NVIDIA

DEEP LEARNING GLOSSARY

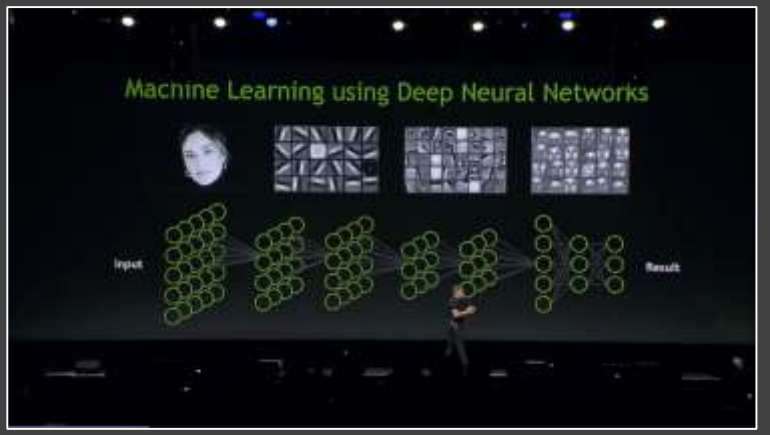
DRIVERLESS CARS, BETTER PREVENTATIVE HEALTHCARE, AND EVEN BETTER FASHION RECOMMENDATIONS ARE ALL POSSIBLE TODAY BECAUSE OF DEEP LEARNING.

OUR FRIENDS AT RE-WORK PUBLISHED AN “A” TO “Z” DEEP LEARNING GLOSSARY. HERE ARE THE MOST IMPORTANT TERMS LINKED WITH RESOURCES FOR MORE IN-DEPTH EXPLORATION …

ARTIFICIAL NEURAL NETWORKS (ANN'S)

"PROCESSING DEVICES THAT ARE LOOSELY MODELLED AFTER THE NEURONAL STRUCTURE OF THE HUMAN BRAIN."

SOURCE: UNIVERSITY OF WISCONSIN-MADISON



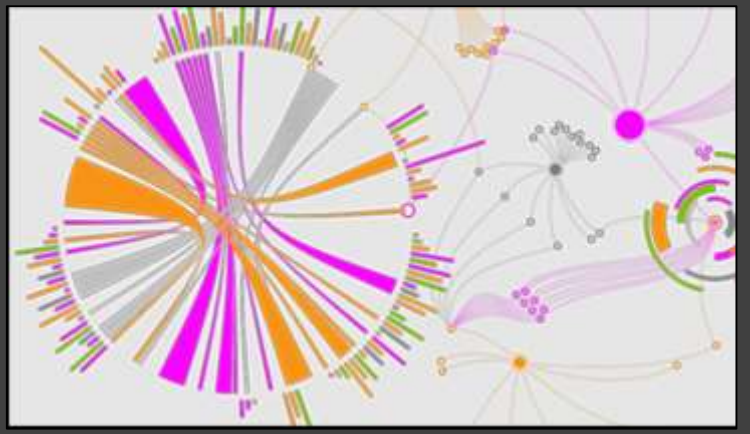
NVIDIA Applied Research

Compressing DNA Engine Facial Performance Video Classification

BIG DATA

"DESCRIBES A LARGE VOLUME OF DATA – BOTH STRUCTURED AND UNSTRUCTURED – THAT INUNDATES A BUSINESS ON A DAY-TO-DAY BASIS."

SOURCE: SAS INSIGHTS



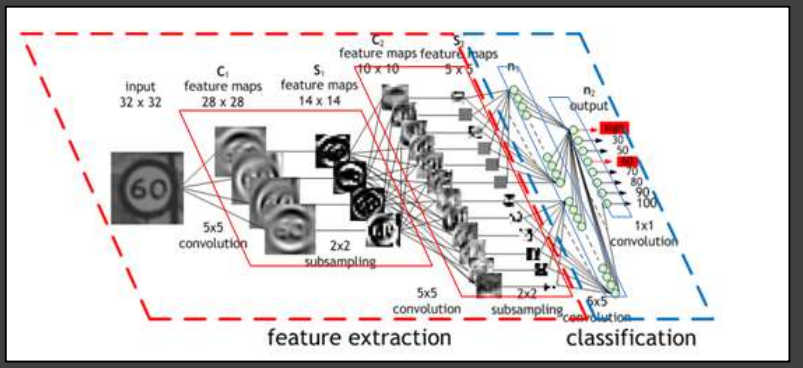
AI-Accelerated Analytics For Industries

Finance Telco IoT

CONVOLUTIONAL NEURAL NETWORKS

"COMPRISED OF ONE OR MORE CONVOLUTIONAL LAYERS AND THEN FOLLOWED BY ONE OR MORE FULLY CONNECTED LAYERS AS IN A STANDARD MULTILAYER NEURAL NETWORK."

SOURCE: UFLDL



NVIDIA Applied Research

Detection & Classification of Hand Gestures

Resource Efficient Inference

DEEP LEARNING

"FORM OF MACHINE LEARNING THAT ENABLES COMPUTERS TO LEARN FROM EXPERIENCE AND UNDERSTAND THE WORLD IN TERMS OF A HIERARCHY OF CONCEPTS."

SOURCE: GOODFELLOW, I., BENGIO, T., COURVILLE, A.

Deep Learning Applications

Transforming Finance

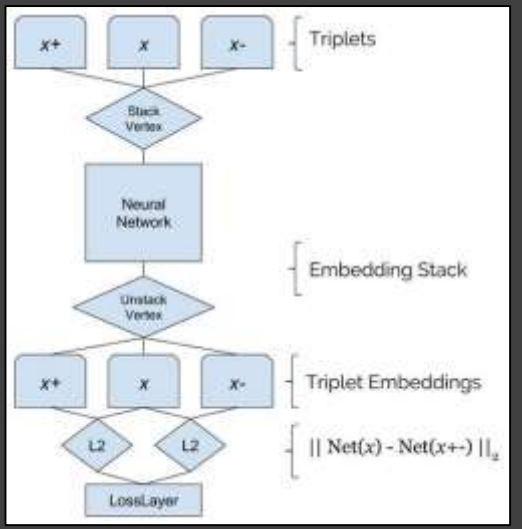
Detecting Cancer

Deep Learning In Self-Driving Cars

EMBEDDING

"IS A REPRESENTATION OF INPUT, OR AN ENCODING. FOR EXAMPLE, A NEURAL WORD EMBEDDING IS A VECTOR THAT REPRESENTS THAT WORD."

SOURCE: DEEPLEARNING4J

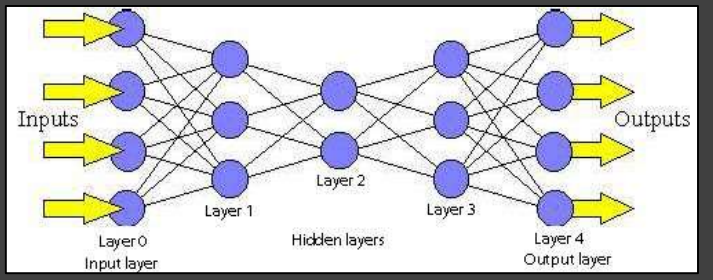


Research Publication

Generating An Embedded Neural Network

FEEDFORWARD NETWORK

"ALLOW SIGNALS TO TRAVEL ONE WAY ONLY; FROM INPUT TO OUTPUT. THERE IS NO FEEDBACK (LOOPS) I.E. THE OUTPUT OF ANY LAYER DOES NOT AFFECT THAT SAME LAYER."



SOURCE: IMPERIAL COLLEGE

Tutorial

Creating a Feed-Forward Network With DIGITS

GENERATIVE ADVERSARIAL NETWORKS

"TYPE OF AI ALGORITHMS USED IN UNSUPERVISED MACHINE LEARNING, IMPLEMENTED BY A SYSTEM OF TWO NEURAL NETWORKS COMPETING AGAINST EACH OTHER IN A ZERO-SUM GAME FRAMEWORK."

SOURCE: IAN GOODFELLOW

Origin of Generative Adversarial Networks

Ian Goodfellow Podcast

GTC 17 Talk – Generative Adversarial Networks

HIGHWAY NETWORKS

"ARE AN ARCHITECTURE TO LET INFORMATION FLOW UNHINDERED ACROSS SEVERAL RNN LAYERS ON SO-CALLED "INFORMATION HIGHWAYS."

SOURCE: DEEPLEARNING4J

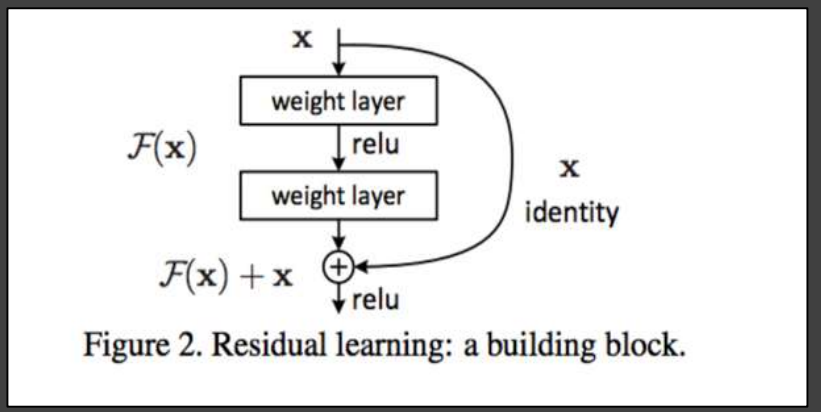


Figure 2. Residual learning: a building block.

Research Publication

Highway Networks for Visual Questions Answering

INITIALIZATION

"TRAINING DEEP MODELS ARE SUFFICIENTLY DIFFICULT TASKS. MOST ALGORITHMS ARE STRONGLY AFFECTED BY THE CHOICE OF INITIALIZATION. THE INITIAL POINT CAN DETERMINE WHETHER THE ALGORITHM CONVERGES AT ALL, WITH SOME INITIAL POINTS BEING SO UNSTABLE THAT THE ALGORITHM ENCOUNTERS NUMERICAL DIFFICULTIES AND FAILS ALTOGETHER."

SOURCE: IAN GOODFELLOW

Article

Weight Initialization In Deep Neural Networks

JITTER

"AN ARTIFICIAL NOISE ADDED TO THE INPUTS DURING TRAINING USED AS ANOTHER METHOD FOR REGULARIZATION AND IMPROVING GENERALIZATION OF A NEURAL NETWORK."

SOURCE: MICHAEL BRAGISNKEY, CTO AT AIDOC

Tutorial

What is Jitter?

K-MEANS ALGORITHM

"IS A TYPE OF UNSUPERVISED LEARNING, WHICH IS USED WHEN YOU HAVE UNLABELED DATA (I.E., DATA WITHOUT DEFINED CATEGORIES OR GROUPS). THE GOALS OF THIS ALGORITHM IS TO FIND GROUPS IN THE DATA, WITH THE NUMBER OF GROUPS REPRESENTED BY THE VARIABLE K."

SOURCE: DATA SCIENCE

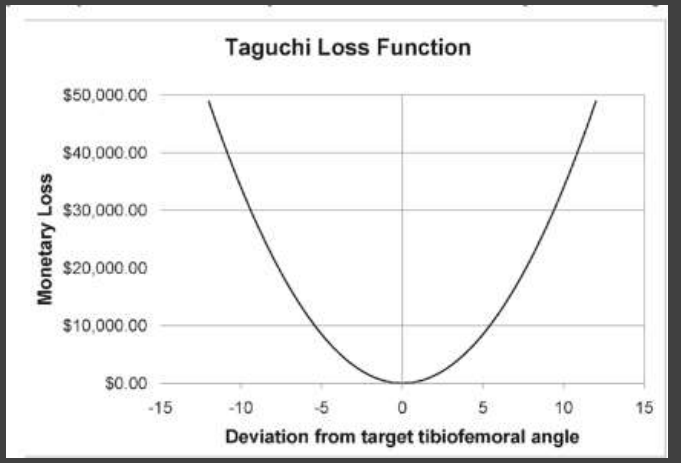
Tutorial

CUDA Implementation of the K-Means Clustering Algorithm

LOSS FUNCTION

"FOR EACH PREDICTION, THERE IS AN ASSOCIATED NUMBER WHICH IS THE LOSS. FOR A TRUE PREDICTION, THE LOSS WILL BE SMALL AND FOR A TOTALLY WRONG PREDICTION THE LOSS WILL BE HIGH."

SOURCE: MICHAEL BRAGINSKY, CTO AT AIDOC



NVIDIA Applied Research

Loss Function for Image Restoration

MULTILAYER PERCEPTRON (MLP)

"IS A FEEDFORWARD NEURAL NETWORK WITH MULTIPLE FULLY-CONNECTED LAYERS THAT USE NONLINEAR ACTIVATION FUNCTIONS TO DEAL WITH DATA WHICH IS NOT LINEARLY SEPARABLE. AN MLP IS THE MOST BASIC FORM OF A MULTILAYER NEURAL NETWORK, OR A DEEP NEURAL NETWORKS IF IT HAS MORE THAN 2 LAYERS."

SOURCE: DEEPLEARNING.NET

Research Publication

Multi-Layer Perceptron On A GPU

NATURAL LANGUAGE PROCESSING

"IS THE COMPREHENSION BY COMPUTERS OF THE STRUCTURE AND MEANING OF HUMAN LANGUAGE (E.G., ENGLISH, SPANISH, JAPANESE), ALLOWING USERS TO INTERACT WITH THE COMPUTER USING NATURAL SENTENCES."

SOURCE: GARTNER RESEARCH

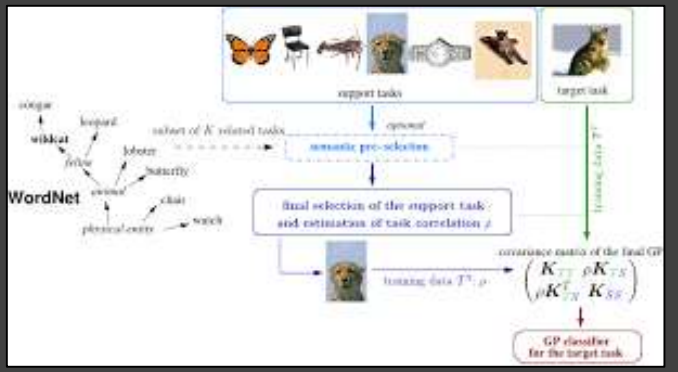
Blog

NVIDIA Developer – Natural Language Processing

ONE-SHOT LEARNING

"ONE-SHOT LEARNING IS WHEN AN ALGORITHM LEARNS FROM ONE OR A FEW NUMBER OF TRAINING EXAMPLES, CONTRAST TO THE TRADITIONAL MACHINE-LEARNING MODELS WHICH USES THOUSANDS EXAMPLES IN ORDER TO LEARN.."

SOURCE: SUSHOVAN HALDAR



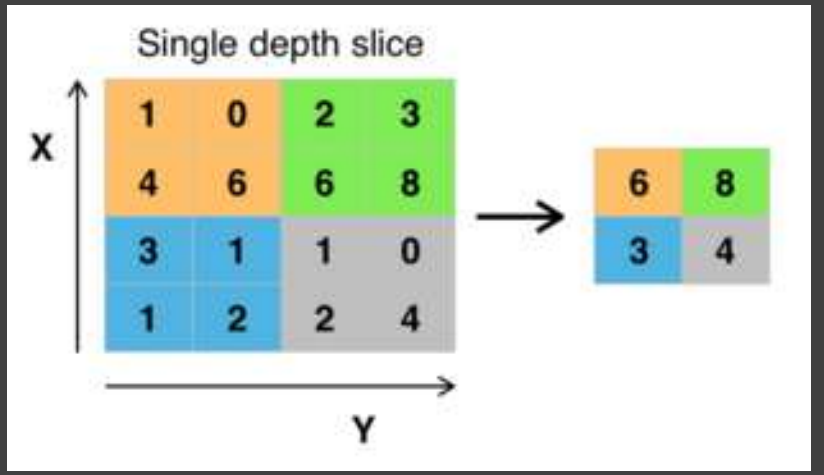
Research Publication

One-Shot Imitation Learning with OpenAI & Berkeley

POOLING

"TYPE OF LAYER COMMONLY FOUND IN CONVOLUTIONAL NEURAL NETWORKS, WHICH INTEGRATES INFORMATION FROM NEURONS WITH NEARBY RECEPTIVE FIELDS."

SOURCE: MICHAEL BRAGINSKY, CTA AT AIDOC



Blog

ParallelForall – Deep Learning In a Nutshell Core Concepts

Q-NETWORKS

"A NOVEL ARTIFICIAL AGENT, TERMED A DEEP Q-NETWORK, THAT CAN LEARN SUCCESSFUL POLICIES DIRECTLY FROM HIGH-DIMENSIONAL SENSORY INPUTS USING END-TO-END REINFORCEMENT LEARNING."

SOURCE: PETERSEN, S. (2015) HUMAN-LEVEL CONTROL THROUGH DEEP REINFORCEMENT LEARNING.

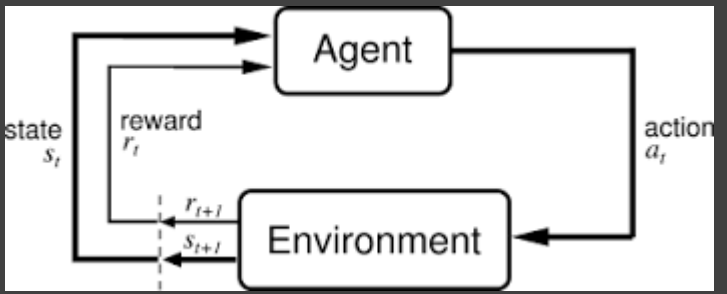
Blog

Q-Network Trained to Play Breakout on OpenAI Gym

REINFORCEMENT LEARNING

"A BRANCH OF MACHINE LEARNING THAT IS GOAL ORIENTATED; THAT IS, REINFORCEMENT LEARNING ALGORITHMS HAVE AS THEIR OBJECT TO MAXIMIZE A REWARD, OFTEN OVER THE COURSE OF MANY DECISIONS."

SOURCE: DEEPLEARNING4J



Blog

Deep Learning in a Nutshell: Reinforcement Learning

SOFTMAX REGRESSION

"IS A FUNCTION USED AS THE OUTPUT LAYER OF A NEURAL NETWORK THAT CLASSIFIES INPUT. IT CONVERTS VECTORS INTO CLASS PROBABILITIES. SOFTMAX NORMALIZES THE VECTOR OF SCORES BY FIRST EXPONENTIATING AND THEN DIVIDING BY A CONSTANT."

SOURCE: DEEPLEARNING4J

Tutorial

Stanford – Softmax Regression

TRANSFER LEARNING

"ALLOWS US TO [TRAIN NEW MODELS] BY LEVERAGING THE ALREADY EXISTING LABELED DATA OF SOME RELATED TASK OR DOMAIN. WE TRY TO STORE THIS KNOWLEDGE GAINED IN SOLVING THE SOURCE TASK IN THE SOURCE DOMAIN AND APPLY IT TO OUR PROBLEM OF INTEREST."

SOURCE: SEBASTIAN RUDER

Research Publication

Transfer Learning From Deep Features for Remote Sensing and Poverty Mapping

UNSUPERVISED LEARNING

"IS A TYPE OF MACHINE LEARNING ALGORITHM USED TO DRAW INFERENCES FROM DATASETS CONSISTING OF INPUT DATA WITHOUT LABELED RESPONSES."

SOURCE: MATHWORKS

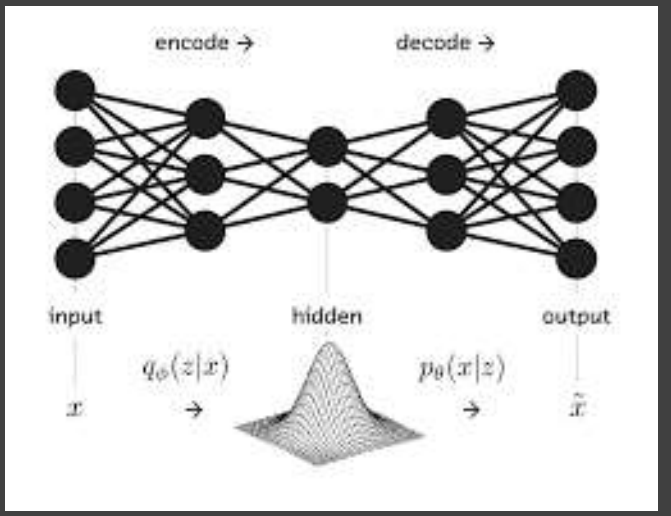
Blog

Using Unsupervised Learning For Artistic Style

VARIATIONAL AUTOENCODER

"IS A DIRECTED MODEL THAT USES LEARNED APPROXIMATE INFERENCE AND CAN BE TRAINED PURELY WITH GRADIENT-BASED METHODS."

SOURCE: GOODFELLOW, IAN



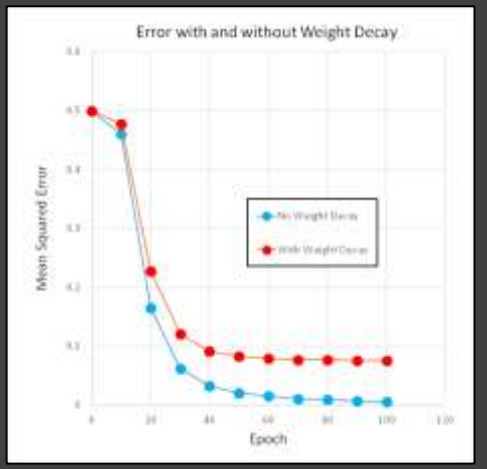
Blog

Auto-Encoder Model Querying a Computer To Design Clothing

WEIGHT DECAY

"TO PENALIZE LARGE WEIGHTS USING PENALTIES OR CONSTRAINTS ON THEIR SQUARED VALUES (L2 PENALTY) OR ABSOLUTE VALUES (L1 PENALTY)."

SOURCE: HINTON, . G. NEURAL NETWORKS FOR MACHINE LEARNING



Research Publication

Weight Decay Can Improve Generalization

XAVIER INITIALIZATION

"THE PROCESS OF INITIALIZING WEIGHTS THAT THE VARIANCE REMAINS THE SAME FOR "X" AND "Y". THIS INITIALIZATION PROCESS IS KNOWN AS XAVIER INITIALIZATION."

SOURCE: PRATEEK JOSHI

Research Publications

Understanding the Difficulty of Training Deep Feedforward Neural Networks

YOSHUA BENGIO & YANN LECUN

"AS PIONEERS OF DEEP LEARNING, YOSHUA & YANN HAVE MADE SIGNIFICANT CONTRIBUTIONS TO THE ADVANCEMENTS OF THIS FIELD. THEY WILL BOTH BE JOINING THE DEEP LEARNING SUMMIT, MONTREAL IN OCTOBER, SPEAKING ON THE "PANEL OF PIONEERS."

SOURCE: RE-WORK GLOSSARY

Their Work

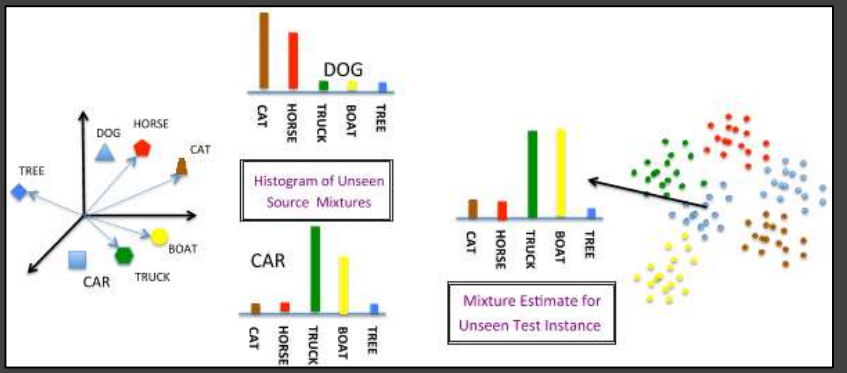
Advancing Robotics, Physics, and Medicine with AI – Yann LeCunn

The Rise of AI Through Deep Learning – Yoshua Bengio

ZERO-SHOT LEARNING

"AN EXTREME FORM OF TRANSFER LEARNING, WHERE NO LABELED EXAMPLES ARE GIVEN AT ALL FOR THE ZERO-SHOT LEARNING TASK."

SOURCE: GOODFELLOW, IAN



Research Publication

Zero-Shot Learning Through Cross-Modal Transfer

DISCOVER THE LATEST NEWS AND UPDATES ON DEEP LEARNING AND AI …

Explore Now