Machine Perception

Fabio Bühler, fabuehle@ethz.ch

Version: 7. März 2024

1 Math Preliminaries

1.1 Matrix Calculus (Numerator Layout)

	Scalar y		ColVec $\mathbf{y}$ (size mx1)		Matr $\mathbf{Y}$ (size mxn)	
	Not.	Size	Not.	Size	Not.	Size
Scalar x	$\frac{\partial y}{\partial x}$	(1)	$\frac{\partial \mathbf{y}}{\partial x}$	(mx1)	$\frac{\partial \mathbf{Y}}{\partial x}$	(mxn)
ColVec $\mathbf{x}$ (nx1)	$\frac{\partial y}{\partial \mathbf{x}}$	(1xn)	$\frac{\partial \mathbf{y}}{\partial \mathbf{x}}$	(mxn)		
Matr. $\mathbf{X}$ (pxq)	$\frac{\partial y}{\partial \mathbf{X}}$	(qxp)				

2 Foundation Of Deep Learning

2.1 Neural Networks

Test

3 Deep Learning Architectures

3.1 Convolutional Neural Networks

4 Deep Learning For Computer Vision

4.1 Parametric Body Models

5 Generative Modeling

5.1 Auto Encoders

6 Deep Reinforcement Learning

6.1 Markov Decision Process