The increasing integration of distributed energy resources in the power systems challenges the conventional control methods. The techniques in smart grids give us the opportunity to develop and implement novel multi-agent optimization- and machine learning-based methods for the enhancement of computation efficiency, customer privacy maintenance, resilience, and reliability in power systems. In the first part of this presentation, we will have a quick review of my research works on the multi-agent optimal operation and resilience enhancement in power distribution systems and microgrids. In the second part, I will introduce a recently published paper, which proposes an asynchronous distributed leader-follower control method to achieve online volt/var control in the three-phase unbalanced distribution systems by optimally scheduling smart inverters. In the third part, I will explore my future research plan.