Input Convex Neural Networks Arxiv

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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 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 imputation, reinforcement learning, and others.

[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) = 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 applications above. Our main con-

Input Convex Neural Networks - arXiv

In this paper, we propose to use 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 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 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.

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

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

A Convex Neural Network Solver for DCOPF with ... - arXiv

(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 inputs with u. A. Single-shot problem The following proposition states a simple suf?cient 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

Optimal Control Via Neural Networks: A Convex Approach - arXiv

Input convex neural networks (ICNNs) are a class of scalar-valued neural networks f (x; ?) such that the function x ? f (x; ?) ? R is convex. The neural network architecture for an ICNN is as follows. Given an input x ? R d, the mapping x ? f (x; ?) is given by a L-layer feed-forward NN using the following equations for l = 0, 1, …, L ? 1:

Optimal transport mapping via input convex neural networks ...

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Input Convex Neural Networks - 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 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.

GitHub - locuslab/icnn: Input Convex Neural Networks

Input Convex Neural Networks. Contribute to avisingh599/icnn development by creating an account on GitHub.

GitHub - avisingh599/icnn: Input Convex Neural Networks

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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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 (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.

Input Convex Neural Networks - NASA/ADS

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 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.

Input Convex Neural Networks for Optimal Voltage Regulation

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Input Convex Neural Networks - CORE

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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. 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 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 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 ...