Hesham Hussien

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Education	• **[2019-now]**
	 A **PhD student** in Computer Systems, Faculty of Computers and Information Science, Ain Shams University (ASU), Cairo, Egypt.
	 Topic: "Deep Learning in advanced vehicle driving systems".
	• **[2016-2019]**
	   MSc in Computer Systems, Ain Shams University (ASU), Cairo, Egypt.
	   Thesis: "Developing a scheduling framework for real time operating systems",
	   An adaptive hierarchical scheduling framework (AHSSF) for a set of independent concurrent applications, which composed of set of tasks with different criticality. It ensures temporal partitioning between independent applications with budget adaption feature, where CPU time of each application is periodically and dynamically assigned. It implemented in kernel of TI-RTOS on a resource constrained platform, experiments show that it enhances the performance of our previously proposed AHSF-EDF during overload conditions and ensures that critical tasks assigned to a server meet their deadlines at the expense of other tasks assigned to the same server.
	• **[2014-2015] Pre-Master:** Faculty of Computers and Information Science, Ain-Shams University, Total Grade: **Very Good** (**B+**).
	• **[2009-2013] Bachelor:** Faculty of Computers and Information Science, Ain-Shams University, Total Grade: **Very Good**, Graduation Project Grade: **Excellent**.

Experience	• **[Apr/2016 – now]:** Teaching Assistant at Faculty of Computers and Information Science, Ain-Shams University. • **[Jan /2018 - now]:** Full Stack Developer at quTIP Company – Full Time. • **[Jun /2016 - Jan /2018]:** Full Stack Developer at Innovola Company – Full Time.
Publications	• Hesham Hussien, Eman Shaaban and Said Ghoniemy. "Adaptive Hierarchical Scheduling Framework for TiRTOS". In The International Journal of Embedded and Real-Time Communication Systems (IJERTCS), Volume 10, Issue 1, Article 7, 2019. 121117-045223. • Hesham Hussien, Eman Shaaban and Said Ghoniemy. "Mixed-criticality Hierarchical Scheduling for TI-RTOS". The 13th IEEE International Conference on Computer Engineering and Systems. (ICCES 2018).
Research Interests	• RTOS and Memory Protection of Embedded systems. • Embedded systems (ADAS).

Technical Skills

Languages:
- C/ C++, C#, JavaScript, Python.
- Prolog, Assembly (ARM, Intel, MIPS, AVR and PIC) and VHDL.

Protocols:
- CAN, LIN, PWM, SPI, I2C, and UART.

Database Management Systems:
- MS SQL.

Technologies:
- AUTOSAR, jQuery, react, Angular, Entity Framework, Ado.Net, MVC, MVVM, Web API, SQL server reporting service, HTML, CSS, JSON, AJAX, and SignalR.

Conceptual programming knowledge:

Machine Learning, Deep Learning, Object Oriented Programming, Real time operating system (TI-RTOS, Micrium-uCOS-II and FreeRTOS), Data Structures, Design Patterns, Algorithms, Software Engineering, System Analysis and Design, Database designing concepts, Computer networks, Computer Security, Computer Vision, Wireless Sensor Network, Hacking, Principles of Robot Motion, Distributed Computing, Parallel Programming (OpenMp, MPI, CL, Main concepts and analysis).

Embedded Projects

- **Designing and Developing a new scheduling framework for TI-RTOS (MSc)**
  in kernel of TI-RTOS using TivaTM C Series TM4c123GXL Evaluation kit.
- **Autonomous Car Based on CAN Protocol with IoT Application**
  This project aims to design an autonomous vehicle that able to sense the surrounding environment, avoiding obstacles based on DL model. The self-driving vehicle can move in certain path between two points A and B autonomously.
  Tools: Raspberry pi, Atmega328p, IMU, Camera, GPS, and Sensors.
- **Auto-parking Car**
  This project aims to design an autonomous vehicle that able to park. The self-driving vehicle can move in the parking area and parking autonomously based on DL models.
  Tools: Raspberry pi, Atmega328p, CAN ICs, Camera, and Sensors.
- **Smart-Irrigation (Web, Arduino, IOT)**
  1. It is a smart irrigation system consists of a group of intelligent sensors and microcontrollers which enables an easy and cheap control for the whole Irrigation processes through a hosted website.
  2. Statistics and abnormal sensors' reading are transmitted immediately through a predefined Web-API to display a live system status.
  Technologies: AVR c programming, ASP.NET, MVC, Web API, JS, MS SQL and Entity Framework.
  Tools: Arduino (Atmega328p), Wi-Fi modem ESP-8266 and Sensors.
- **Memory Protection - FreeRTOS (MINION Approach)**
  keep all software modules in the same privilege mode. Unlike the current architecture of real-time MCS that runs all software modules in the privileged mode, modified system runs them in the unprivileged mode. However, view switcher, is the only program that

runs in the privileged mode (which has the whole map of all Tasks) To reduce the context switches and keep system secure.

Tools: STM32.

- **CAN Car - FreeRTOS**

  Technologies: AVR c programming, PWM, and CAN.

  Tools: Arduino (Atmega328p), MCP2515 CAN controller, MCP2551 CAN Transceiver, LCD, DC Motors, Ultrasonic sensor and LM35 sensor.

- **Kids Care for special Ability Parents (deaf parents)**

  Which monitoring the kid's heartbeat pulses, temperature and screaming. And informing parents by blinking a led in the abnormal situations.

- **Home Safety System (HSS)**

  HSS presents a solution which monitoring the safety of a house where,

  1. HSS monitors the temperature of room and displays it on LCD.

  2. HSS keep monitoring the motion in a room for a specific period (for e.g., 1:00 AM to 6:00 AM) depending on RTC.

  3. The specified period (for e.g., 1:00 AM to 6:00 AM) is configured by the system user on the startup system and settled on eeprom to overcome electricity interruption.

  4. For abnormal situation (motion or fire), HSS will fire the alarm for 15 seconds.

  Tools: Arduino (Atmega328p), LCD, PIR Motion Sensor, LM35, RTC, alarm and buttons.

- **Mp3 player - FreeRTOS**

  Tools: Arduino Uno, Speaker, Buttons, LCD and SD-Card.

- **Patient Monitoring System**

  Tools: Arduino (Atmega328p), LCD, Heartbeat sensor, Pressure sensor and LM35 sensor and Buttons.

- **Microwave**

  Tools: Arduino (Atmega328p), 7 segments, LEDs, DC motor and buttons.

- **Prayer and calendar system with RTC**

  Technologies: AVR c programming, PWM, and I2C.

  Tools: Arduino (Atmega328p), LEDs, RTC DS1307, alarm and buttons.

- **Fire Detection and Control System**

  Tools: Arduino Uno, LM35, LCD, Alarm and Fan.

- **IR Car**

  Tools: Arduino Uno, IR Sensors, Batteries, H-bridge and DC motors.

- **Internet Download Manager IDE**

  Tools: Arduino Uno, Arduino WiFi Shield, Buttons and LCD.

Teaching Courses

- **Microcontrollers (4th year students and HTI 10TH of Ramadan)**: Deliver on fundamental concepts and equipping the students with the skills required to develop microcontroller-based systems. This comprehensive course provides covers the details about Atmel's 8-AVR microcontroller technology, including the pin diagram, architecture, interrupts and timers, and assembly language. Participants also learn about the I/O device interface covering Uart, ADC, SPI and I2C protocols, PWM and others. **Laboratory:** Hands-on using AVR studio. **Book:** "AVR Microcontroller and Embedded

Systems by Mazidi".

- **Advanced Microcontrollers (4th year students)**: Target the fundamental concepts of RTOS such as multitasking, context switches, memory management, software interrupts, hardware interrupts and others. **Laboratory:** Hands-on FreeRTOS by Porting the FreeRTOS on Arduino Uno and Atmel studio IDE. **Guide:** "Mastering the FreeRTOS™ Real Time Kernel".

- **Computer Architecture (3th year students)**: Essential VHDL targeting RTL synthesis done right, instruction set architecture (emphasis on the MIPS processor), design verification with VHDL test benches. **Laboratory:** VHDL RTL design, synthesis, implementation, verification by simulation and testing of a RISC basic MIPS processor instruction on a XILINX FPGA platform.

- **Digital Logic Design (2nd year students)**: Digital system technology, digital integrated circuits, Boolean algebra, logic circuits and minimization, combinational circuit analysis and design, XOR gates and their applications (parity circuits, comparators), coding, decoders, encoders, demultiplexers, multiplexers, arithmetic and logic circuits (adders, subtractors, ALUs, multipliers), iterative logic arrays, three-state buffers, latches and flip-flops, finite state machine, parallel and shift registers, counters, sequential digital systems.

Personality	**Date of Birth.** February 9, 1992 **Nationality.** Egyptian **Military Status.** Completed in March 2016 **Languages.** Arabic (Native language), English (Very Good) **Marital status.** Married
References	**REFERENCES UPON REQUEST**