Literature Review: Machine Learning Applied to Dynamic Physial System.

August 2018

1 Abstract

2 Background

2.1 Modeling of physical systems

1. Traditional work in modeling physical systems
   Automated Design of Complex Dynamic Systems

2. Data driven design
   Theory-Guided Data Science: A New Paradigmfor Scientific Discovery from Data

   (a) Machine learning based approach

   (b) Deep learning based approach
   Towards a Hybrid Approach to Physical ProcessModeling
   Deep learning for universal linear embeddings of nonlinear dynamics
   Nonlinear Systems Identification Using Deep Dynamic Neural Networks
   Analyzing Inverse Problems withInvertible Neural Networks
   Deep Hidden Physics Models: Deep Learning ofNonlinear Partial Differential Equations
   How Can Physics Inform Deep Learning Methods inScientific Problems?: Recent Progress andFuture Prospects
   Learning New Physics from a Machine
   Nanophotonic Particle Simulation and Inverse DesignUsing Artificial Neural Networks
   Particle Track Reconstruction with Deep Learning
   Neural Message Passing for Jet Physics
   Physics-guided Neural Networks (PGNN):An Application in Lake

Temperature Modeling

(c) Reinforcement learning based approach
Large-Scale Study of Curiosity-Driven Learning
DeepMimic: Example-Guided Deep Reinforcement Learningof Physics-Based Character Skills

(d) Adversarial learning based approach
Tips and Tricks for Training GANs with PhysicsConstraints
Adversarial learning to eliminate systematic errors:a case study in High Energy Physics

2.2 Solving PDEs

Solving differential equations with unknownconstitutive relations as recurrent neural networks

2.3 Non-linear control

2.4 Motor control

2.5 Time series