ASHISH PAKA

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PROFESSIONAL EXPERIENCE

1. **Robotics Research Engineer** | **LOGOS Robotics Lab** ↗ | **Arizona State University, Tempe, AZ**
   Jan 2025 – Present
   - Architecting a **PerSPARAMA** ↗ agent by coupling sparse voxel transformer perception with a homeostatic self-model via bidirectional cross-attention into a joint situational latent. Self-worth modelled via dual-utility PPO with state-conditioned exchange rate. A reality alignment loss jointly updates world and self for life-like mission autonomy
   - Collaborated with Weiwei Gu and ASU-SCAI professor Dr. Nakul Gopalan on the CoRL 2024 paper **Continual Skill and Task Learning via Dialogue** ↗ to develop **Cross Embodiment Skill Representation in Robotics** ↗
   - Deployed ResNet-18 & ACT-LoRA to engage RL and trajectory-based unsupervised skill learning on FR3 Franka arm for few shot continual learning. Integrated CV and Gemini VLM into the framework and acheived 91.4% confidence in skill matching on RH20T dataset to segment demonstrations into skill primitives with semantic labels
2. **Mechanical Engineer** | **Larsen & Toubro Technology Services (LTTS)** | **Bangalore, India**
   Sept 2020 – June 2023
   - Consulted clients like Carrier Transicold, Scania, Eaton Corporation and Cooper Lighting aiding in product development (using CAE tools Creo Parametric, SOLIDWORKS, Autodesk Inventor and Ansys for FEA/CFD analysis), failure mode analysis, environmental protection ratings, manufacturing design and intellectual property protection

PROJECTS

1. **A.L.B.E.R.C. (Autonomous Learning Bot to Explore React and Collaborate)** ↗ | **Jan 2026 - Present**
   - Developing a sub $1000 & 50 W wheeled differential-drive robot with a Jetson Orin Nano Super, Unitree L1 4D LiDAR, ZED Mini stereo camera, US sensors, Phone and IMU for multi-modal fused perception
   - Extended Kalman Filter for dual SLAM (SLAM Toolbox + RTAB-Map), global planners (A*, RRT*, Voronoi GVD) and MPPI local trajectory optimization. LLM based voice-driven task decomposition and multi-modal control for collaborative HRI or reactive evasion
2. **Swarm Robotics for Autonomous Collaborative Mapping** ↗ | **Aug 2024 - Dec 2024**
   - Pioneered collaborative exploration using Voronoi pattern swarm exploration for optimal area coverage. Implemented sensor fusion with SLAM (gmapping, Hector SLAM) and ROS2 and tested in Gazebo with TurtleBot3
   - Integrated RL in Gymnasium, TOF cameras attaining 5x faster 3D reconstruction compared to sequential approaches
3. **Optimized VoxFormer for Autonomous Driving** ↗ | **Jan 2024 - May 2024**
   - Designed a 75% resource-efficient 3D Semantic Scene Completion Voxformer model trained on SemanticKITTI (3.6 billion labelled points) with mixed precision PyTorch distributed training. Accomplished 10% IoU improvement for occluded voxel estimation
   - Implemented CARLA simulator integration for real-time inference at 20 FPS, TensorBoard for loss visualization, Open3D for 3D voxel rendering, and Weights & Biases for hyperparameter optimization tracking

PROFICIENCIES:

1. **Areas of Expertise:** Autonomous Systems and Navigation, Control Systems, Sensor Fusion, Motion-Planning, SLAM (Simultaneous Localization and Mapping), Computer Vision, Transformer Models, CUDA Programming
2. **Certified Skills:** Linear Algebra, ML, DL, RL, Modeling and Control of Robots, Multi-Robot Systems, Robot Kinematics and Dynamics, Perception in Robotics, AR-VR Systems, Expressive Robotics, Certified Drone Pilot (sUAS, USA)
3. **Software Tools:** TensorFlow, PyTorch, Git, Docker, ROS 1/2, Catkin, V-Rep (CoppeliaSim), Gazebo, OpenAI Gym, ISAAC Sim, MoveIt, MuJoCo, Arduino, Pybullet, CARLA, Arduino, MQDH, Unity AR/VR, Python, C/C++, Java, MATLAB
4. **Additional Skills:** Product Design/Analysis/Life Cycle Management, Material Science and Composites, Aerospace Design, DFMA, DFMAE, Sustainable Design, Fluid dynamics and turbines, Project Management, Strategy Formulation

EDUCATION

1. **M.S. in Robotics and Autonomous Systems** | **Arizona State University, Tempe, AZ** **GPA: 3.96/4.00**
   Aug 2023 – May 2025 ASU-SEMTE Paper Presentation Spring 2025
2. **B.Tech. in Mechanical Engineering** | **Manipal Institute of Technology, Manipal, India**
   Jul 2016 – Jun 2020 Minor in Mechanical Design and Physics

ACHIEVEMENTS

1. **Paper Presentation** | **Southwest Robotics Symposium 2024:** Swarm Robotics for Autonomous Collaborative Mapping
2. **Spot Award - Design** | **Spaceport America Cup 2019** | **thrustMIT** ↗ (India's no.1 Student Rocketry Team)
   - Launched sounding rockets Project Vyom and Arya. Worked as a Structures and Composites Lead from **2017 to 2020**
3. **Patent no. 506725** ↗– **A SYSTEM FOR EJECTION"** - Invented a reliable pressurized canister based ejection system.