David Eigen

de@deigen.net

EXPERIENCE

Principal Scientist, Clarifai — 2019 – Present
Research Scientist, Clarifai — 2015 – 2019
Research Intern, Google Brain — 2013
PhD Student, New York University — 2010 – 2015
Software Engineer, Cisco IronPort Systems — 2007 – 2010
Software Engineer, NetApp — 2005 – 2007

EDUCATION

New York University, New York, NY — Ph.D. Computer Science, 2015
   Thesis: "Predicting Images using Convolutional Networks: Visual Scene Understanding with Pixel Maps"
Brown University, Providence, RI — Sc.M. Computer Science, 2005
Brown University, Providence, RI — Sc.B. Mathematics - Computer Science, 2003

PUBLICATIONS

Enhancing Worldwide Image Geolocation by Ensembling Satellite-Based Ground-Level Attribute Predictors
Michael J Bianco, David Eigen, Michael Gormish
ArXiv Preprint 2024

Deep learning in medical image analysis: introduction to underlying principles and reviewer guide using diagnostic case studies in paediatrics
Constance Dubois, David Eigen, Emmanuel Delmas, Margot Einfalt, Clara Lemaçon, Laureline Berteloot, Patrick M Bossuyt, David Drummond, Pauline Scherdel, François Simon, Héloïse Torchin, Yasaman Vali, Isabelle Bloch and Jérémie F Cohen
bmj 2024

Development and validation of a smartphone-based deep-learning-enabled system to detect middle-ear conditions in otoscopic images
Constance Dubois, David Eigen, François Simon, Vincent Couloigner, Michael Gormish, Martin Chalumeau, Laurent Schmoll and Jérémie F. Cohen
npj Digital Medicine 2024

Efficient Training of Deep Convolutional Neural Networks by Augmentation in Embedding Space
Mohammad Saeed Abrishami, Amir Erfan Eshratifar, David Eigen, Yanzhi Wang, Shahin Nazarian and Massoud Pedram
ArXiv Preprint 2020

Finding Task-Relevant Features for Few-Shot Learning by Category Traversal
Hongyang Li, David Eigen, Samuel Dodge, Matthew Zeiler and Xiaogang Wang
CVPR 2019

A Meta-Learning Approach for Custom Model Training
Amir Erfan Eshratifar, Mohammad Saeed Abrishami, David Eigen and Massoud Pedram
AAAI Student Abstract Track 2019

Gradient Agreement as an Optimization Objective for Meta-Learning
Amir Erfan Eshratifar, David Eigen and Massoud Pedram
NeurIPS Meta-Learning Workshop 2018

Predicting Depth, Surface Normals and Semantic Labels with a Common Multi-Scale Convolutional Architecture

David Eigen and Rob Fergus

ICCV 2015

Unsupervised Learning of Spatiotemporally Coherent Metrics

Ross Goroshin, Joan Bruna, Jonathan Tompson, David Eigen and Yann LeCun

ICCV 2015

End-to-End Integration of a Convolutional Network, Deformable Parts Model and Non-Maximum Suppression

Li Wan, David Eigen and Rob Fergus

CVPR 2015

Depth Map Prediction from a Single Image using a Multi-Scale Deep Network

David Eigen, Christian Puhrsch and Rob Fergus

NIPS 2014

OverFeat: Integrated Recognition, Localization and Detection using Convolutional Networks

Pierre Sermanet, David Eigen, Xiang Zhang, Michael Mathieu, Rob Fergus and Yann LeCun

ICLR 2014

Learning Factored Representations in a Deep Mixture of Experts

David Eigen, Marc'Aurelio Ranzato and Ilya Sutskever

ICLR Workshops 2014

Understanding Deep Architectures using a Recursive Convolutional Network

David Eigen, Jason Rolfe, Rob Fergus and Yann LeCun

ICLR Workshops 2014

Restoring An Image Taken Through a Window Covered with Dirt or Rain

David Eigen, Dilip Krishnan and Rob Fergus

ICCV 2013

Nonparametric Image Parsing using Adaptive Neighbor Sets

David Eigen and Rob Fergus

CVPR 2012

PATENTS

Prediction-model-based mapping and/or search using a multi-data-type vector space
M Zeiler, D Eigen, R Compton, C Fox
US Patent 11281962 (2022)

System and method for facilitating graphic-recognition training of a recognition model
D Eigen, M Zeiler
US Patents 10163043 (2018), 10776675 (2020), 11417130 (2022)

System, method and computer-accessible medium for restoring an image taken through a window
R Fergus, D Eigen, D Krishnan
US Patents 9672601 (2016), 9373160 (2017)

Method and apparatus for generating dynamic microcores
D Eigen, D Grunwald
US Patent 7783932 (2010)

SELECTED PROJECTS

Model Deployment Encapsulation, at Clarifai, 2023

Designed and led development of model packaging and encapsulation, including input/output formats, dependency installs and runtime resource estimates. Models can be shipped between clusters, including air-gapped environments, without being tied to container base images.

LLM Model Inference and Training Integration, at Clarifai, 2023

Led efforts to integrate third-party open source LLMs into our training and inference pipelines, including larger GPU deployments, profiling and train adapter training.

Model Inference Deployment Scaling, at Clarifai, 2020-23

Developed system to automatically scale model deployments in cloud environments based on inference request load. Can load and scale up neural network models from zero on demand to handle unexpected bursts and slowly adapting traffic, and efficiently shares GPUs between models.

Model Training and Deployment in Cloud Environments, at Clarifai, 2018-23

Led project to integrate training and experimentation system with data platform to create detection and classification models in multiple cluster environments. Handles data validation, model training, evaluation, and inference deployment. Defined benchmarks to measure accuracy and speed, and found best price/performance points.

Estimating Camera FOV, Pitch and Roll from a Single Image, at Clarifai, 2021

Developed prototype method to estimate camera field of view, pitch and roll from single image. Located and assembled initial datasets and models, simplified and improved models adding normalized angle regression and NLL loss. Combined FOV with horizon estimates to find pitch with its estimated certainty.

Video Object Detection Streaming Engine, at Clarifai, 2020-21

Wrote core execution engine for video object detection and tracking: frame buffer, parallel inference, serialized tracker and completion, and interface with custom video streaming protocols used by customer.

Object Detection for Aerial Video, at Clarifai, 2017-20

Object detector for near-realtime detection on aerial videos in a government contract. Led ML team and developed improvements to detection methods, data cleaning, and measurement, resulting in significant performance gains. Top-performing system in comparison to other contract competitors.

Few-Shot Learning Research Projects, at Clarifai, 2017-19

Mentored interns on projects in few-shot learning. Published works at CVPR 2019 and NeurIPS Meta-Learning Workshop 2018.

Object Detection Neural Network and Framework, at Clarifai, 2016-18

Wrote object detection code framework for use with in-house neural network library and tensorflow. Created object detection models performing at state-of-the-art accuracy and ~1.5x faster compared to concurrently developed opensource object detectors.

Experiment and Training Infrastructure, at Clarifai, 2016-18

Built job scheduler and experiment tracking system targeted for ML model building, comparison and change tracking for reproducibility.

Fast Image Classifier Training, at Clarifai, 2015-17

Developed fast classifier training used by customers and internal teams to quickly build many classifiers in diverse applications. Includes frozen embeddings, quantization, data balancing, and network architecture. Benchmarked based on customers' uses in deployments for improvements.

Logo Recognition from Synthetic Data, at Clarifai, 2016

Built a system to train detection models to recognize logos in images based on synthetic data.

Face Detection and Recognition, at Clarifai, 2016-17

Created industry-competitive face detection and recognition system. Initial labeling for the detector based on combinations of open-source detectors with data filtering, and refined with hard example mining.

Image Content Moderation using Weak Labels, at Clarifai, 2015

Created industry-leading classifier for image-based content moderation and filtering, using target labels created automatically from a word-based classifier applied to weak labels and user-supplied text.

Depth, Surface Normals and Semantic Labels Prediction from a Single Image, at NYU, 2013-15

Predicts depth, surface normals and semantic segmentation from a single image using a multi-scale convolutional network. Published works at NIPS 2014, ICCV 2015.

OverFeat: ImageNet Classification, Localization and Detection, at NYU, 2013

Object localization and detection system; only system to enter in all three ImageNet 2013 challenge tasks (classification, localization and detection). Published work at ICLR 2013.

Sender IP Reputation from Spam Trap Rates, at IronPort/Cisco, 2010

Created a system to classify IP addresses as likely spam senders for email, using live streams of spam trap hits and overall mail volume estimates.

Automated Web Content Classifier. at IronPort/Cisco, 2009

Created a system to automatically classify web page content into 30 categories, based on Naive Bayes classification methods. Used to categorized over 10 million sites.

Web Reputation, Telemetry and Corpus, at IronPort/Cisco, 2007 - 2009

Datasource aggregator to score HTTP requests according to the chance of malicious content. Used on web proxy devices to block potentially malicious requests. Automatically fed back traffic samples from deployments to improve accuracy and coverage.

NVLog Parallelization, at NetApp, 2007

Rewrote filesystem journal writes to nearly eliminate lock contention, leading to over 10% higher throughput in file server workloads.

Visualization for Differential Geometry, as RA with Prof. Banchoff, Brown Univ., 2000-2004

Created a software package for creating interactive differential geometry visualizations, and produced class labs and demonstrations using this software.

Paper Reviewer, 2013 - present

Official submission reviewer for NeurIPS, ICLR, TMLR, annually.

CVPR, ICCV, ICML and other conferences and journals on occasion.