David (Suhyung) Lee

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Research Interests

Machine Learning (Reinforcement Learning, Neural Network, Deep Learning, Sample Efficient Learning, Transfer Learning), Artificial Intelligence, Natural Language Processing, Computer Vision

Education

University of California, Irvine, CA (GPA: 3.786/4.000) *June 2020 - Present*

- B.S. in Computer Science (2023)
- Specialization: Intelligent Systems
- Selected Completed Courseworks: CS 178 (Machine Learning and Data-Mining), CS 171 (Introduction to Artificial Intelligence), CS 121 (Information Retrieval), CS 122A (Introduction to Data Management)

Edison High School, Huntington Beach, CA *Sept. 2017 - June 2020*

- President, Mu Alpha Theta *Sept. 2018 - June 2020*
- Software Team Head, Robotics Club *Oct. 2018 - June 2020*
- Founder, President, Manager, and Tutor, Peer Tutoring Center *Oct. 2018 - June 2020*

Skills

Computer Languages: Java, Python, SQL, C++, HTML, PHP (server-related), JavaScript (intermediate), CSS (intermediate), Assembly (intermediate), R (elementary)
Software: Android Studio, SolidWorks, Fusion 360, MySQL, Eclipse, NetBeans, RStudio, Visual Studio Code, Apache Tomcat (elementary), MATLAB (elementary)
Foreign Languages: Korean (native)

Ongoing Projects

Mobile Application for Effective Advertising, Developer *April 2020 - Present*

- A system providing customized advertisements to users more effectively and compensating users for watching advertisements
- Developed mobile applications with Android Studio and used a Linux web server and MySQL database to provide service
- Preparing for a start-up (currently at the stage of field testing)

American Sign Language to Text/Voice System, Designer and Developer *Aug. 2019 - Present*

- A system detecting sign languages and translating to text and/or voice
- Allows easier communications between signers (mainly deaf/heard of hearing) and non-signers
- Google's Soli system will be applied to enable more precise detection of hand gestures to differentiate the subtleties

4DOF/6DOF Motion Simulator, Designer, Developer, and Sales Manager *July 2019 - Present*

- Designed and developed new hybrid 4DOF/6DOF (degrees of freedom) motion simulators using SolidWorks
- Lowered the cost tremendously (current market price: ~$20,000 vs. new price: ~$10,000)
- Use Thanos AMC controller to handle telemetry data fetched from software and control actuators
- Place customized orders and manage imported goods, and assemble parts for sales
- Preparing for a start-up (currently at the stage of final testing and developing a website)
    - Company: Systemku Corp / Website: https://simsdepot.com/

Navigation for the Blind, Designer and Developer *July 2019 - Present*

- A navigation system providing directions customized for the blind for easier navigation
- Used Android Studio to develop mobile applications and used a MySQL database and Linux web server
- Using RFID and compass, provide navigation based on the user's precise location and direction
- Detect RFID tags and fetch corresponding data from a database for up-to-date information which is critical for such navigation

PAST PROJECTS

Search Engine (Information Retrieval) *Spring 2022*

- A search engine that is capable of handling thousands of documents or websites within under 100 milliseconds from scratch in Python
- Preprocessed UCI-related documents and websites in JSON with BeautifulSoup to build a corpus/inverted index

- Searched top 10 websites as per the search query using TF-IDF scores and own ranking method (based on the importance of each word on a website using HTML tags)
- Created a web GUI for easier user interaction with the search engine

AI Sudoku Solver *Winter 2022*

- An AI solver for various Sudoku board sizes with different initial positions, counts, and values of numbers in Python
- Based on the backtracking method, implemented Forward Checking, Arc Consistency, Norvig's Heuristics, Minimum Remaining Value Heuristic (with Degree Heuristic as a tie-breaker as another option), and Least Constraining Value Heuristic to solve Sudoku
- The performance of the solver was determined by the size of the board dimensions and the number of given values initially; modified the solver accordingly based on the possibility to solve the board and the time it took

Bombsweeper *Fall 2021*

- Minesweeper in Assembly
- Came up with the game logic and coded logic and UI of the game
- Converted given pseudocode for some of the functions to Assembly

Determination of Major Causes of Rehospitalization in the U.S. *Spring 2021*

- With datasets (10 years of data from 130 US hospitals with over 50 features) from the UCI Machine Learning Repository, analyzed the major factors of rehospitalization with machine learning algorithms in Python
- Preprocessed data values (one-hot encoding to take categorical variables into account, discarded variables with the majority of their values missing, categorized values into several sections for variables with too many different values)
- Implemented Random Forest, Logistic Regression, Naive Bayes, Decision Tree, Support Vector Machine, Adaboost, and Multi-layer Perceptron to validate performance with a cross-validation score

EXPERIENCES

Learning Assistant, University of California, Irvine *Sept. 2021 - Present*

- An undergraduate version of teaching assistant (TA)
- Supported CS major-required courses: I&C SCI 6B (Boolean Logic and Discrete Structures) and I&C SCI 6D (Discrete Mathematics for Computer Science)
- Head of the learning assistant team
- Taught and supported 1,800+ students

CS & Math Tutor, University of California, Irvine *March 2021 - Present*

- Tutored courses: ICS 31-33 (Python), ICS 45C (C++), CS 178 (Machine Learning and Data-Mining), CS 171 (Artificial Intelligence), Math 2B (Single-Variable Calculus II), Math 3A (Linear Algebra)

Peer Tutoring Program/Center, Edison High School *Sept. 2018 - June 2020*

- Founder, program manager, and tutor
- Covered most STEM-related Advanced Placement courses (Computer Science A, Computer Science Principle, Calculus AB/BC, Statistics, Physics 1, Biology, Chemistry)
- Supported 80+ students each semester

AWARDS / HONORS

Dean's Honor List, University of California, Irvine *All quarters (Fall 2020 - Present)*
AP Scholar with Distinction Award, College Board *July 2020*
AP Scholar with Honor Award, College Board *July 2019*
AMC 12 Winner Pin, Mathematical Association of America *May 2018*

PATENT

South Korea Patent no. 1020200140704, *Guide and Surrounding Information Provision System Using Label and Electronic Compass*, assigned to Sanghyub Lee, inventors are Suhyung Lee and Sanghyub Lee