Machine learning / AI in astronomy

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Fundamental physics, astronomy and cosmology are all now well into the era of giant, complex data. New ground-based telescopes, space telescopes, gravitational wave detectors and collider technologies are driving exabyte-scale data avalanches. These new datasets are providing transformative insights across these fundamental scientific disciplines, including the natures of dark matter and dark energy, the most violent cosmic explosions, supermassive black holes, the growth of large-scale structure in the Universe, and the fundamental laws and symmetries that govern all physics. These data avalanches have driven the development and application of a very wide range of machine learning / artificial intelligence (AI) technologies. In this talk I will review a few of (what I think are) the most interesting and useful applications of machine learning technologies in astronomy, focusing mainly but not exclusively on imaging data. In computer science terms this will be an entry-level talk, with a focus rather on sampling some of the breadth and versatility of machine learning applications for astronomy.