Curriculum Vita

Mohammed Ali AlMutawa

Teaching Assistant

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Personal Data

Nationality | Saudi

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Language Proficiency

Language	Read	Write	Speak
Arabic	Excellent - (Native)	Excellent - (Native)	Excellent - (Native)
English	Excellent - (secondarily)	Excellent - (secondarily)	Excellent - (secondarily)

Academic Qualifications (Beginning with the most recent)

Date	Academic Degree	Place of Issue	Address
2011-2017/01/24	Bachelor of Science in Electrical Engineering	King Fahd University of Petroleum and Minerals (KFUPM)	Dhahran – Eastern Province – Saudi Arabia

Professional Record: (Beginning with the most recent)

Job Rank	Place and Address of Work			Date
Teaching Assistant	IAU	Mechanical and Energy Engineering Department, College of Engineering – Imam Abdulrahman Bin Faisal University – Dammam – Saudi Arabia	KSA	2019/02/14 till date.
Master Student	KFUPM	Electrical Engineering – King Fahd University of Petroleum and Minerals (KFUPM)- Dhahran – Saudi Arabia	KSA	2017/09/17 to 2018/05/29
Teaching Assistant for EE 311 – Fundamentals of EE Design	KFUPM	Electrical Engineering – King Fahd University of Petroleum and Minerals (KFUPM) – Dhahran – Saudi Arabia	KSA	2017-11-13 to 2018-01-18
Facility Engineering Maintenance	Aramco	Aviation department – Dammam Aramco Airport – Dammam – Saudi Arabia	KSA	2015/06/08 to 2015/08/06

Scientific Achievements

Published Scientific Research (ORCID: 0000-0002-2727-3733)

#	Name of Investigator(s)	Research/Project Title	Date
1	Eng. Mohammed AlMutawa Nasir G. Hariri Ibrahim Sufian Osman Ibrahim K. AlMadani Abdulilah M. Almahdi Sajid Ali	Experimental Investigation of Azimuth- and Sensor-Based Control Strategies for a PV Solar Tracking Application	2022-05-09

Abstract
Today, the world continuously investigates the promising potential of advanced and optimized technologies for harvesting green renewable energy sources, such as a solar tracking system (STS). This study presents an actual implementation of a single-axis solar tracking system (SAST), where an azimuth control scheme is developed to precisely follow the sun's orientation. This is demonstrated by computing in real-time the optimal azimuth angle based on the actual altitude, date, and time using an embedded microcontroller. At the same time, experimental comparisons using the azimuth-based control method compared with the proportional, integral, derivative (PID) control scheme and fixed-tilt PV systems (FTPV) are derived. Experimental results show that the developed azimuth solar tracker can autonomously follow the sun's orientation primarily from time and location-based information and independent from the actual solar irradiance. Nevertheless, the electrical energies gained from all three tested systems revealed that using the sensor-based STS would increase the net energy production by 12.68% compared to the azimuth-based SAST, with an energy production increase of 7.7%. In addition, energy consumption by the azimuth-based STS is 65% greater than the energy consumption of a sensor-based STS due to the continuous movements of the tracker, regardless of the increase or change in power production within short periods

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Unpublished Scientific Research and Projects
(In Chronological Order Beginning with the Most Recent)

#	Name of Investigator(s)	Research/Project Title	Date
1	Eng. Mohammed AlMutawa	Comparing DC Optimal Power Fow Solution Using Shuffled Frog-Leaping Algorithm (SFLA) and Genetic Algorithm (GA)	2018-12-23
2	Eng. Mohammed AlMutawa	Compartive Study of DC Optimal Power Flow (DC OPF) - Scenarios Based Study with Integration of Wind Energy	2018-12-21

3	Eng. Mohammed AlMutawa and a classmate	Shuffled Frog-Leaping Algorithm (SFLA)	2018-11-07
4	Eng. Mohammed AlMutawa	Design a Photovoltaic Module and Applying Perturb and Observe Maximum Power Point Tracking (MPPT) Algorithm	2018-05-16
5	Eng. Mohammed AlMutawa	Economic Dispatch and Unit Commitment Approach for Power System Planning of Thermal Units and Renewable Energy Resources with LP Method for Optimization	2018-05-11
6	Eng. Mohammed AlMutawa	Implementing Animal Words Puzzle Game using Verilog Language in FPGA Platform	2018-01-08
7	Eng. Mohammed AlMutawa	Voltage Difference Transconductance Amplifiers	2018-01-06
8	Eng. Mohammed AlMutawa	The Effect of Load Current on a Three-Phase Fault	2017-11-16
9	Mohammed AlMutawa	Studying Airfield Lighting System, Refueling System and Instrument Landing System with a Focus on Shaybah Upgrade Electrical Study	2016-05-24
10	Mohammed AlMutawa and a classmate	Elevator Control System using Logixpro and Siemens-STEP 7 Lite v3.0 simulation software	2016-05-10
11	Mohammed AlMutawa, and four other classmates.	Project Title Stretchable Printed Circuit Boards for Digital and Analog Applications	2016-04-24
12	Mohammed AlMutawa, and four other classmates.	Design of A Variable DC Power Supply	2015-05-17
13	Mohammed AlMutawa	Robotic Control System Technology: the Clinical Applications of the Exoskeleton Structure to Help Disabled People Walk	2014-12-02
14	Mohammed Almutawa	The Fukushima 2011 Nuclear Disaster: What Happened and Lessons for the Future	2013-05-06
15	Mohammed AlMutawa	Wave Energy	2012-07-23

Contribution to Scientific Conferences and Symposia

#	Conference Title	Place and Date of the Conference	Extent of Contribution
1	Second Solar & Wind Energy Symposium & Exhibition – on Renewable Energy Training – a National Need by Department of Mechanical & Energy Engineering	Colleage of Engineering – Imam Abdulrahman Bin Faisal University 2019-03-12 to 2019-03-14	Orgznizer and assistance

Membership of Scientific and Professional Societies and Organizations

- Member of Institute of Electrical and Electronics Engineers (IEEE)

Teaching Activities

Undergraduate

#	Course/Rotation Title	No./Code	Extent of Contribution (no. of lectures/Tutorials. Or labs, Clinics)
1	Control Systems	ENRG 405	14 labs per semester. Which is 14 × 3 = 42 of total labs tought for T2191 & T2201. Which is equivalent to 42 × 2 = 84 of contact hours.
2	Measurements and Data Acquistion	ENRG 312	14 labs per semester. Which is 11 + 14 × 3 = 53 of total labs tought for T2182, T2192 & T2202. Which is equivalent to 53 × 2 = 106 contact hours.
3	Electrical Circuits	ENG 331	14 labs per semester. Which is 14 × 2 + 14 × 2 + 14 × 2 = 84 of total labs tought for T2191, T2201 and T2202. Which is equivalent to 84 × 2 = 168 contact horus.
4	Introduction to Electrical Power Systems	ENRG 411	14 labs per semester. Which is 11+ 14 × 2 + 14 × 2 = 67 of total labs tought for T2182, T192 and T2202. Which is equivalent to 67 × 2 = 134 contact horus.

5	Embedded Computing & Remote Sensing	ENRG 563	14 labs per semester. Which is 7 + 14 = 21 of total labs tought for T192 and T2201. Which is equivalent to 21 × 2 = 42 contact hours.
6	Solar Power System Design	ENRG 557	Assistaing the main instractor conducting for the first time (T2192) this elective course in a form of Tutoriing sessions for 7 weeks. A total of 7 × 4 = 28 contact hours.
7	Electric Machines	ENRG 562	Assistaing the main instractor conducting for the first time (T2192) this elective course in 2 weeks. A total of 2 × 2 = 4 contact hours.
8	Senior Design Project I	ENRG 503	General assistance for the instractor and his student in T2191.
9	Senior Design Project II	ENRG 509	General assistance for the instractor and his student in T2192. Conducting a 2 hours tutorial in Fuzzy Logic and its exercises.
10	Engineering Economics	ENG 412	General assistance for the instractor and his student in T2182.
11	Electromechanical Systems	ENG 422	General assistance for the instractor and his student in T2182.
12	Directed Research	ENRG 565	General assistance for the instractor and his student in T2182.

Brief Description of Undergraduate Courses Taught: (Course Title – Code: Description)

1	**Control Systems – ENRG 405:** The course lab is designed for undergraduate students in energy engineering. The lab nature will be heavily relying on the coding skills that you might obtain in computer programming courses. The main tool used in this lab is MATLAB software. Its programming language is similar to C++. The lab will cover some main dynamic modeling and simulation of system response using MATLAB and Simulink. The use of Simulink will be of much help in designing block diagrams of closed-loop dynamic systems. Students are encouraged to install MATLAB on their personal computers to complete their experiment work. Students might also be introduced to LabView for designing control systems. The course lab manual was collected and written completely by Eng. Mohammed AlMutawa. Some online video lectures was performed and recorded by Eng. Mohammed.

2	**Measurements and Data Acquisition – ENG 312:** Introduction to Measurements and Data Acquisition Systems with emphasis on analog electronics, digital electronics, sensors and transducers, and actuators. The course is intended to provide the student with foundational concepts in measurements and data acquisition systems and practical familiarity with the commonly used electronic test and measurement instrumentation. Elementary techniques for the characterization of systems' responses. Fundamental aspects of data acquisition and data conversion (e.g. measuring position and speed, differential transformer, digital optical encoder, resistance thermometer, pressure, and flow Measurement). The course lab relies on hands-on experience with electronics components, Multisim simulation, and LabVIEW with myDAQ platform as a data acquisition device.
3	**Electrical Circuits – ENG 331** The course lab is designed for undergraduate students in energy engineering. The lab nature will be hand-on experience on small electronic components to build electrical circuits studied in the theory part. The course also will utilize one of the common electronic simulation software called Multisim to emulate the electrical system/circuit studied in the lab. The lab will cover basic voltage, current measurement techniques, and electrical circuit theory analysis. Will proof Ohm's law, power measurements, series, parallel circuits, KVL, KCL, mesh & nodal, superposition, Thevenin & Norton, MPT theory, and DC & AC circuits. Simulation with Multisim will be integrated during experiment work to re-enforce the result obtained during the lab. There will be some tutorials on how to use MATLAB/Octave to solve linear system encounter in circuit analysis. The course lab manual is updated and some selected experiments were made by Eng. Mohammed AlMutawa. A course project was added for students with cooperation with the Biomedical Engineering department. The following project titles "Studying LDR and its behavior under different surrounding light conditions" and "Studying PV modules and using them for simple applications with the help of Arduino board (Nano or Uno)" were proposed and developed by Eng. Meernah Alabdullah and Eng. Mohammed AlMutawa respectively.
4	**Introduction to Electrical Power Systems – ENRG 411** This course is designed for undergraduate students in the field of electric power systems and electrical to mechanical energy conversion. Electric power has become extremely important to transmit and transform energy in industrial, military, and transportation applications. Electric power systems are also used in solar systems, wind energy generation, and hydroelectric generation. Lab experiments were conducted using PSIM, and PowerWorld simulation software. Special converters and inverter teaching units were used in the lab for the power electronics part of the course.

5	**Embedded Computing & Remote Sensing – ENRG 563** The course is designed for undergraduate students in energy engineering. Topics to be covered: Embedded Computing Vs. Generic PC Computing, Controllers, Dedicated Computing System, Basics for Input/output interfacing with MCU, Real-Time Operating System (RTOS) Structure, Hardware-Software Interaction, Interface technologies with MCU (Analog/ Digital, SPI, Serial Ports, I2C...etc). Applications, Data loggers, Control System, Signal Control, Navigation System. The lab cover mainly, Arduino IDE and Arduino MCU's architecture. I/O and ADC/DAC interface with external devices. Using I2C and SPI protocol with LCD, SD module, and accelerometer. Building an application with a DC-servo motor and understand its concept by interfacing it with Arduino. Experimenting with remove data sensing and transmitting. The lab instructor Eng. Mohammed AlMutawa and the main instructor Dr. Nasir Hariri, providing all the support needed for students for their course final design project.
6	**Solar Power System Design – ENRG 557** Introduction to solar power, solar energy systems, solar cell and PV systems, theoretical principles and practical design aspects of solar energy systems, applications, solar cells, fabrication of solar cells, PV module construction, and the design of a PV system using state of the art commercial software.
7	**Electric Machines – ENRG 562** Basic principles of electromechanical systems and machines. To test the circuit models and parameters for single-phase and 3-phase transformers. Fundamentals of DC machines; characteristics and circuit models of DC motors. Fundamentals of AC machines; theory and operation of synchronous machines and induction motors. AC and DC motors principles and their applications; introduction to magnetic circuits, transformers, and electrical machines, with laboratory applications.
8	**Senior Design Project I – ENRG 503** This course is an integral part of the final project program. The course emphasizes the identification and development of practical and technical ideas and concepts that are to be researched, analyzed, programmed, and documented in an effective and efficient professional report. The project title for this group of students was "Design of PV maximum Power point Tracker Using Fuzzy Logic Control", in T2192 (2020).
9	**Senior Design Project II – ENRG 509** This course provides individual research in a field of special interest under the supervision of a faculty member as a requirement for the B.Sc. degree, culminating in a written report/thesis. The experiment is run, data is analyzed, and conclusions are sought in the second semester.
10	**Engineering Economics – ENG 412** The course is designed to educate the students about the principles of economics when applied to the engineering field. Topics include basic concepts of engineering economics, economic equivalence, time value of money.

11	**Electromechanical Systems – ENG 422** This course will cover the principles and applications of electrical components of constructed facilities, basic electrical circuit theory, motors, control, codes, and building distributed systems. Principles and applications of mechanical systems, HVAC system design, components, and system selection criteria including room air distribution, air quality standards, ducting and piping systems, control systems will also be presented along with fire fighting systems, components, code, and standards for distribution systems, fire alarm, and detection systems as well as vertical transportation systems.
12	**Directed Research – ENRG 565** This course is for active research projects that could be taken as a one-time Elective Special Topic. It is only open to students having a GPA of 3 or above and consent of the instructor is mandatory. Faculty conducting the course must submit a formal well written program of research work

Mentoring and Tutoring

#	Mentor/Tutor	Trainee	Topic(s)	From	To
1	Eng. Mohammed AlMutawa	Mr. Naif Al-Rubai, Mr. Osama Asker, and Mr. Faisal AlZahrani	1. MATLAB and Simulink. 2. Soldering and Basics of Electrical Wiring and Connecitons. 3. Basic of Electronics. 4. Intro to Arduino IDE.	2020-08-23	2020-09-03
2	Eng. Mohammed AlMutawa	Students of the first section in ENG 331 in T2191	1. Reviewing circiut analysis teachnicse. 2. Solveing numbers of circuits and discussing students' solving problem issues.	2019-12-14	2019-12-14 (2 Hours)
3	Eng. Mohammed AlMutawa	Students of the second and third section in ENG 331 in T2191	1. Reviewing circuit analysis teachnicse. 2. Solving freqntly asked qusitons in circiut theory. 3. Engagying students to copoprate in solving problems.	2019-12-15	(6.5 Hours)

Supervision

#	Supervisor	Member(s) of the Group	Task(s)/Topic(s) and Organization	From	To
1	Eng. Mohammed AlMutawa and Dr. Nasir Hariri	Mr. Naif Al-Rubai, Mr. Osama Asker, Mr. Faisal AlZahrani, and Mr. Kamal Nayel	Robotic Arm Workshop – College of Engineering - IAU	2021-02-16	Till date
2	Eng. Mohammed AlMutawa and Dr. Nasir Hariri	Mr. Naif Al-Rubai, Mr. Osama Asker, and Mr. Faisal AlZahrani	Running FabLab and Electrical Labs – College of Engineering - IAU	2019-12-14	Till date

Administrative Responsibilities, Committee and Community Service **(Beginning with the most recent)**

Committee Membership

#	From	To	Position	Organization
1	2020-12-31	Till date	Member in Public Relations and Media Committee.	Colleage of Engineering – Imam Abdulrahman Bin Faisal University
2	2020-12-31	Till date	Member in a Temporary Committee to Develop the College of Engineering Website	Colleage of Engineering – Imam Abdulrahman Bin Faisal University
3	2020-11-20	Till date	Member in the Inventory System Development and Asset Management Committee at the College of Engineering	Colleage of Engineering – Imam Abdulrahman Bin Faisal University
4	2020-10-01	Till date	Member in Committee of Alumni and Professional Development.	Colleage of Engineering – Imam Abdulrahman Bin Faisal University
5	2020-08-27	Till date	Member in FabLab Committee	Department of Mechnical and Energy Engineering - Colleage of Engineering – Imam Abdulrahman Bin Faisal University

6	2020-08-27	Till date	Member in Computer Programs and Engineering Softwares Committee	Department of Mechnical and Energy Engineering - Colleage of Engineering – Imam Abdulrahman Bin Faisal University
7	2020-08-27	Till date	Member in Laboratory Committee	Department of Mechnical and Energy Engineering - Colleage of Engineering – Imam Abdulrahman Bin Faisal University
8	2019-12-01	2020-02-01	Member in Preparation Committee for the Visit of HE Minister of Education to college of Engineering workshops and labs	Colleage of Engineering – Imam Abdulrahman Bin Faisal University
9	2019-03-06	2020-08-27	Member in Summer Training Committee	Department of Mechnical and Energy Engineering - Colleage of Engineering – Imam Abdulrahman Bin Faisal University

Volunteer Work

#	From	To	Type of Volunteer	Organization
1	2019-02-02	2019-02-02 (8 Hours)	Elderly Persons Program– KSA	King Fahd University of Petroleum and Minerals (KFUPM) – Dhahran – Saudi Araiba
2	2018-02-16	2018-02-16 (8 Hours)	Hospital Visits to Help Patients with Disabilities (Mainly Autistic Patients) – KSA	King Fahd University of Petroleum and Minerals (KFUPM) – Dhahran – Saudi Arabia
3	2011-09	2011-09 (8 Hours)	Repaint Walls of an Old school in Al-Thoghba – KSA	King Fahd University of Petroleum and Minerals (KFUPM) – Dhahran – Saudi Araiba

Personal Key Competencies and Skills: (Computer, Information technology, technical, etc.)

1	Excellent in Microsoft office (Word, Excell, Outlook, PowerPoint, etc….)
2	Skilled in Engineering Softwares as below: • MATLAB and Simulink (2 years of teaching experience) • Multisim (2 years of teaching experience) • LabVIEW (1.5 years of teaching experience) • PSIM (2 years of teaching experience) • Arduion IDE (1 year of teaching experience) • PowerWorld • GAMS – General Algbric Modeling System • PSPICE – Personal Simulation Program with Integrated Circuit Emphasis • C Language • Assembly Language • Python (bigneer) • DipTrace • 3D printing, and moduling. • Thinkercad • SolidWorks • Inkscape Sketch • Auto CAD 2D Sketch • Cadence & HSPICE • Logixpro and Siemens-STEP 7 Lite v3.0 PLC ladder programming language simulation software. • Visual Studio Code (Pythonk cmd, PowerShell, and othes).
3	Other general software and teaching platforms like: • Mendeley Desktop • Zoom meetings and Microsoft Teams • Blackboard • SAP PM modul (bigneer) • Making good quality surveys and quizzes (using MS Form) • AutoHotkey (beginner-reading and modifying codes) • Video Recording and Editing (beginner to intermediate) • YouTube channel – running an educational channel for the Electrical Engineering discipline.
4	Typing Speed: a top speed of 120 WPM and an average of 50 to 60 WPM
5	Member of Toastmasters KFUPM Pranch – Communications & Professional Development
6	Leadership, work commitment, and perfectionist quality
7	Building electronics project as a hobby
8	Inventory and data collection and organization