THE NEURAL PERSPECTIVE

DEEP LEARNING SIMPLIFIED

WELCOME

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NOTE: This website is no longer maintained as of **June 2017**. Currently working on several other projects, which I hope to release in the coming year!

Welcome to The Neural Perspective! This blog is all about simplifying and democratizing deep learning concepts and applications. There will be two types of publications: tutorials and readings. The tutorials will consist of basic math and detailed implementations for specific concepts in Tensorflow (PyTorch coming soon!). The readings will be recent publications that I found interesting and I will be simplifying a lot of the theory and math and will occasionally implement a few of the papers as well.

Note: *I made many of the tutorials back in 2016 but I try to refactor them and keep them up to date for newer Tensorflow/PyTorch releases. If something does not work or there is a newer efficient way of doing something, please comment on the post! PyTorch content coming soon!*

Thank you for all the support, corrections, conversations and for reaching 3000+ followers 🙂

SHOWCASE:

- **Interpretability via Attentional and Memory-based Interfaces**
- **Using Fast Weights to Attend to the Recent Past**
- **PyTorch Video Tutorials**
- **Natural Language Processing with PyTorch** (December 2018)

RESEARCH:

GENERALIZATION / INTERPRETABILITY

- **Understanding Deep Learning Requires Rethinking Generalization** [arXiv]
- **Making Neural Programming Architecture Generalize Via Recursion** [OpenReview]
- **Opening the Black Box of Deep Neural Networks via Information** [arXiv]

GENERATIVE ADVERSARIAL NETWORKS

- **Generative Adversarial Networks** [arXiv]
- **Unsupervised Representation Learning with Deep Convolutional Generative Adversarial Networks** [arXiv]
- **Generative Adversarial Text to Image Synthesis** [arXiv]
- **Improved Techniques for Training GANs** [arXiv]
- **Learning to Protect Communications with Adversarial Neural Cryptography** [arXiv]

MISCELLANEOUS

- WaveNet: A Generative Model for Raw Audio [arXiv][DeepMind]
- Decoupled Neural Interfaces using Synthetic Gradients [arXiv] [DeepMind]
- Hybrid Computing using a Neural Network with Dynamic External Memory [Nature]
- **Show, Attend and Tell: Neural Image Caption Generation with Visual Attention** [arXiv]
- **Understanding Deep Learning Requires Rethinking Generalization** [arXiv]

ONE-SHOT / ZERO / TRANSFER LEARNING

- **Matching Networks for One Shot Learning** [arXiv]
- **Domain Adaption in Question Answering** [arXiv]

OPTIMIZATION / ARCHITECTURE

- **Highway Networks** [arXiv]
- Maxout Networks [arXiv]
- **HyperNetworks** [arXiv]
- **Using Fast Weights to Attend to the Recent Past** [arXiv]
- **Quasi-Recurrent Neural Networks** [arXiv]

- **Learning to learn by gradient descent by gradient descent** [arXiv]
- Language Modeling with Gated Convolutional Networks [arXiv]
- Value Iteration Networks [arXiv]
- Adding Gradient Noise Improves Learning for Very Deep Networks [arXiv]
- Outrageously Large Neural Networks: The Sparsely-gated Mixture-of-Experts Layer [Open Review]
- **Convolutional Neural Networks for Sentence Classification** [arXiv]
- **GRAM: Graph-based Attention Model for Healthcare Representation Learning** [arXiv]
- **Overcoming Catastrophic Forgetting in Neural Networks** [arXiv]
- **Online and Linear-Time Attention by Enforcing Monotonic Alignments** [arXiv]
- **Exploring Sparsity in Recurrent Neural Networks** [arXiv]

QUESTION ANSWERING / MACHINE COMPREHENSION

- **A Neural Conversational Model** [arXiv]
- **Highlights and Tutorials for "Richard Socher on the Future of Deep Learning"** [O'Reilly]
- **Ask Me Anything: Dynamic Memory Networks for Natural Language Processing** [arXiv]
- **Dynamic Memory Networks for Visual and Textual Question Answering** [arXiv]
- **Dynamic Coattention Networks For Question Answering** [arXiv]
- **A Joint Many-Task Model: Growing a Neural Network for Multiple NLP Tasks** [arXiv]
- **Bidirectional Attention Flow for Machine Comprehension** [arXiv]
- **Generating Long and Diverse Responses with Neural Conversation Models** [OpenReview]
- **Gated-Attention Reader for Text Comprehension** [arXiv]
- **FVQA: Fact based Visual Question Answering** [arXiv]
- **Query-Reduction Networks for Question Answering** [arXiv]
- **Domain Adaption in Question Answering** [arXiv]
- **Question Answering from Unstructured Text by Retrieval and Comprehension** [arXiv]
- Adversarial Examples for Evaluating Reading Comprehension Systems [arXiv]

RECOMMENDATION ENGINES

- **Deep Neural Networks for Youtube Recommendations** [Google]

REINFORCEMENT LEARNING

- Episodic Exploration for Deep Deterministic Policies: An Application to StarCraft Micromanagement Tasks [arXiv]
- Third Person Imitation Learning [arXiv]
- Multi-agent Reinforcement Learning in Sequential Social Dilemmas [Paper]

REPRESENTATION LEARNING

- **Doctor AI: Predicting Clinical Events via Recurrent Neural Networks** [arXiv]
- **Distributed Representations of Words and Phrases and their Compositionality** [NIPS]
- Multi-layer Representation Learning for Medical Concepts [arXiv]
- **Poincare Embeddings for Learning Hierarchical Representations** [arXiv]
- **Learning to Compute Word Embeddings On the Fly** [arXiv]
- Learned in Translation: Contextualized Word Vectors [arXiv] [blog]

SEQ-TO-SEQ MODELS

- **Sequence to Sequence Learning with Neural Networks** [arXiv]
- **Learning Phrase Representations using RNN Encoder-Decoder for Statistical Machine Translation** [arXiv]
- **Neural Machine Translation by Jointly Learning to Align and Translate – Attention in RNNs** [arXiv]
- **On Using Very Large Target Vocabulary for Neural Machine Translation- Sampled Softmax** [arXiv]
- **Pointer Sentinel Mixture Models** [arXiv]
- **Context-Dependent Word Representation for Neural Machine Translation** [arXiv]
- **Learning to Translate in Real-time with Neural Machine Translation** [arXiv]
- **Fully Character-Level Neural Machine Translation without Explicit Segmentation** [arXiv]

TUTORIALS:

Note: Tutorials are outdated and written for Tensorflow. New updated PyTorch tutorials with code will be available soon.

- **Linear Regression**
- **Logistic Regression**
- **Vanilla Neural Network**
- **Weights Initialization**
- **Convolutional Neural Networks (CNN)**
- **Image Recognition with Inception**
- **Embeddings (skipgram and CBOW) Implementations**
- **Recurrent Neural Networks (RNN) – Part 1: Basic RNN / Char-RNN**
- **Recurrent Neural Networks (RNN) – Part 2: Text Classification**
- **Recurrent Neural Networks (RNN) – Part 3: Encoder-Decoder**

- **Recurrent Neural Network (RNN) – Part 4: Attentional Interfaces**
- **Recurrent Neural Network (RNN) – Part 5: Custom Cells**
- **Gradients, Batch/Layer Normalization**
- **Generative Adversarial Networks**
- **Improved Techniques for Training GANs**
- **Reinforcement Learning (RL) – Policy Gradients I**
- Reinforcement Learning (RL) – Policy Gradients II
- Convolutional Text Classification
- **Using Fast Weights to Attend to the Recent Past**
- Quasi-Recurrent Neural Networks
- Deep Convolutional Generative Adversarial Networks (DCGAN)
- InfoGAN Implementation
- Text to Image with Generative Adversarial Networks

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