AMNEH JABER

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Work Experience:

- **Research & Development Engineer at Alarko | Carrier – Kocaeli, Türkiye**   Feb 2021 to Present
  - Performed aeraulic and thermal testing on fan coil units by organizing work among lab personal to ensure that tests are completed correctly, in a timely manner, and in accordance with regulatory standards.
  - Analysed Rooftop (industrial air conditioners) laboratory testing results for validation and simulated different Rooftop units at different conditions using Carrier IPM (1-D vapor compression simulation tool) for Eurovent certification and R&D purposes.
  - 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.
    - Developed an Excel macro using Visual Basic for Applications (VBA) to create user friendly selection software. This tool enabled the production team to choose the appropriate distributor and nozzle for Direct Expansion (DX) coils used in air handling units (AHUs).
  - Performed analysis and 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.
    - Analyzed simulation data and created scripts to export summarized Excel reports using Python.

- **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.

- **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.

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 system design and building energy modeling.
- Design and simulation of fluid mechanical systems.
- Budgeting and engineering economic skills.
- Finite element analysis of thermal systems.
- Mathematical modeling and basic control design of dynamic systems.
- Working knowledge of strain gauges, accelerometers, oscilloscopes, and other instrumentation equipment.
- Electric vehicle battery thermal management, design and simulation.
- Ability to work on advanced algebraic, differential, numerical and nonlinear mathematical problems.

Computer Skills:

- HVAC thermal modeling and simulation: OpenStudio, BEOpt, Carrier IPM & Carrier CoilPC, Carel 1tool.
- CAD, FEA and CFD packages : PTC Creo, AutoCAD, SolidWorks, ANSYS CFX, ANSYS Fluent.
- Programming languages: Python, Visual Basic, Arduino (C/C++), MATLAB, EES, PTC Mathcad, HTML/CSS.

Languages:

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