

## Summary

Graduate of Robotics and Control with expertise in legged robotics, model-based control, state estimation, and sensor fusion. Experienced in developing and implementing advanced control algorithms for humanoid robots and autonomous systems. Research interests include reinforcement learning and computer vision for enhancing robotic autonomy.

## Current Position

2022–Present **Robotics & AI Engineer**, CHEETAH

- Leading the development of Forward Collision Warning (FCW) System using computer vision and deep learning
- Developing Driver Monitoring System for real-time drowsiness and distraction detection
- Implementing and optimizing algorithms for embedded systems deployment
- Integrating various sensors and establishing robust data transmission infrastructure

## Previous Research Position

2017–2024 **Robotics Researcher**, CENTER OF ADVANCED SYSTEMS & TECHNOLOGIES (CAST)

- Led the dynamics and control team for Surena-V humanoid robot project as Senior Developer
- Developed and implemented walking pattern generation, state estimation, and perception modules
- Managed the center's Robotics and AI portfolio, overseeing multiple research projects
- Mentored graduate students and supervised BSc and MSc theses

## Teaching Experience

2020–2022 **Lead Teaching Assistant**, UNIVERSITY OF TEHRAN, Control Engineering (Prof. Yousefi-Koma)

2021–2022 **Teaching Assistant**, UNIVERSITY OF TEHRAN, System Identification & State Estimation (Dr. Ayati)

2024 **Instructor**, ONACADEMY24, Online Platform, Introduction to Neural Networks

## Education

2019–2022 **M.S. in Dynamic & Control Engineering**, UNIVERSITY OF TEHRAN

- Master's thesis on real-time localization and configuration identification of a humanoid using machine vision

2015–2019 **B.S. in Mechanical Engineering**, UNIVERSITY OF TEHRAN

- Bachelor's project on redesign and repair of a hydraulic robot for sewer line maintenance

## Major Projects (Videos & More Content)

2020–2024 **Design & Development of Surena-V Humanoid Robot**, CAST

- Led the dynamics and control team, coordinating development efforts across multiple subsystems
- Designed and implemented advanced trajectory planning and control algorithms for robust locomotion
- Established and maintained project's open-source infrastructure through GitHub Organization
- Validated algorithms in simulation and successfully deployed on the physical robot

2020–2022 **Simultaneous Localization and Mapping on Surena-V**, CAST

- Implementing various SLAM algorithms on the robot
- Creating a map of the robot's environment using a depth camera for path planning

2020–2022 **Estimation of Kinematic Base States of Surena-V**, CAST

- Implementing Extended Kalman filters based on Lie algebra
- Combining robot's forward kinematics with pose estimation using inertial sensor data

2022–Present **Pre-Collision Warning System (FCW)**, Cheetah

- Implementing and optimizing real-time object detection and tracking algorithms using neural networks
- Developing distance estimation and pre-collision warning algorithm using a single camera
- Simulating and testing algorithms in the CARLA simulation environment

- 2023–Present **Driver Drowsiness and Distraction Warning System, Cheetah**
- Implementing human face mesh and head orientation detection algorithms using neural networks
  - Developing drowsiness and distraction detection algorithms
  - Establishing communication with vehicles via OBDII port and sending data to a central server
- 2019–2020 **Estimation of Applied Forces by Hand, CAST**
- Estimating forces using recurrent neural networks (GRU, LSTM)
  - Simultaneously using pressure sensor and EMG data

## Publications (citations: 28, h-index: 3) (source:Google Scholar 1/28/2025)

- Journal Ghorbani, A., Yousefi-Koma, A., **Vedadi, A.** (2023). Estimation and early prediction of grip force based on sEMG signals and deep recurrent neural networks. Journal of the Brazilian Society of Mechanical Sciences and Engineering, Springer.
- Conferences Bazrafshani, A., Yousefi-Koma, A., ..., **Vedadi, A.** (2024). Surena-V: A Humanoid Robot for Human-Robot Collaboration with Optimization-Based Control Architecture. IEEE-RAS Humanoids.
- Abdollahnezhad, P., Yousefi-Koma, A., **Vedadi, A.**, et al. (2022). Online Bipedal Locomotion Adaptation for Stepping on Obstacles Using a Novel Foot Sensor. IEEE-RAS Humanoids.
  - **Vedadi, A.**, Yousefi-Koma, A., Shariat-Panahi, M., Nozari, M. (2023). Kinematic Base State Estimation for Humanoid using Invariant Extended Kalman Filter. ICROm.
  - **Vedadi, A.**, Yousefi-Koma, A., Yazdankhah, P., Mozayyan, A. (2023). Comparative Evaluation of RGB-D SLAM Methods for Humanoid Robot Localization and Mapping. ICROm.
  - **Vedadi, A.**, Sinaei, K., Abdollahnezhad, P., Aboumasoudi, S., Yousefi-Koma, A. (2021). Bipedal Locomotion Optimization by Exploitation of the Full Dynamics in DCM Trajectory Planning. ICROm.
  - Taheri, S., Yousefi-Koma, A., **Vedadi, A.** (2023). Robust Optimization-based Push Recovery for High-Speed Walking with Three-Mass Inverted Pendulum Model. ICROm.

## Technical Skills

- Programming C++, Python, MATLAB & Simulink, Git, Docker, Bash Script
- AI, ML PyTorch, TensorFlow, Hugging Face
- Simulation Isaac Sim, Gazebo, PyBullet, Choreonoid, CARLA
- Robotics ROS (1, 2), State Estimation, Computer Vision, SLAM
- Other SolidWorks, Ansys, MS Office, LaTeX

## Honors

- 2019–2022 **Awarded Full scholarship** to study at University of Tehran for Graduate Program
- 2015–2019 **Awarded Full scholarship** to study at University of Tehran for Undergraduate Program

## Languages

- English IELTS: 7.0
- Persian Native