MOHAMMAD Radi HAYAJNEH

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CAREER AND WORK EXPERIENCE

Assistant professor: Mechatronics Engineering Department, Sep 2016 - Present **The Hashemite University**

Teaching courses:

- Automatic control and Lab.
- Design of mechatronics systems.

EDUCATION AND RESEARCH

Ph.D.: Automatic Control and Operational Research, Jan 2013 - 27/05/2016 **University of Bologna**

Center for Research on Complex Automated Systems (CASY) - Italy

- Recipient of Erasmus Mundus Action 2 – JOSYLEEM Scholarship for a PhD Degree
- **Project 1**: participant in SHERPA Project for search and rescue operations.

My developments included:

- Mechatronic design of aerial quadrotor platforms for search and rescue applications.
- Sensors fusion and state estimations for Autonomous UAV.
- Guidance and navigation system design for autonomous aerial robots.

- **Project 2**: A novel design of autonomous smartphone based quadrotor.

- Novel Autopilot design in Android operation system.
- Developing a full Mechatronic system.
- Navigation system design and implementation.
- Implementations of nonlinear controllers for stability and tracking.
- Design of a guidance system to control the quadrotor remotely using a Twitter client

Thesis title: Nonlinear State Estimation and Control of Autonomous Aerial Robots: Design and Experimental Validation of Smartphone Based Quadrotor

Master of Science: Mechanical Engineering/ Mechatronics **Jordan University of Science and Technology**

Jordan, Feb 2010 - Aug 2012

- **Thesis title:** Strain Concentration Analysis for countersunk Holes in Orthotropic Plates
- Recipient of several assistantships.
- **Award:** Universities Robotics Competition (URC 2011), Philadelphia University, Jordan, (First Place).

Bachelor of Science: Mechanical Engineering/ Mechatronics **Jordan University of Science and Technology**

Jordan, Sep 2005 - Feb 2010

- **Project title**: Design and Implementation of Climbing Service and Maintenance Robot along Tubular Surfaces
- Ranking 11 out of 117 of class
- Recipient of several Grants from Ministry of Higher Education, Jordan

TEACHING EXPERIENCE

- **Teaching assistant:** Mechanical Engineering department, 2010 -2012
  Jordan University of Science and Technology, Jordan
  - Drawing Engineering and mechanical design.
  - Instrumentation and vibration Lab
  - Strength of materials Lab.

- Mechatronic systems design.
- Robotics

- **Student project supervision :** Automation Engineering, 2013-2016
  University of Bologna, Italy

Teaching Interests

Sensing And Navigation in Robotics, Control Systems Design, Control of Dynamic Systems, and Design of mechatronics systems, Dynamics, Automatic Control, System Modeling and Simulation.

---------- REFERENCES ----------

Prof. Lorenzo Marconi

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Dr. Wafa Batayneh

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---------- PROFESSIONAL SUMMARY ----------

- Experienced Research Engineer with extensive works on Unmanned Aerial Vehicles (UAVs) including navigation system designs and control and guidance system implementations in different civilian applications.
- Experienced with programming languages (Java, C, C++) and embedded systems for dynamic programming and developing autopilots on small aerial robots.
- Experienced with algorithm development and simulation environment Matlab/Simulink;
- Record in research and analysis experience working with multi-disciplinary groups in a high reliability environment.
- Experienced with sensory systems in robots and have principle of data acquisition and signal processing (IMU, Barometer, GPS).
- Skilled in utilizing 3-d modelling platforms to design and customize parts for both small and large assemblies for mechatronic systems Using 3D CAD platforms (Pro-Engineer, SolidWorks).
- Experienced with building different electro-mechanical systems such as VTOL aerial vehicles.

---------- PERSONAL SKILLS ----------

JOB-RELATED TOOLS

Professional Tools

- Mathworks MATLAB /SIMULINK
- Java/C Scripting
- 3-D CAD Modelling (Pro-E, SolidWorks)
- FE analysis
- Anroid
- Autopilots (PX4, ardupilot)
- Arduino

Additional Tools

- Microsoft Office (word, Excel, PowerPoint)
- Latex

Familiar with

- Robot Operating System (ROS)
- Linux

ORGANIZATIONAL SKILLS

- Quick learning and problem solving ability.
- Multitasks worker.
- Working well independently in diverse team environments.
- Leadership abilities.
- Creating networks with new people.
- Excellent research skills.
- Self-motivated and proactive in a result-oriented way.
- Creative and critical mindset towards technical problems.
- Organized and committed with deadlines

LANGUAGES

Arabic: Mother tongue

English:

UNDERSTANDING		SPEAKING		Writing
Listening	Reading	Interaction	Production	
C1	C2	B2	B2	C1

Evaluation based on European language levels C2: Highest level

Italian:

UNDERSTANDING		SPEAKING		Writing
Listening	Reading	Interaction	Production	
B1	B1	A2	A2	B1

Evaluation based on European language levels C2: Highest level

---------- MEMBERSHIPS ----------

IEEE membership (Graduate Student Member #92710923), Italy section. **2013- Current.**
IEEE robotics and automation society (RAS) membership. **2014- Current.**

---------- PUBLICATIONS ----------

Conferences

- Aldrovandi, L.; **Hayajneh, M**.; Melega, M.; Furci, M.; Naldi, R.; Marconi, L., "**A smartphone based quadrotor: Attitude and position estimation**," in *International Conference on Unmanned Aircraft Systems (ICUAS), 2015*, vol., no., pp.1251-1259, 9-12 June 2015.
- Batayneh W.; **Hayajneh M**.; and Rasras Z.; "**Design and Implementation of Climbing Service and Maintenance Robot along Tubular Surfaces**", *International Science and Technology Conference*, Famagusta, Turkish Republic of Northern Cyprus, 2010.
- Feras H. Darwish; Ahmad Alshyyab; **Mohammad Hayajneh, "Strain Concentration Analysis of Biaxialy Loaded Countersunk Hole in an Orthotropic Plate",** International Conference on Computational Mechanics CM13, UK, 2013.

Journals

- **Mohammad Hayajneh**, Feras H. Darwish, Ahmad Alshyyab, "**A Modeling Strategy and Strain Concentration Analysis for a Countersunk Hole in an Orthotropic Plate**", *International Journal of Design Engineering (IJDE), Jan 2014.*

---------- ONGOING PROJECTS ----------

1) **Research project: (25/3-25/11 2017)**

Title: Modeling and Simulation of Multi-Robotic System and Control Methods Developments

Objectives:

1) Develop adjustable automated models of quadrotors and mobile robots.
2) Implement different control methods for each model for stability and tracking.
3) Develop navigation algorithms such as mapping, path planning, and collision avoidance to allow for autonomous motion in a multi-agent system.
4) Design a Virtual Laboratory VL environment for multi-agent control simulator with handy human-machine interface to facilitate the access and modification on the models and control systems.

5) Validate the functionality of the created VL for research and educational drives.

2) Undergraduates Projects:

a) Trash cleaning mobile robot based on visual feedback system.

b) Controlling a wheelchair motion by movements of human head.

c) Design a prototype of self-driving car.