omanshu thapliyal

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education

phd | aeronautics & astronautics enginering

purdue university | 2019 - present

- research: human machine interaction, hybrid systems, reinforcement learning in estimation & control
- advisors: inseok hwang , arthur frazho
- collaborators: meeko oishi
- gpa: 3.83

ms | aeronautics & astronautics enginering

purdue university | 2015 - 2017

- thesis: kalman filtering for LTI systems with state dependent packet losses
- advisor: inseok hwang
- concentration: control systems
- gpa: 3.97

btech | aerospace engineering

iit kanpur | 2010 - 2014

- theis: UAV velocity estimation using optic flow
- advisor: abhishek
- gpa: 7.8/10

coursework

control systems

optimal control & estimation
guidance & control of aero. vehicles
linear systems analysis & synthesis
hybrid systems
stochastic processes
multidisciplinary design optimization
system-of-systems: modeling & analysis

stat/math

machine learning
statistical inference
bayesian applied decision theory
R/RHIPE & HADOOP
real analysis
linear algebra

work experience

mathworks inc. | application support engineer

mar - dec 2018

- implemented square-root algorithms in Kalman Filters used in all MATLAB tools
- provided technical support in MATLAB, Simulink & automatic code generation
- interviewed application support candidates in control design and automation

mathworks inc. | graduate technical intern

jan 2017 - jul 2017

- authored 6 new Simulink blocks & 2 block architectures for HDLCoder
- implemented Kalman Filter blocks in HDLCoder for release in MATLAB R2018a
- Won intern Hackathon; designed vision based IoT platform for parking lot monitoring on a Raspberry Pi 3B

purdue university. | graduate teaching assistant

2015 - 2017, 2019 - present

- instructor in control systems lab for 20 students
- conducted lecture on controller design in MATLAB for 100+ students
- guided 40+ students in aircraft design projects

projects

f-16 autopilot design in simulink | course project

spring 2016

- designed f-16 lateral & longitudinal autopilot in simulink
- implemented MIMO control as stability & command augmentation systems
- simulated semi-autonomous flight using a series of pre-decided 3D way-points

foothold based optimal control for monopod robot | course project

spring 2015

- designed mpc controller for a monopod hopping robot (Raibert hopper)
- simulated hybrid model to compute offline optimal control strategy

a study of smart grid resilience | course project

spring 2015

- implemented agent based model to study micro grid to smart grid evolution
- studied grid performance wrt resilience metrics & network growth models

boeing iit-k autonomous navigation system | research project

2012-2013

- built an autonomous, obstacle avoiding, jumping robot with boeing india
- designed robot chassis & torsion spring jumping mechanism
- achieved a jumping distance of 12 inches with a 500g payload

rubik's cube solving robot | research project

2011

- built an autonomous $3 \times 3 \times 3$ cube solving robot from any starting configuration
- obtained a minimum solving time less than 21 seconds

PURDUE AERONAUTICS & ASTRONAUTICS

teaching

purdue university | graduate teaching assistant
2015 - 2017, 2019 - present

- aae 364L: control systems lab
- aae 301: signal analysis
- aae 364: control systems analysis
- aae 251: aerospace design

skills

languages
python • MATLAB • r • c++

software tools
simulink • autodesk inventor • codevision avr • LaTeX• hadoop

general
languages
english • hindi
os
linux • windows
ides
spyder• vim • visual studio
web
hugo • basic html

personal interests

board games, board game design, d&d
reading history books
playing guitar, ukulele & harmonica
video games

research thesis

kalman filtering for lti systems with state dependent packet losses | graduate thesis
2016 - 2017

- formulated optimal estimator for intermittent measurements in lossy channels
- realized state estimators for sensor networks with time varying packet losses
- extended the optimal filter for state dependent packet losses; numerically validated the estimator for aircraft tracking subject to radar jammers

uav velocity estimation using optic flow | undergraduate thesis
2013 - 2014

- utilized real time video optic flow to extract translational velocities of the camera
- calculated optic flow field on a USB camera using Lucas-Kanade algorithm in C++
- obtained UAV velocities by decomposing optic flow fields

publications

journal papers

- kalman filtering with state-dependent packet losses, 2018
  o. thapliyal, j. s. nandiganahalli, i. hwang
  IET control theory & applications
- distributed state estimation for stochastic linear hybrid system over a sensor network, 2018
  r. deshmukh, o. thapliyal, c. kwon, i. hwang
  IET control theory & applications

conference papers

- predicting mode confusion through mixed integer linear programming, 2019
  v. sivaramakrishnan, o. thapliyal, a. vinod, m. oishi, i. hwang
  58th IEEE conference on decision and control, nice, france
- optimal state estimation in LTI systems with imperfect observations, 2017
  o. thapliyal, j. s. nandiganahalli, i. hwang
  56th IEEE conference on decision and control, melbourne, australia

academic achievements

recipient of boeing-IITK undergraduate research scholarship	2012-2013
placed in top 0.3% in the country in JEE	2010
represented india at 7th Asian physics olympiad at almaty, kazakhstan	2006

co-curricular activities

charity music performance at springdale barrel room, framingham, ma	2018
winner of intern hackathon at mathworks inc.	2017
mentored a group of 9 freshmen as a counseling service student guide	2011 - 2012
maintenance secretary, hostel executive committee	2011 - 2012
secretary, institute fine arts club	2011 - 2012
ngo volunteer, project aryabhat	2007 - 2010

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