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Geometry and Deep Learning

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Abstract

In an era when deep learning is used to solve all problems, it is often forgotten (or at least ignored) that two dimensional images arise as a result of a three dimensional world. This lecture will present the mechanics of Lie groups and their algebras as a way of encoding geometric information about the world and will then show how these methods can be combined with deep learning to create accurate robust systems. Topics such as parallel and cascaded learning, as well as modelling and estimation of uncertainty will also be discussed, along with methods for accelerating machine learned models for use in real-time interactive systems.