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Tutorial on Software Testing & Quality Assurance for Machine Learning Applications from research bench to real world PreviousChapterNextChapter Rapid progress in Machine Learning (ML) has seen a swift translation to real world commercial deployment. While research and development of ML applications have progressed at an exponential pace, the required software engineering process for ML applications and the corresponding eco-system of testing and quality assurance tools which enable software reliable, trustworthy and safe and easy to deploy, have sadly lagged behind. Specifically, the challenges and gaps in quality assurance (QA) and testing of AI applications have largely remained unaddressed contributing to a poor translation rate of ML applications from research to real world. Unlike traditional software, which has a well-defined software testing methodology, ML applications have largely taken an ad-hoc approach to testing. ML researchers and practitioners either fall back to traditional software testing approaches, which are inadequate for this domain, due to its inherent probabilistic and data dependent nature, or rely largely on non-rigorous self-defined QA methodologies. These issues have driven the ML and Software Engineering research communities to develop of newer tools and techniques designed specifically for ML. These research advances need to be publicized and practiced in real world in ML development and deployment for enabling successful translation of ML from research prototypes to real world. This tutorial intends to address this need. This tutorial aims to: [1] Provide a comprehensive overview of testing of ML applications [2] Provide practical insights and share community best practices for testing ML software Besides scientific literature, we derive our insights from our conversations with industry experts in ML. Chris Murphy, Gail E Kaiser, and Marta Arias. 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