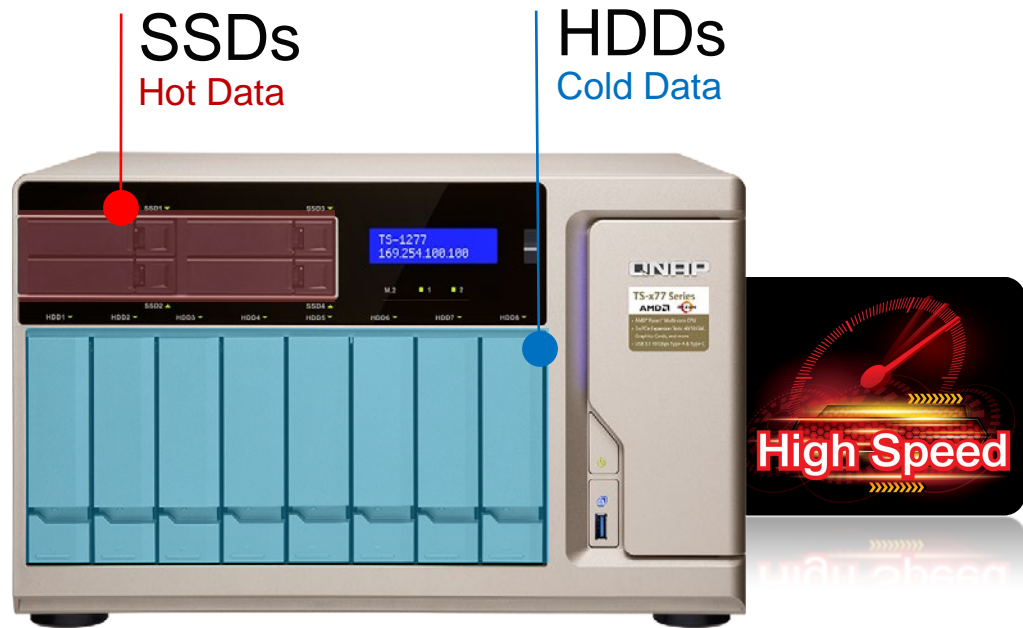




Why QNAP NAS for AI ?

High IOPS

Accelerate IOPS performance for your IOPS-intensive AI applications with QNAP's SSD cache technology.





Why QNAP NAS for AI?

Multiple layers of data protection

Built on the security first principal to minimize the risk of data breaches with multiple data protection mechanisms, and user privilege controls.



Why QNAP NAS for AI?

QTS 4.3.4

QNAP NAS with **QTS**, the most stable, robust, comprehensive and Intelligent operating system, is a strong foundation for your AI applications and training frameworks.

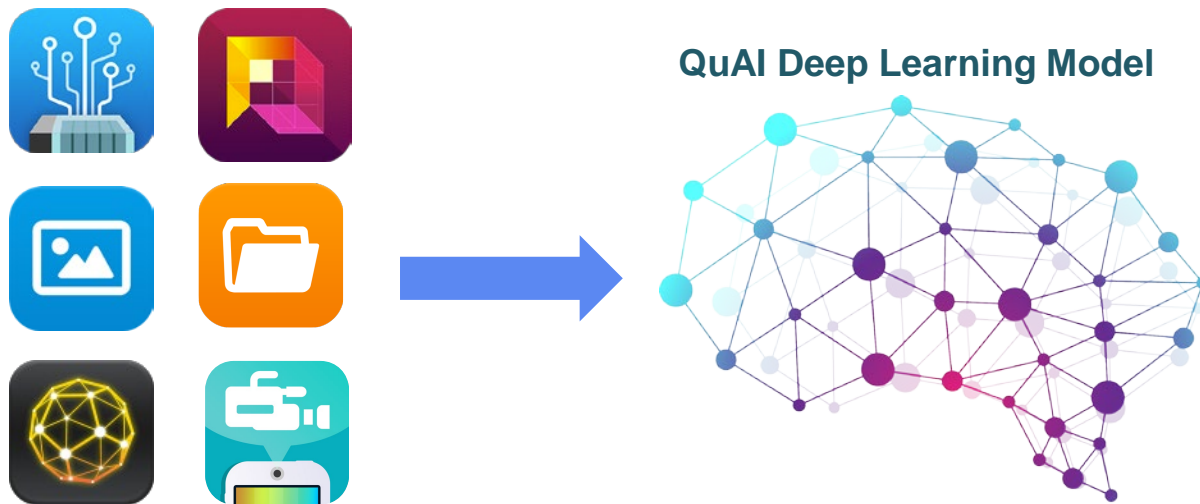




Why QNAP NAS for AI?

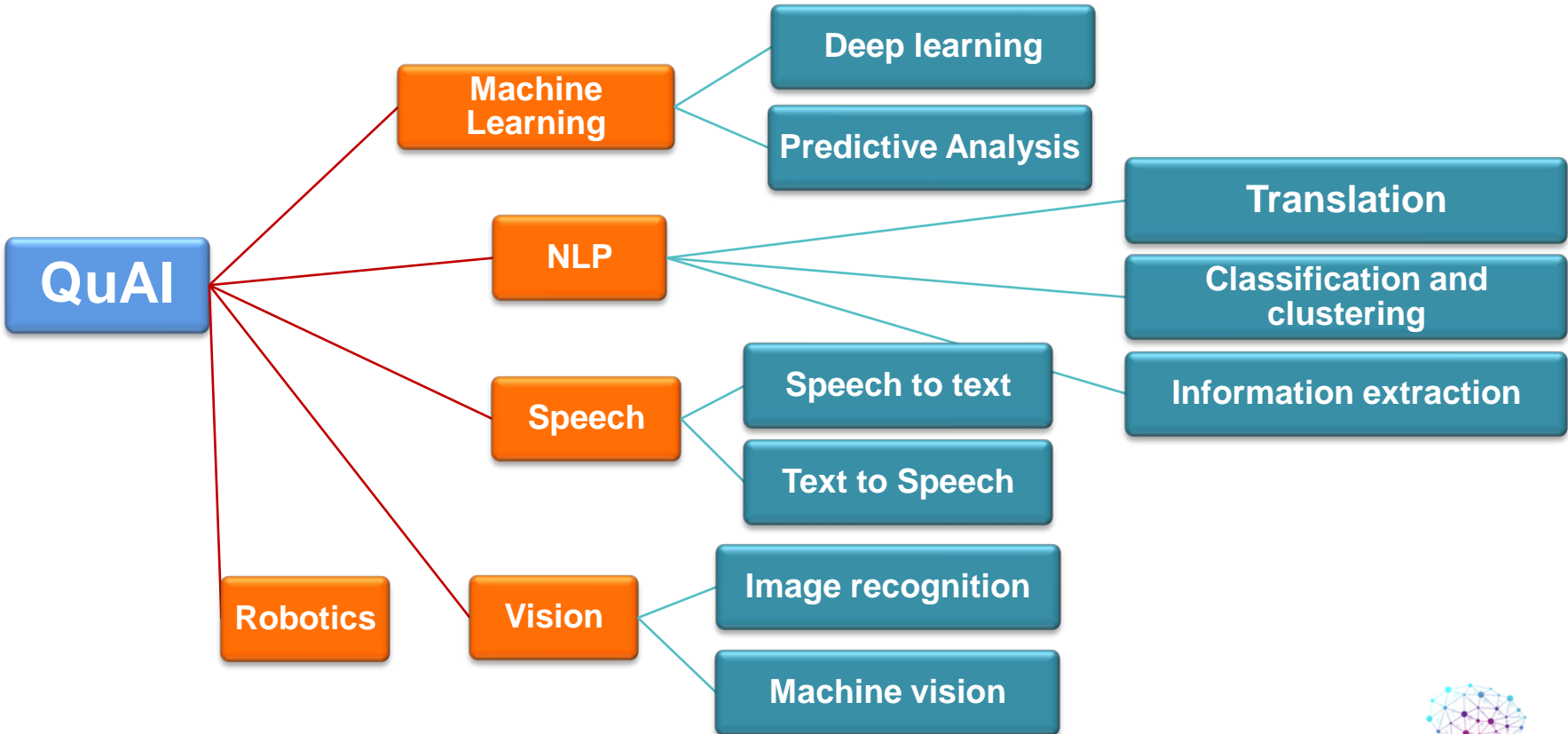
Availability of Huge Training Data:

Leverage huge and diverse data which is readily available from huge range of QNAP NAS applications to train your AI Models.





Applications of QuAI



Supported Models and System Requirements



NAS Models

TS-x77

System Requirements:

QTS 4.3.4 and above; Container Station v1.8 and above

Supported Graphics Cards: (TBD)

Brand	Model
ASUS	DUAL-GTX1050-O2G-GAMING
ASUS	GPH-GTX1050-2G
ASUS	PH-GTX1050TI-4G
ASUS	PH-GTX1060-3G
EVGA	GTX1050 2G SC
EVGA	GTX1050TI 4G SC GAMING
EVGA	GTX1060 6G SC GAMING
GIGABYTE	GV-N1050TD5-4GD
GIGABYTE	GV-N1070IXOC-8GD

Brand	Model
MSI	GTX1050 TI 4GT LP
MSI	GTX1060 6GT OCV1
MSI	GTX1060 AERO ITX 3G OC
NVIDIA	Quadro M2000
NVIDIA	Quadro P2000 5G
NVIDIA	Quadro P4000



Getting Started with QuAI

Image Classification using Caffe

Training a handwritten digits
predication model using Tensorflow

Image Classification using Caffe

QNAP DiGiCOR

Container
Station

QNAP & AI

Artificial
Intelligence

Thank You

Reasoning

