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Provable guarantees for data-driven policy synthesis: a formal verification perspective

Machine learning solutions are revolutionizing AI, but their instability against adversarial examples – small perturbations to inputs that can drastically change the output – raises concerns about the readiness of this technology for widespread deployment. Formal verification, and particularly probabilistic verification, have become indispensable components of rigorous engineering methodologies to ensure system safety and dependability. Using illustrative examples, this lecture will discuss the role that formal verification technology can play in motion planning by providing provable guarantees on safety and optimality of neural network policies.