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: 3.95 — *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**   C++, Python, JavaScript, Java, 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 - Present
  - Building a tool to calculate width of hair strands using microscopic images.
  - Using image processing techniques such as sharpening, thresholding dilation, erosion etc.
  - Using regression for drawing hair strand boundaries.
- **Center for Unified Biometrics and Sensors, Research Assistant** — Jun 2022 - Present
  - *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.
    - ∗ 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. Mentoring students and grading 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.
  - Using DQN, Double DQN and TD Advantage Actor Critic algorithm to solve the problem.
- **CartPole, Mountain Car, Lunar Lander - OpenAI Environments** — Sep 2022 - Nov 2022
  - Used reinforcement learning algorithms such as Q-Learning and SARSA to solve grid world environments.
  - Implemented value approximation functions such as DQN and Double DQN to solve OpenAI gym environments such as CartPole and Mountain Car.
  - Worked on actor critic policy gradient methods to solve more complex environments such as Lunar Lander.
- **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.
- **Panorama Stitcher** — Mar 2022
  - Built a system which could stitch images together to form a panorama.
  - System detects which images can be stitched together by using SIFT features.
  - Transformation is applied according to the matched SIFT key points.
- **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.
- **PintOS: Operating Systems** — Sep 2021 - Dec 2021
  - Accomplished priority scheduling and MLFQ scheduling among threads on PintOS, provided by Stanford University.
  - Improved alarm clock functionality enabling threads to sleep without busy waiting.
  - Worked on process initialization and setup of user level processes. Implemented all functionalities in C language.