Utkarsh Bansal

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EDUCATION

- **University at Buffalo, The State University of New York** — Buffalo, NY
  Master of Science - Computer Science and Engineering; GPA: 3.96 — *Expected Feb 2023*
- **Ambala College of Engineering and Applied Research** — Ambala, India
  Bachelors in Technology - Computer Science and Engineering; Percentage: 85.2% — *Aug 2017 - Jul 2021*

SKILLS & TOOLS

- **Computer Languages** — Python, C++, JavaScript, HTML, CSS, C, SQL.
- **Software & Libraries** — PyTorch, React.js, Node.js, MongoDB, Docker, ROS, Scikit-learn, NumPy, Pandas, Postman.
- **Courses & Certifications** — Front-end Web Development with React and Bootstrap, Machine Learning, Data Science, Programming in C, Database Management Systems.

WORK EXPERIENCE

- **Lemma Labs Inc., Software Engineer Intern** — Sep 2022 - Dec 2022
  - Built a tool to calculate width of hair strands using microscopic images.
  - Utilized image processing techniques such as sharpening, thresholding dilation and erosion provided in opencv.
  - Used regression for drawing hair strand boundaries.
- **Center for Unified Biometrics and Sensors, Research Assistant** — Jun 2022 - Dec 2022
  - *Introducing intentional distortion to distiguish between live and spoof fingers.*
    - Finding a more robust form of fingerprint biometric authentication by working on dynamic images of fingerprints taken from an optical scanner instead of static images.
    - Aided in research on different synthetic materials to generate spoof fingerprints as well as a spatio-temporal algorithm to detect a spoof finger is in works.
- **University at Buffalo, Teaching Assistant - CSE 421/521 Operating Systems** — Feb 2022 - Dec 2022
  - Assisting the instructor in course schedule and assignment planning. Mentored students and graded exams.

PROJECTS

- **Forest Fire Evacuation using Reinforcement Learning** — Nov 2022 - Dec 2022
  - Designed an environment using gym for forest fire simulation. The agent has to navigate through the stochastic environment where fire is spreading to rescue people.
  - Used a custom observation space which informs the agent about the intensity of person and fire in each of its four directions.
  - Leveraged DQN, Double DQN and TD Advantage Actor Critic algorithm to solve the problem.
- **File Access Manager as a Distributed System** — Feb 2022 - May 2022
  - Made a distributed file access manager where user can upload files and set file access rights.
  - Leveraged React.js and Node.js for build of the application. Utilized Docker to simulate the distributed environment.
  - Used Redis for session management and RAFT algorithm to achieve consensus among nodes.
- **Face Detection and Clustering System** — Apr 2022
  - Developed a system which could detect faces in multiple images and clustered similar faces together.
  - The system leveraged Haar Cascade method to detect faces in a given image.
  - Calculated SIFT features of the detected faces and then applied K-Means clustering on the detected features using opencv and scikit learn libraries.
- **Perception and Path Planning, Robotics** — Sep 2021 - Oct 2021
  - Executed planning algorithms in C++ such as Bug2 and A* taking advantage of ROS, tf and stage.
  - Designed a perception system, making use of RANSAC algorithm, for wall detection.
  - The robot could move from start to finish in given binary world map.
- **Printing Job Management System** — Feb 2021 - May 2021
  - MERN application formulated for a printing and packaging industry to digitalize job management operations.
  - User can view, add, update jobs and track steps (designing, printing etc.) needed for a job's completion.
- **Data Structures and Algorithm Visualizer** — Sep 2020 - Dec 2020
  - Visualized stack and queue data structures as well as BFS and DFS graph traversal algorithms utilizing React and Bootstrap to assist remote learning during COVID-19 pandemic.
- **Personal Travelogue Website** — Aug 2020 - Sep 2020
  - Travel blog and portfolio built using Bootstrap and React libraries.
  - Hosted on Github using Github Actions(CI/CD).