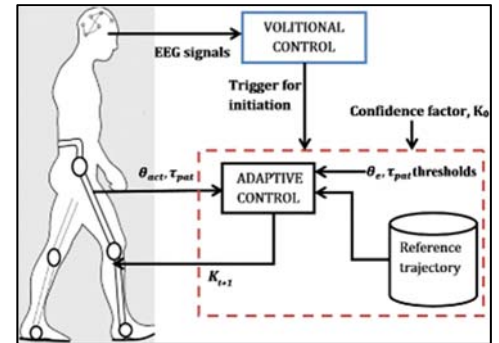
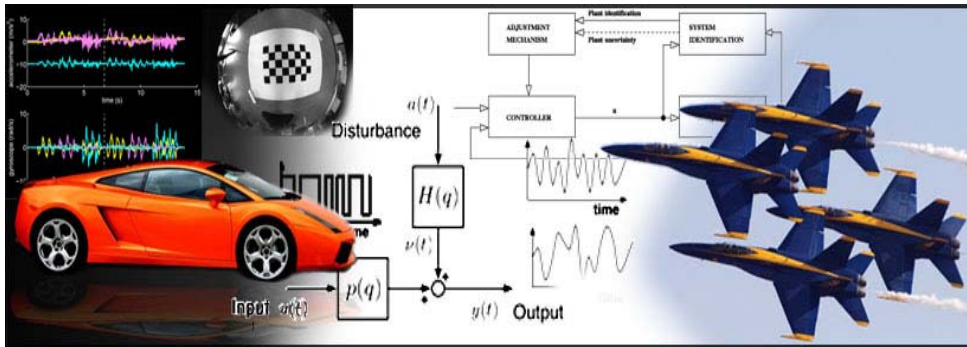


ECE 792 Adaptive Control and Reinforcement Learning

Fall 2018 Semester



Instructor: Dr. Aranya Chakraborty (Email: achakra2@ncsu.edu)

Lecture time: TTh 11.45 am-1 pm at MRC 313 Studio Room

Textbook: Gang Tao, *Adaptive Control Design & Analysis*, Wiley 2003

Reference book: P. Ioannou and B. Fidan, *Adaptive Control Tutorial*, SIAM 2006

Syllabus:

1. Review of nonlinear systems and Lyapunov stability theory
2. Parameter Estimation using least squares
3. Indirect adaptive control
4. Persistency of excitation
5. Model reference adaptive control (MRAC)
6. Backstepping, adaptive backstepping, over-parameterization
7. Instabilities in adaptation
8. Adaptive optimal control- reinforcement learning, Q-learning, neural networks

Course project will feature interesting applications of adaptive control to practical systems such as electric power grids, robotics, multi-agent networks, biomedical systems, human-in-the-loop adaptation, etc.