Irvine, CA

BENJAMIN DEPEW

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EDUCATION

Oregon State University **Expected Graduation December 2021**
B.S. Computer Science
University of California, Davis **Graduated June 2019**
B.S. Mechanical Engineering, Minor in Computer Science

PROJECTS

Sudoku Solver / Python / Arc Consistency Constraint Propagation, Backtracking **May 2020**
Artificial Intelligence Coursework, *Columbia University via edX*

- Implemented arc consistency constraint propagation and backtracking to solve Sudoku puzzles in a matter of seconds.
- Improved backtracking algorithm by updating a list of possible solutions for each square whenever a new value is tested and by prioritizing unsolved boxes with the least amount of these possible solutions.

Chessboard Data Classifier / Python / sklearn **May 2020**
Artificial Intelligence Coursework, *Columbia University via edX*

- Used various methods from sklearn to classify chessboard-like data into two separate classes.
- Implemented both a single perceptron and gradient descent from scratch.

2048 Solver / Python / Minmax Algorithm, Alpha-Beta Pruning **April – May 2020**
Artificial Intelligence Coursework, *Columbia University via edX*

- Created a minmax implementation for the popular number game 2048 which could beat the game.
- Since the tree search had a time limit of 0.2 seconds, iterative deepening was used to make sure that the decision made was the best of what was explored.
- Applied three heuristics: one for smoothing, rewarding values being close in value, one for monotonicity, making sure that the rows and columns either ascended or descended, and one for the average value of the tiles.

8-Puzzle Solver / Python / A* Algorithm **April 2020**
Artificial Intelligence Coursework, *Columbia University via edX*

- Implemented A* for the 8-puzzle game, which took the sum of the Manhattan distances of each numbered tile as its heuristic.

Video Frame Matching / MATLAB / Visual Vocabulary, SIFT Descriptors **June 2019**
Computer Vision Coursework, *University of California, Davis*

- Found an image's nearest neighbor, the image most like itself, within a video by finding the minimum total distance between descriptors within query regions.
- Sorted images based on SIFT descriptors and created a visual vocabulary of all the images within the video.

Content Aware Image Resizing / MATLAB / Seam Carving, Dynamic Programming **May 2019**
Computer Vision Coursework, *University of California, Davis*

- Found the minimum energy path via gradient analysis for jpg images in order to reduce or increase image dimensions without effecting "important" features of the image.
- The energy of a pixel is defined by the derivative between two adjacent pixels in an image.

Connect Four / Java / Q-Learning **January 2019**
Artificial Intelligence Coursework, *University of California, Davis*

- Created an agent that plays connect four against an adversary on various board sizes by using Q-learning.
- Trained the system to play after training for 1M samples and solely using rewards in terminal states.

Efficient Mountain Traversal / Java / A* Algorithm **January 2019**
Artificial Intelligence Coursework, *University of California, Davis*

- Found the path of least resistance from random points A to B on a terrain map of Mt. Saint Helens.
- Took into account the energy expenditure of ascending vs descending as well as the distance traveled.
- Created heuristics based on the energy expenditure in a typical gravitational field as well as the inverse of such.

Polishing System Cantilever / MATLAB **September 2017 - December 2017**
Mechanical Design Class Project, *University of California, Davis*

- Analyzed specifications for the system to meet requirements and hone design on the most efficient iteration by creating minimum thickness charts on MATLAB.
- Executed cost-analysis for various metals to create the cheapest model that would be able to support the system.
- Created a written report of the reasoning behind the design with diagrams and figures for fluent comprehension.

Solar Boat Design Team **October 2017 – May 2018**

Hull Team Member, *University of California, Davis*

- Designed a hull for the boat that both holds the solar panels safely and cuts through the water.
- Utilized SolidWorks and Fusion360 to CAD and CAM the foam mold for the layup of the boat.
- Created the hull out of fiber-glass / Kevlar and resin composite by using a vacuum sealed layup.

WORK EXPERIENCE

Mechanical Tooling Engineer **January 2020 - Present**

IMI USA, *Tustin, CA*

- Data manipulation and preparation of printed circuit board (PCB) component locations for robotic pick and place machines.
- Design and 3-D printing (FDM) fabrication of various fixtures for hand soldering and frame removal for various prototypical circuit boards.
- Validation of design for manufacturing (DFM) for various incoming designs from various clients to ensure manufacturing build quality and reliability.

Validation Engineering Intern **June 2019 - December 2019**

M.S. Hatch Consulting LLC, *Irvine, CA*

- Created and updated a fatigue calendar on Excel of the individual components of GIILLIG's prototype bus based upon test vs road time data provided by an outsourced testing company.
- Established and worked on the DVP&R for the prototype design cycle of the electric bus.
- Compiled parts and created a pressure manifold for testing the pressure transducers used for instrumenting the coolant package on testing trips.
- Tested the bus in various environments to verify design capabilities and to assist with acquiring metrics for sales.

Engineering Intern **June 2017 - September 2017**

M.S. Hatch Consulting LLC, *Irvine, CA*

- Calculated total and daily toxic emissions for different projects and customers.
- Gathered information on the amount of volatile organic compounds within different products through examinations of Safety Data Sheets and Technical Data Sheets.

Mechanical Engineering Intern **June 2016 - September 2016**

Opus Solutions, *Irvine, CA*

- Designed, printed, and tested material efficient 3D models for accessories for a Yamaha production robot through SolidWorks. Collaborated with a the inhouse mechanic create a new gluing function for the robot.
- Programmed the robot to glue pre-attached components onto the power supplies of mobile computers by using Microsoft Excel to calculate coordinates.

RELEVANT COURSEWORK

- Graphics Design
- Mechanical Design
- Mechatronics
- Control Systems
- Dynamics
- Object Oriented Code

SKILLS

- C/C++ programming
- Mill/Lathe/Drill Operation
- MATLAB
- AutoCAD
- NI Virtual Bench
- SolidWorks
- OrCAD PSpice
- Microsoft Suite
- GD&T
- Composite Layup
- 4D Bot Operation
- Unix Experience
- Numerical Analysis
- Data Structures
- Assembly Code
- Circuit Analysis

LEADERSHIP

Theta Tau - Engineering Fraternity, *University of California, Davis* **Fall 2015 - Present**

Corresponding Secretary (Spring 2018), Webmaster (Fall 2018), Prof. Development Officer (F2016), Historian (S2016)

CERTIFICATIONS

Artificial Intelligence, sponsored by Columbia University on edX

Natural Language Processing in TensorFlow, sponsored by deeplearning.ai on Coursera

Convolutional Neural Networks in TensorFlow, sponsored by deeplearning.ai on Coursera

Introduction to TensorFlow for Artificial Intelligence, Machine Learning and Deep Learning, sponsored by deeplearning.ai on Coursera