

# Shivani Kamtikar

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## Education

- **University of Illinois – Urbana Champaign** **Champaign-Urbana, IL, USA**  
*Ph.D. Computer Science - Advised by Prof. Girish Chowdhary* *May 2022 - Present*  
**Relevant courses:** Learning to Learn (Meta Learning)
- **University of Illinois – Urbana Champaign** **Champaign-Urbana, IL, USA**  
*M.S. Computer Science, CGPA: 3.5/4.00* *Sept 2020 - May 2022*  
**Relevant courses:** Learning-Based Robotics | Computer Vision | Robotics and Automation | Machine Learning - Advised by Prof. Girish Chowdhary
- **Savitribai Phule Pune University, Pune, India** **Pune, India**  
*B.Tech Information Technology, CGPA: 8.75/10* *Aug 2016 - Oct 2020*

## Publications

- **S. K. Kamtikar**, S. Marri, B. T. Walt, N. K. Uppalapati, G. Krishnan, and G. Chowdhary, "Visual servoing for pose control of soft continuum arm in a structured environment", IEEE Robotics and Automation Letters (RA-L), pp. 1–1, 2022 and 5th IEEE-RAS International Conference on Soft Robotics – RoboSoft 2022.
- **S. K. Kamtikar**, S. Marri, B. T. Walt, N. K. Uppalapati, G. Krishnan, and G. Chowdhary, "Towards Autonomous Berry Harvesting using Visual Servoing of Soft Continuum Arm" - AI for Agriculture and Food Systems (AIAFS) workshop 2022, Vancouver, Canada.
- **S. K. Kamtikar**, E. Ji, N. K. Uppalapati, G. Krishnan, and G. Chowdhary, "Realistic Simulation Environments to Achieve Visual Servoing on Soft Continuum Arms in Constrained Environments" - Fourth International Workshop on Machine Learning for Cyber-Agricultural Systems (MLCAS 2022)

## Relevant Experience

- **University of Illinois at Urbana-Champaign** **Champaign, IL, USA**  
*Graduate Research Assistant (DASLab), Advisor: Prof. Girish Chowdhary* *Jan 2021 - Present*
  - Demonstrated reliability of CNN based visual servoing to control position and orientation of soft arms (SCA).
  - Demonstrated ability to control position as well as orientation of SCA, unlike other methods.
  - Achieved <2 cm translation error and less than 0.25 radians rotation error (current best).
  - Exhibited quick adaptability of the self-supervised system in a new environment in 3-4 hours.
  - Currently working on visual servoing for SCAs in cluttered unstructured environments.
- **University of Notre Dame** **South Bend, IN, USA**  
*Research Intern, Advisor: Prof. Zhiyong (Johnny) Zhang* *June 2019 - July 2019*
  - Assisted on a project titled "Statistical Social Network Analysis for Behavioral Research".
  - Developed a network model that maps behavioral traits to mathematical equations to analyze personality.
  - First student to be selected from Pune University and the only Indian selected to join the team.
- **Dravin Solutions Pvt. Ltd.** **Pune, India**  
*Intern, Supervisor: Mr. Yogesh Mishra* *Oct 2017 - Dec 2017*
  - Collaborated with analysts from stock market and gathered information about Futures and Options.
  - Successfully built a tool that provides buy and sell signals in real-time market.

## Teaching

- **University of Illinois at Urbana-Champaign** **Champaign, IL, USA**  
*Graduate Teaching Assistant, Professor: Prof. Svetlana Lazebnik* *Sept 2020 - Dec 2020*
  - Teaching assistant for the course 'Introduction to Deep Learning'.

## Academic Projects.....

### **Towards Reach-Avoid using Visual Servoing on a Soft Continuum Arm (March 2022 - May 2022)**

- Applied SfM based methods to reconstruct cluttered scenes in 3D using 2D RGB images.
- Constructed occupancy grid to determine obstacles in the scene.
- Formulated best path from source to destination using Dijkstra's algorithm
- Found waypoints, to reach the target, along the path using heuristics.

### **Reinforcement Learning for Visual Servoing in a Structured Environment (Sept 2021 - Dec 2021)**

- Trained a DDPG for tracking the path of the end effector of SCA to target using real-world data.
- Performed various ablation studies to find the best parameters for the DDPG.
- Demonstrated the shortcomings of DDPG on the system using experiments.
- Compared the system with other learning-based pose-estimation methods and investigated the shortcomings of DDPG.

### **Learning Based Relative Pose Estimation for Visual Servoing of a Soft Robot, (March 2021 - May 2021)**

- Implemented and trained 4 different CNN based architectures to learn relative pose between 2 images.
- Performed ablation studies to find the best parameters for each of the architectures.
- Demonstrated the performance of different architectures on SCA to reach a target from a given position.
- Compared the performance on the SCA prototype and demonstrated the best performing architecture.

### **Segmentation of Gliomas from Brain MRI, (Nov 2020 - Dec 2020)**

- Fine-tuned a Unet deep learning model for 3-D image segmentation of tumor in brain
- Achieved an accuracy of 78% which ranked 5th in the class.

### **Indian Sign Language Recognition using Deep Learning Frameworks (Jan 2019 - Aug 2020)**

- Created a novel dataset by collecting images of Indian Sign Language (ISL) alphabets.
- Built a custom CNN based model from scratch to identify and classify ISL.
- Proved the robustness of the model on images in various lighting conditions, orientations, etc.
- Achieved an optimal accuracy of 97.3% on the gesture recognition task using a CNN trained from scratch.

## Technical Proficiency.....

- *Python and specific libraries(PyTorch, keras, numpy, pandas, opencv, scipy, scikit-learn), ROS, C*

## Awards and Recognition.....

- Received "Best Outgoing Student Award" awarded by Savitribai Phule Pune University, Pune, India.
- Patent filed with the Indian Patent Office for final-year project.
- Awarded a grant of 11000 USD from IBM for final-year project.
- Featured on the [website](#) of the University of Notre Dame.
- Awarded a full scholarship from iSURE - International Student Undergraduate Research Experience.

## Leadership Experience.....

- Volunteered at the weSTEM conference at UIUC - Feb 2022
- Appointed the Diversity Advocate for a hiring committee at UIUC. - 2021
- Volunteered as a committee member at the We21 conference hosted by SWE. - 2021
- Treasurer of GradSWE (Graduate Society of Women Engineers) at UIUC. - 2021 - 2023
- Gave a talk on Visual Servoing for Soft Arms at the Illinois Autonomous Farms (IAF) Workshop, UIUC - 2021

## Interests.....

Reading | Painting | Travelling | [Blogging](#)