Berliner Colloquium für wissenschaftliche Visualisierung

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Stochastic gradient descent optimisation for fast medical image registration

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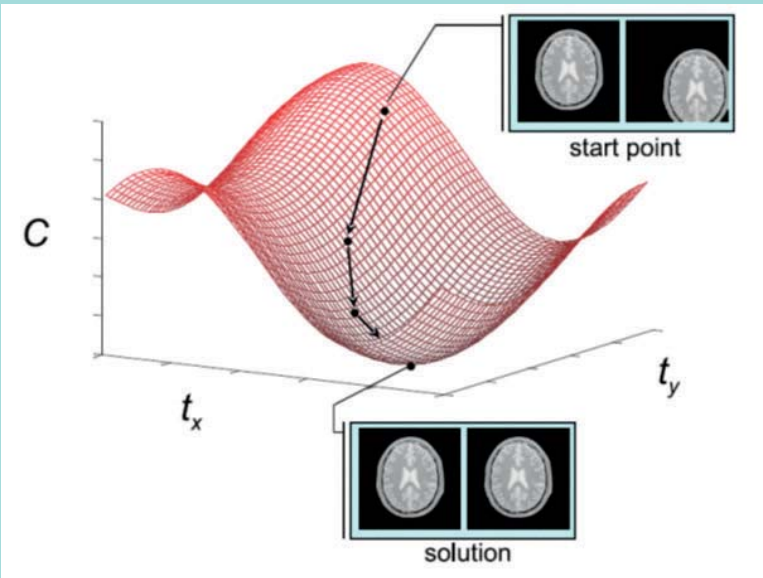
Erasmus MC - University Medical Center Rotterdam

Montag, 3. April 2017 um 17:15 Uhr
Zuse-Institut Berlin (ZIB), Takustraße 7, 14195 Berlin
Großer Hörsaal (Rundbau, Erdgeschoss)

Numerical optimisation algorithms are at the core of most intensity-based image registration methods. Efficient optimisation means efficient image registration. In this presentation I will focus on a particular class of optimisation methods: stochastic gradient descent (SGD). Based on SGD, highly efficient registration algorithms can be constructed. SGD is widely used in other fields as well, for example for deep learning to train the weights of a neural network.



I will discuss the basic principles of SGD and explain how it enables very fast image registration by random subsampling. Next, I will present several variations of the basic algorithm, introducing randomness in different components of the registration algorithm, aimed at achieving further acceleration or at improving registration accuracy.