Understand and Learn from Humans towards Efficient and Adaptive Autonomous Robots

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Abstract: Autonomous robots, such as self-driving vehicles and household collaborative robots, possess great potential to enormously benefit the society. However, the current data / computational efficiency and adaptability of the autonomous robots pale in comparison to proficient humans in performing routine sensorimotor tasks such as driving and cooking, thereby severely hindering their widespread application in the real-world. This talk provides some recently developed novel computational algorithms for robot autonomy with principles and insights of neurobiological learning and brain intelligence. We describe novel learning architecture and algorithms, parallel to the brain's machinery, which can be adapted to various autonomous robots and significantly improve their data/energy efficiency and resilience. The presentation highlights innovative algorithmic designs and showcases experimental results, underscoring the effectiveness and potential applications of understanding and learning from humans in the realm of current and future autonomous robots towards enhanced efficiency and performance.