Diagnostic Evaluation

Supervisor: Dr. William Beksi
Mentor: Dr. Nicholas Gans

Bardia Mojra
UTA: 1000766739
October 19, 2022
Robotic Vision Lab
UTA Research Institute
University of Texas at Arlington

Committee

- Dr. William Beksi
- Dr. Nicholas Gans
- Dr. Yan Wan
- Dr. Vassilis Athitsos
- Dr. Manfred Huber
- Dr. Deok Gun Park

Research Interests

- Real-time robotic control and manipulation: deformable linear objects (DLO) manipulation
- Optimal control of nonlinear and chaotic systems: MPC-Koopman control and online system identification
- Real-time system identification from high dimensional data: DMD, piDMD
- Vision-based navigation and scene reconstruction: Xest (QuEst+VEst+QEKF), XSfM (X structure from motion from multiple images)
- Advanced and agile manufacturing: Digital twin, digital thread, photo-realistic and physics-based simulation

Course Work

CSE	5360	AI-1	B1	**B**
EE	5322	Intel. Control Systems	B2	**A**
CSE	5301	Data Structures	A1	**B**
CSE	5311	Algorithms	A2	**B**
CSE	6363	ML	C1	**B**
CSE	5306	Distributed Systems	A3	**B**
EE	5323	Nonlinear Systems	B3	**A**
CSE	5351	Parallel Processing	A4	**B**
EE	5325	Robotics	B4	**B**
MATH	5392	Math Modeling	B5	**--**
CSE	5368	Neural Networks	C2	**--**

CSE	6397	Research in CS		**P**
CSE	6397	Research in CS		**R**
CSE	6397	Research in CS		**R**
CSE	6397	Research in CS		**--**

requirements	
A:1-4	core courses
B:1-3	5000
C:1-3	6000
D:1-6	dissertation research

Requirements

A BS to PhD student must enroll for a minimum of 30 semester hours of coursework as follows:

Completion of 4 core courses with a minimum GPA of 3.5:

- CSE 5311 - Design and Analysis of Algorithms (completed) and three of the following:
  - CSE 5301 - Data Analysis and Modeling Techniques (completed)
  - CSE 5306 - Distributed Systems (completed)
  - CSE 5317 - Design and Construction of Compilers
  - CSE 5350 - Computer Systems Architecture or CSE 5351 - Parallel Processing (completed)
  - Completion of at least three 6000 level courses (9 hours) as PhD student at UTA: 6369, 6367, 6363

Research Direction

- Vision-based navigation and scene reconstruction: Xest (QuEst+VEst+QEKF), XSfM (X structure from motion from multiple images) → DMD as denoising solution to QuEst
- Real-time manipulation of deformable linear objects (DLO): piDMD+Koopman → develop end-to-end explicit modeling from data and optimal control via MPC-Koopman controller, dataset for a cable
- Digital twin (DT) on Nvidia Omniverse: Reinforcement learning, rapid data generation, and sim2reality transfer
- DT for rapid expansion to 2D and 3D deformable object: Introduce unit segment object for deformable, object oriented programming (OOP), and hierarchical state machine (HSM) → agile implementation, computationally optimal for a given hardware

› Thank you!