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application to deep neural networks

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/"New deep neural networks solving
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Threats for Machine Learning

Gradient descent, how neural
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chapter 2 4. Stochastic Gradient
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11 – Convolutional Networks for NLP
~~Input Convex Neural Networks Arxiv~~

This paper presents the input convex neural network architecture. These are scalar-valued (potentially deep) neural networks with constraints on the network parameters such that the output of the network is a convex

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function of (some of) the inputs. The networks allow for efficient inference via optimization over some inputs to the network given others, and can be applied to settings including structured prediction, data imputation, reinforcement learning, and others.

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~~[1609.07152] Input Convex Neural
Networks - arXiv.org~~

ative) Qfunction, $Q(s;a;)$ as an input convex neural network. In this case the action selection procedure can be formulated as a convex optimization problem $a^*(s) = \operatorname{argmin}_a Q(s;a;)$. This

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paper lays the foundation for optimization, inference, and learning in these input convex models, and explores their performance in the applications above. Our main con-

~~Input Convex Neural Networks - arXiv~~

In this paper, we propose to use

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specifically designed neural network to tackle the learning and optimization problem together. In the training stage, the proposed input convex neural network learns the mapping between the power injections and the voltages. In the voltage regulation stage, such trained

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network can find the optimal reactive power injections by design.

~~Input Convex Neural Networks for
Optimal ... arXiv.org~~

This involves learning two convex functions, by solving a novel minimax optimization. Building upon recent

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advances in the field of input convex neural networks, we propose a new framework where the gradient of one convex function represents the optimal transport mapping. Numerical experiments confirm that we learn the optimal transport mapping.

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~~Optimal transport mapping via input
convex neural networks~~

This paper presents the input convex neural network architecture. These are scalar-valued (potentially deep) neural networks with constraints on the network parameters such that the

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output of the network is a convex function of (some of) the inputs. The networks allow for

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arxiv.org~~

1) We constrain the neural network to have an input convex structure,

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which allows the model to generalize well. The guarantees on generalization performance are given in Theorem 5.4 and Theorem 5.5. These theorems prove our method can generalize to testing data points from spaces unseen in the training process. The effectiveness of

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~~A Convex Neural Network Solver for
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(b) The proposed input convex recurrent neural networks (ICRNN) architectures. In our control settings, we keep all weights in both networks nonnegative, while expanding the

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inputs with u . A. Single-shot problem

The following proposition states a

simple sufficient condition for a

neural network to be input convex:

Proposition 1. The feedforward neural

network in Fig. 2(a) is convex from

input to output given that all weights

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~~Optimal Control Via Neural Networks:
A Convex Approach arXiv~~

Input convex neural networks (ICNNs) are a class of scalar-valued neural networks $f(x; \theta)$ such that the function $x \mapsto f(x; \theta)$ is convex. The neural network architecture for an ICNN is as follows. Given an input x

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\mathbb{R}^d , the mapping $x \mapsto f(x; \theta)$ is given by a L -layer feed-forward NN using the following equations for $l = 0, 1, \dots, L - 1$:

~~Optimal transport mapping via input convex neural networks ...~~

ative) Qfunction, $Q(s; a; \cdot)$ as an input

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convex neural network. In this case the action selection procedure can be formulated as a convex optimization problem $a^*(s) = \operatorname{argmin}_a Q(s; a)$. This paper lays the foundation for optimization, inference, and learning in these input convex models, and explores their performance in the

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applications above. Our main con-

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Proceedings of Machine ...~~

Input Convex Neural Networks
(ICNNs) This repository is by Brandon
Amos, Leonard Xu, and J. Zico Kolter
and contains the TensorFlow source

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code to reproduce the experiments in our ICML 2017 paper Input Convex Neural Networks. If you find this repository helpful in your publications, please consider citing our paper.

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Contribute to [avisingh599/icnn](#) development by creating an account on GitHub.

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arXiv:2002.09773v1 [cs.LG] 22 Feb
2020 Convex Duality of Deep Neural
Networks Tolga Ergen 1Mert Pilanci
Abstract We study regularized deep
neural networks and introduce an
analyti

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This paper presents the input convex neural network architecture. These are scalar-valued (potentially deep) neural networks with constraints on the network parameters such that the output of the...

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ResearchGate

Abstract. This paper presents the input convex neural network architecture. These are scalar-valued (potentially deep) neural networks with constraints on the network parameters such that the output of the network is a convex function of

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(some of) the inputs. The networks allow for efficient inference via optimization over some inputs to the network given others, and can be applied to settings including structured prediction, data imputation, reinforcement learning, and others.

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Input Convex Neural Networks for
Optimal Voltage Regulation. Feb 19,
2020. The increasing penetration of
renewables in distribution networks
calls for faster and more advanced

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voltage regulation strategies. A promising approach is to formulate the problem as an optimization problem, where the optimal reactive power injection from inverters are calculated to maintain the voltages while satisfying power network constraints.

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~~Input Convex Neural Networks for
Optimal Voltage Regulation~~
Abstract. This paper presents the
input convex neural network
architecture. These are scalar-valued
(potentially deep) neural networks
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parameters such that the output of the network is a convex function of (some of) the inputs. The networks allow for efficient inference via optimization over some inputs to the network given others, and can be applied to settings including structured prediction, data

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imputation, reinforcement learning,
and others.

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This paper presents the input convex
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the network parameters such that the output of the network is a convex function of (some of) the inputs. The networks allow for efficient inference via optimization over some inputs to the network given others, and can be applied to settings including ...

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Training neural networks involves minimizing a complex, high-dimensional, nonconvex loss function, yet, empirically, it proves possible to produce useful models without rigorous global optimization.

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To provide insight into this observation, we analyze the structure of the loss-function landscape of deep neural networks and show that it features either a single funnel or low barriers between ...

~~Archetypal landscapes for deep~~

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~~neural networks | PNAS~~

In this paper, we propose a new neural architecture search (NAS) problem of Symmetric Positive Definite (SPD) manifold networks. Unlike the conventional NAS problem, our problem requires to search for a unique computational

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cell called the SPD cell. This SPD cell serves as a basic building block of SPD neural architectures. An efficient solution to our problem is important to minimize the ...

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The multi-volume set LNAI 12975 until 12979 constitutes the refereed proceedings of the European Conference on Machine Learning and Knowledge Discovery in Databases, ECML PKDD 2021, which was held during September 13-17, 2021. The conference was originally planned to

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take place in Bilbao, Spain, but changed to an online event due to the COVID-19 pandemic. The 210 full papers presented in these proceedings were carefully reviewed and selected from a total of 869 submissions. The volumes are organized in topical sections as

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follows: Research Track: Part I: Online learning; reinforcement learning; time series, streams, and sequence models; transfer and multi-task learning; semi-supervised and few-shot learning; learning algorithms and applications. Part II: Generative models; algorithms and learning

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theory; graphs and networks;
interpretation, explainability,
transparency, safety. Part III:
Generative models; search and
optimization; supervised learning;
text mining and natural language
processing; image processing,
computer vision and visual analytics.

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Applied Data Science Track: Part IV: Anomaly detection and malware; spatio-temporal data; e-commerce and finance; healthcare and medical applications (including Covid); mobility and transportation. Part V: Automating machine learning, optimization, and feature

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engineering; machine learning based simulations and knowledge discovery; recommender systems and behavior modeling; natural language processing; remote sensing, image and video processing; social media.

This text focuses on developing an

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intimate acquaintance with the geometric meaning of curvature and thereby introduces and demonstrates all the main technical tools needed for a more advanced course on Riemannian manifolds. It covers proving the four most fundamental theorems relating curvature and

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topology: the Gauss-Bonnet Theorem,
the Cartan-Hadamard Theorem,
Bonnet ' s Theorem, and a special
case of the Cartan-Ambrose-Hicks
Theorem.

This book constitutes the refereed
proceedings of the 20th International

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Conference on Integer Programming and Combinatorial Optimization, IPCO 2019, held in Ann Arbor, MI, USA, in May 2019. The 33 full versions of extended abstracts presented were carefully reviewed and selected from 114 submissions. The conference is a forum for researchers and

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practitioners working on various aspects of integer programming and combinatorial optimization. The aim is to present recent developments in theory, computation, and applications in these areas.

This monograph presents the main

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complexity theorems in convex optimization and their corresponding algorithms. It begins with the fundamental theory of black-box optimization and proceeds to guide the reader through recent advances in structural optimization and stochastic optimization. The

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presentation of black-box optimization, strongly influenced by the seminal book by Nesterov, includes the analysis of cutting plane methods, as well as (accelerated) gradient descent schemes. Special attention is also given to non-Euclidean settings (relevant

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algorithms include Frank-Wolfe, mirror descent, and dual averaging), and discussing their relevance in machine learning. The text provides a gentle introduction to structural optimization with FISTA (to optimize a sum of a smooth and a simple non-smooth term), saddle-point mirror

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prox (Nemirovski's alternative to Nesterov's smoothing), and a concise description of interior point methods. In stochastic optimization it discusses stochastic gradient descent, mini-batches, random coordinate descent, and sublinear algorithms. It also briefly touches upon convex

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relaxation of combinatorial problems and the use of randomness to round solutions, as well as random walks based methods.

This modern and self-contained book offers a clear and accessible introduction to the important topic of

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machine learning with neural networks. In addition to describing the mathematical principles of the topic, and its historical evolution, strong connections are drawn with underlying methods from statistical physics and current applications within science and engineering.

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Closely based around a well-established undergraduate course, this pedagogical text provides a solid understanding of the key aspects of modern machine learning with artificial neural networks, for students in physics, mathematics, and engineering. Numerous exercises

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expand and reinforce key concepts within the book and allow students to hone their programming skills. Frequent references to current research develop a detailed perspective on the state-of-the-art in machine learning research.

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This open access book presents the first comprehensive overview of general methods in Automated Machine Learning (AutoML), collects descriptions of existing systems based on these methods, and discusses the first series of international challenges of AutoML

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systems. The recent success of commercial ML applications and the rapid growth of the field has created a high demand for off-the-shelf ML methods that can be used easily and without expert knowledge. However, many of the recent machine learning successes crucially rely on human

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experts, who manually select appropriate ML architectures (deep learning architectures or more traditional ML workflows) and their hyperparameters. To overcome this problem, the field of AutoML targets a progressive automation of machine learning, based on principles from

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optimization and machine learning itself. This book serves as a point of entry into this quickly-developing field for researchers and advanced students alike, as well as providing a reference for practitioners aiming to use AutoML in their work.

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Control problems offer an industrially important application and a guide to understanding control systems for those working in Neural Networks. Neural Systems for Control represents the most up-to-date developments in the rapidly growing application area of neural networks and focuses on

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research in natural and artificial neural systems directly applicable to control or making use of modern control theory. The book covers such important new developments in control systems such as intelligent sensors in semiconductor wafer manufacturing; the relation between

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muscles and cerebral neurons in speech recognition; online compensation of reconfigurable control for spacecraft aircraft and other systems; applications to rolling mills, robotics and process control; the usage of past output data to identify nonlinear systems by neural

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networks; neural approximate optimal control; model-free nonlinear control; and neural control based on a regulation of physiological investigation/blood pressure control. All researchers and students dealing with control systems will find the fascinating Neural Systems for

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Control of immense interest and assistance. Focuses on research in natural and artificial neural systems directly applicable to control or making use of modern control theory Represents the most up-to-date developments in this rapidly growing application area of neural networks

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Takes a new and novel approach to
system identification and synthesis

These notes present a polished
introduction to tropical geometry and
contain some applications of this
rapidly developing and attractive
subject. It consists of three chapters

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which complete each other and give a possibility for non-specialists to make the first steps in the subject which is not yet well represented in the literature. The notes are based on a seminar at the Mathematical Research Center in Oberwolfach in October 2004. The intended audience

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is graduate, post-graduate, and Ph.D. students as well as established researchers in mathematics.

The book is devoted to the theory of gradient flows in the general framework of metric spaces, and in the more specific setting of the space

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of probability measures, which provide a surprising link between optimal transportation theory and many evolutionary PDE's related to (non)linear diffusion. Particular emphasis is given to the convergence of the implicit time discretization method and to the error estimates for

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this discretization, extending the well established theory in Hilbert spaces. The book is split in two main parts that can be read independently of each other.

Artificial Intelligence for the Internet
of Everything considers the

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foundations, metrics and applications of IoE systems. It covers whether devices and IoE systems should speak only to each other, to humans or to both. Further, the book explores how IoE systems affect targeted audiences (researchers, machines, robots, users) and society, as well as future

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ecosystems. It examines the meaning, value and effect that IoT has had and may have on ordinary life, in business, on the battlefield, and with the rise of intelligent and autonomous systems. Based on an artificial intelligence (AI) perspective, this book addresses how IoT affects sensing, perception,

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cognition and behavior. Each chapter addresses practical, measurement, theoretical and research questions about how these “ things may affect individuals, teams, society or each other. Of particular focus is what may happen when these “ things begin to reason, communicate and act

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autonomously on their own, whether independently or interdependently with other “ things . Considers the foundations, metrics and applications of IoE systems Debates whether IoE systems should speak to humans and each other Explores how IoE systems affect targeted audiences and society

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Discusses theoretical IoT ecosystem
models

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