AMNEH JABER

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Work Experience:

- **Research & Development Engineer at Alarko | Carrier – Kocaeli, Türkiye**   Feb 2021 to Present
  - Developed a model-based component matching system for Direct Expansion (DX) coils:
    - Defined a set of parameters related to the geometry and operating conditions of the DX coils.
    - Developed python simulations and used them to perform detailed air and refrigerant side capacity calculations for each DX coil we manufacture.
    - Found a suitable distributor for each DX coil based on capacity per distributor and circuit number.
  - Conducted simulations of water coils under various Eurovent test conditions for Fan Coil Units using Python.
    - Defined simulation parameters related to coolant, fin material, tube material properties, as well as FCU sizes, operating modes, and row types.
    - Iterated through each FCU coil data and performed calculations under various Eurovent test conditions.
    - Parsed simulation data and created scripts to export summarized Excel reports using Python.
  - Developed and implemented new methods that significantly improved the product design and system optimization process by integrating Python scripts with Excel datasheets.
    - Technically evaluated deviation permits and product design changes and ensured the continuity of Eurovent certification on fan coil units.
    - Improved the modular selection programs for Airovision and WinCoil products by developing improved model-based logic that pairs customer application performance requirements with matching products.
  - Performed analysis, defined requirements, and supported aeraulic and thermal testing on fan coil units.
  - Worked on defining new equipment calibration and operation procedures, and organized work among lab personal to ensure that tests are completed correctly, in a timely manner, and in accordance with regulatory standards.

- **Mechanical Engineer – Freelance (Upwork) | Remote work during Covid shutdown, USA**   Feb to Sep.2020
  - Python development, embedded system programming (Arduino, C/C++), and mechanical system design.
  - Relevant Freelance Projects:
    - Designed and developed the code for a hidden door linear actuator, driver, and control panel.
    - Wrote the embedded code for an AC relay driver panel with user programmable 7 day rolling window.
    - Designed and selected the components of a telescoping optical thermometer for Covid-19 screening.

- **Graduate Student Researcher at Colorado School of Mines | Golden, Colorado, USA**   Feb to Dec.2019
  - Created multiple Colorado School of Mines HVAC building models on OpenStudio.
    - Modeled multiple Colorado School of Mines buildings in OpenStudio from mechanical drawings.
    - Defined and tuned equipment model parameters using building automation system data.
    - Validated the model against billing data for electricity, cooling, and heating loads.
  - Performed a study to evaluate the use of vehicle to grid technology as a solution to grid instability problems.
    - Simulated a set of residential units using BEOpt and scaled the set to simulate the entire grid.
    - Recreated a problematic daily demand curve on a grid level (Duck Curve).
    - Simulated the effect of vehicle to grid use on battery degradation over time.
    - Studied the effect of optimized vs. unoptimized charging of the vehicle on the grid.
    - Calculated the vehicle to grid adoption costs and a time of use electric utility schedule to balance it out.
  - Analyzed chiller and building energy load data on a central plant loop for multiple buildings.
    - Calculated the electric and cooling loads for the buildings and chillers in a central plant using sensor data from the building automation system.
    - Determined the contribution of several buildings and chillers on the total energy load.

- **Mechanical Project Engineer at Dağgaz– Kocaeli, Türkiye**   Jan. to Aug. 2018
  - Designed Piping and Instrumentation Diagrams (P&ID) for odorizing and chemical injection systems.
  - Created and managed material lists for designed systems.
  - Examined and analysed tender documents.
  - Wrote up technical quotations with summary of the deliverables for multiple projects.

- **Mechanical Engineering Intern at Queen Alia International Airport – Amman, Jordan**   Jun. to Sept. 2016
  - Received hands on HVAC engineering training at the central utility plant HVAC unit.
  - Gained some design for manufacturing experience at the workshop and welding unit.
  - Worked alongside engineers in the wastewater treatment plant, studied requirements, and became familiar with the filtering and disinfection process.

Education:

- **M.Sc. in Mechanical Engineering (Thermal Fluid Systems)**
  Colorado School of Mines   Dec. 2019

- **B.Sc. in Mechanical Engineering (Thermal Power)**
  Jordan University of Science and Technology   Jan. 2017

Relevant Projects:

- **Designed and analysed a passive electric vehicle battery cooling solution.**
  - A single prismatic cell of a lithium-ion battery was modeled along with an integrated cooling fin.
  - The single cell model was expanded to a full battery pack simulation using symmetry conditions.
  - The effectiveness of the cooling solution was assessed at different vehicle speeds using CFD.
- **Performed a computational fluid dynamic analysis on a Francis turbine blade design using ANSYS.**
  - Optimized meshing parameters and generated the mesh for the geometry.
  - Setup the solver parameters then configured boundary and initial conditions.
  - Validated the Francis turbine model against prior work.
  - Showed different case studies for different mass flow rates and studied pressures variations.
- **Performed a transient CFD analysis on air distribution through a house using ANSYS Fluent.**
  - Created a geometry of the conditioned space in ANSYS design modeler.
  - Optimized meshing parameters and set up the solver parameters with the boundary conditions.
  - Simulated the model and created velocity contours and streamline plots.
- **Used BEOpt to perform an energy footprint optimization study on a fitted house model.**
  - Modeled my apartment using BEOpt (a 2-story apartment unit).
  - Calibrated the model to match measured utility data.
  - Found the most cost-effective retrofit package that will reduce energy usage while having a low payback period.
- **Performed an optimization study of a thermophotovoltaic system for a commercial building.**
  - Found the inclined irradiation, the peak solar hours, and calculated the derating values for the site.
  - Found the load required by the building, then determined the number of parallel and series modules needed.
  - Sized the inverter and calculated the payback period.
- **Created a balancing robot with obstacle avoidance.**
  - Designed the mechanical assembly of the robot using Fusion 360.
  - Assembled the robot and built the circuit including an ultrasonic sensor, inertial measurement unit, and two motors.
  - Programmed an Arduino microcontroller to balance the robot using a PID feedback loop and avoid obstacles.

Engineering Skills:

- Thermodynamic systems analysis and design (HVAC, Engines, Combustion, chemical and phase equilibrium).
- HVAC system design and building energy modeling.
- Design and simulation of fluid mechanical systems.
- Budgeting and engineering economic skills.
- Finite element analysis of mechanical and thermal systems.
- Mathematical modeling and basic control design of dynamic systems.
- Working knowledge of strain gauges, differential amplifiers, oscilloscopes, and other instrumentation equipment.
- Ability to work on advanced algebraic, differential, numerical and nonlinear mathematical problems.
- Battery and fuel cell design and simulation.

Computer Skills:

- CAD, FEA and CFD packages: PTC Creo, AutoCAD, SolidWorks, ANSYS CFX, ANSYS Fluent.
- Programming languages: Python, Arduino (C/C++), MATLAB, EES, PTC Mathcad, HTML/CSS.
- HVAC thermal modeling and simulation: OpenStudio, BEOpt, Airovision Builder, WinCoil, Coil PC, IPM.

Languages:

- Arabic: Native proficiency.
- English: Full professional working proficiency.
- Turkish: Professional working proficiency.