

Honda Research Institute USA (HRI-US) strives to be at the cutting edge of Honda's research and development activities. Driven by Honda's global slogan – The Power of Dreams – we pursue emerging technologies and bring them into reality to make people happy by engaging daily in highly scientific, pioneering work. We realize that dreams don't come from organizations, systems, or money. They come from people, and we seek people who have such a challenging spirit to join us.

Currently, HRI-US is offering fall and winter research internships to highly motivated Ph.D. (and qualified M.S.) students. Interns will work closely with HRI researchers, and publishing results in academic forums is highly encouraged. We are looking for candidates with good publication track records and excellent programming skills to join our team!

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**How to Apply:** Submit applications through our website (<https://usa.honda-ri.com/careers>)  
Candidates must have the legal right to work in the U.S.A.

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**List of Jobs:** Follow the link for detailed job description.

#### **Computer Vision**

- Human Activity Prediction (Job Number: P22INT-28)
- Visuo-Linguistic Models for Human-Machine Interaction (Job Number: P22INT-37)
- Visual Scene Understanding and Common Sense Reasoning under Uncertainty (Job Number: P22INT-45)
- Video Understanding and Visual Reasoning (Job Number: P22INT-48)

#### **Human-Computer Interaction**

- Human Action Understanding in Long Videos (Job Number: P22INT-29)
- Human Factors Research Intern (Job Number: P22INT-30)
- Computational Models for Human-Aware Systems (Job Number: P22INT-35)
- Communication and HMI Research Intern (Job Number: P22INT-41)
- Human-AI Teaming Research Intern (Job Number: P22INT-40)
- [Affective Computing and Driver State Estimation \(P23INT-02\)](#)

#### **Machine Learning/AI**

- Research Intern: Interaction Aware Motion Planning (Job Number: P22INT-39)
- Generative models for scene synthesis (Job Number: P22INT-42)
- Scene understanding and causal reasoning for ADAS (Job Number: P22INT-43)
- [Driver Behavior and Intent Prediction Intern \(Job Number: P23INT-01\)](#)

#### **Robotics**

- Intention Estimation for Teleoperation (action, task recognition and prediction) (Job Number: P22INT-31)
- Physical Human-Robot Interaction (Job Number: P22INT-32)
- Visuotactile Perception for Robotic Manipulation (Job Number: P22INT-33)
- Interpersonal Dynamics Understanding in Human-Human-Robot Interaction (Job Number: P22INT-34)
- Deep Learning Based Dexterous Manipulation (Job Number: P22INT-36)
- Robotic Dexterous Manipulation (Job Number: P22INT-38)
- Multi-robot Team Formation Research Intern (Job Number: P22INT-47)

#### **Software Engineering**

- Autonomous Systems (Job Number: P22INT-24)
- Robotics Software Engineering Intern (Job Number: P22INT-44)

## **Computer Vision**

### **Human Activity Prediction (Job Number: P22INT-28)**

This project focuses on the development of algorithms for predicting human states and activities, aiming to provide support for autonomous systems such as robots and vehicles that collaborate with humans in everyday environments. During the time of the internship, you are expected to develop algorithms to advance research in human activity prediction. Examples of previous intern projects include: RAFT former for real-time action anticipation (CVPR 2023, spotlight), and Adams Former for future action localization (CVPR 2023). Potential research topics include (but not limited to):

- Generative AI for modeling future human action affordances (e.g. pose, location, etc.).
- Multi-modal foundation models for human activity understanding.
- Estimating human states (e.g. intent, goal, etc.) for human activity prediction.

#### **Qualifications:**

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, robotics, or related field.
- Strong research experience in computer vision, multi-modal learning and/or robotics.
- Experience in open-source deep learning frameworks such as PyTorch or TensorFlow.

#### **Bonus Qualifications:**

- Experience in one or more of the following: deep generative models, foundation models.
- Publications in top-tier conferences (CVPR, ICCV, ECCV, ICML, NeurIPS, ICLR, ICRA, IROS, ...).

**Duration:** 3 months

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### **Visuo-Linguistic Models for Human-Machine Interaction (Job Number: P22INT-37)**

This project focuses on the development of algorithms that can extract and reason on visuo-linguistic representation of the surrounding environment, aiming to provide support for autonomous systems such as robots and vehicles that interact with humans in everyday environments. Develop algorithms for visual scene understanding, path planning, and road-risk estimation using video from a moving car. During the time of the internship, you are expected to develop algorithms to advance research in vision-and-language understanding in interactive applications. Potential research topics include (but not limited to):

- Large (or infinite) vocabulary scene understanding via natural language.
- Analyzing and improving shortcomings of vision-and-language foundation models for interactive applications.

#### **Qualifications:**

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, cognitive science, or related field.
- Strong familiarity with computer vision and/or natural language processing techniques pertaining to scene understanding and vision-and-language understanding.
- Experience in open-source deep learning frameworks such as PyTorch or Tensorflow.

#### **Bonus Qualifications:**

- Experience in scene understanding techniques such as object detection (2D, 3D, video), panoptic segmentation, simultaneous localization and mapping (SLAM), etc.
- Experience in vision-and-language foundation models.

**Duration:** 3 months

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### **Visual Scene Understanding and Common-Sense Reasoning under Uncertainty (Job Number: P22INT-45)**

This project focuses on developing computer vision and machine learning algorithms for scene understanding and common-sense reasoning associated with uncertain behavior of interacting agents in mobility domains. It aims towards enhancing transparency, interpretability for safe and effective motion planning and decision making in highly interactive mobility scenes.

#### **Key Responsibilities**

- During the time of the internship, you are expected to develop algorithms to advance research in common sense reasoning of agents' uncertain behavior prediction in interactive scenes. Potential research topics include (but not limited to):
- Predicting agents' intentions with/without complete observations
- Leverage LLMs for common sense reasoning
- Prompt Engineering, Model fine-tuning
- Uncertainty quantification of agents' behavior
- Robustness in future prediction

#### **Minimum Qualifications**

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, robotics, or related field.
- Strong research experience in computer vision, machine learning, and/or robotics.
- Experience in open-source deep learning frameworks such as PyTorch or Tensorflow.
- Excellent programming skills in Python or C++

#### **Bonus Qualifications**

- Experience in one or more of the following: deep generative models, probabilistic modeling, graph neural networks, foundation models, prompt engineering.
- Publications in top-tier conferences (CVPR, ICCV, ECCV, ICML, NeurIPS, ICLR, ICRA, IROS, ...).

**Years of Work Experience Required:** 1 year

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### **Video Understanding and Visual Reasoning (Job Number: P22INT-48)**

The project aims to research and develop computer vision and machine learning algorithms for recognizing and reasoning human behaviors and reactions, including actions, intentions, interactions, and affective states in response to surrounding events. The ultimate goal is to provide a new perspective in understanding human experiences and situations.

#### **Key Responsibilities**

- During the time of the internship, you are expected to develop computer vision and machine learning algorithms for video understanding and visual reasoning problems. Potential research topics include, but are not limited to:
- Unsupervised video anomaly detection and out-of-distribution detection
- Human emotion recognition and reasoning in videos
- Visual prompting for adapting foundation models to downstream video understanding tasks

### **Minimum Qualifications**

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, or related field.
- Strong research experience in computer vision and machine learning.
- Proficiency in programming languages such as Python and deep learning frameworks such as PyTorch.

### **Bonus Qualifications**

- Experience in one or more of the following: action recognition, anomaly detection, vision-language reasoning, multi-modal foundation models, and visual prompting.
- Publications in top-tier conferences or journals (CVPR, ICCV, ECCV, ICML, NeurIPS, ICLR, T-PAMI, T-IP, IJCV, etc.)

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## **Human-Computer Interaction**

### **Human Action Understanding in Long Videos (Job Number: P22INT-29)**

The project focuses on research and development of computer vision and machine learning algorithms toward understanding of human actions and activities in instructional videos, with particular emphasis on weakly supervised online action segmentation and detection of anomalies and errors during execution of those tasks. During the time of the internship, you are expected to:

- Develop computer vision algorithm for action understanding and anomaly detection using weakly supervised methods
- Support development of a benchmark dataset for evaluation of results
- Develop and evaluate metrics to verify reliability of the proposed algorithms
- Contribute to a portfolio of patents, academic publications, and prototypes to demonstrate research value

#### **Qualifications:**

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, or related field
- Strong research experience in computer vision and machine learning
- Hands-on experience in long-range video understanding of instructional videos, e.g., action segmentation, action detection, or action anticipation.
- Experience in addressing problems at the intersection of language and vision, particularly use of large language models.
- Experience in open-source deep learning frameworks such as TensorFlow or PyTorch

#### **Bonus Qualifications:**

- Zero-shot learning.
- Anomaly detection.
- Publications in top-tier conferences (CVPR, ICCV, ECCV, ICML, NeurIPS, ICLR, etc.)

**Duration:** 3 months

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### **Human Factors Research Intern (Job Number: P22INT-30)**

This project focuses on defining and establishing measures that can help assess mobility users in different situations across different mobility types. The project involves the design and evaluation of user studies

that can help assess how emerging mobility systems can impact people. During the time of the internship, you are expected to:

- Conceptualize and quantify concepts, and determine methods to assess those concepts
- Design and implement complex experiments that can be used for testing hypothesis for the key project objectives.
- Establish and implement the user study design protocols, while ensuring the integrity of the experiment and the data generated is maintained
- Contribute towards preliminary data analysis to conduct hypothesis testing/regression analysis

**Qualifications:**

- Highly qualified M.S./Ph.D., candidate in human factors related field (human factors, cognitive science), psychology, or social science, statistics, or operation/industrial engineering.
- Familiarity with interaction/behavioral modeling for automobiles/ micro mobility /pedestrian behavior.
- Familiarity with using toolkits to develop experimental scenarios in simulation software (VR tools)
- Knowledge in experimental design, multivariate statistical methodologies e.g., causal inference with observable data, longitudinal analysis, classification, dimension reduction, clustering, hierarchical linear (random effects) modeling.

**Duration:** 3 months

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**Computational Models for Human-Aware Systems (Job Number: P22INT-35)**

Seamless interaction between humans and automation requires the automation to be aware of human states and resultant behaviors. This position involves developing computational models of the human state as well as optimizing automated mobility behavior based on the human state using supervised and reinforcement learning algorithms. During the time of the internship, you are expected to:

- Model dynamics of human behavior for human-automation interactions
- Develop a modeling framework to understand and predict human cognitive states
- Create and validate tools to optimize system performance based on predicted human states

**Qualifications:**

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, mathematics, statistics, psychology, cognitive science, or human behavior-related field
- Research experience in behavioral research and human-computer interaction
- Excellent programming skills in Python and/or C++

**Bonus Qualifications:**

- Experience in applied statistics i.e., probabilistic models and Bayesian models, machine/deep learning, reinforcement learning, and human-in-the-loop online learning
- Experience in open-source deep learning frameworks such as TensorFlow or PyTorch preferred
- Experience with designing and conducting human subject study

**Duration:** 3 months

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## Communication and HMI Research Intern (Job Number: P22INT-41)

### Position Introduction:

This project focuses on developing innovative platforms designed to support communication needs in the mobility domain. The project involves the design and development of prototype interfaces in a simulated environment and the evaluation of the related psychological impacts.

### Key Responsibilities

- Review literature
- Design prototype HMIs for various scenarios
- Incorporate HMI into the simulation
- Conduct pilot testing
- Support psychological impact evaluation and analysis

### Minimum Qualifications

- PhD student in Human Factors, Industrial Engineering, Psychology, Neuroscience, or similar disciplines
- Strong research experience in human-machine interaction, and multi-modality HMI design
- Experience in simulation development using Unreal Engine
- Excellent programming skills in Python and/or C++, or other similar languages
- Research experience in the automotive and mobility domain, human state evaluation, and design and analysis of subjective data

### Bonus Qualifications

- Passion for learning new software tools and languages
- Strong problem-solving skills
- Excellent communication skills
- Be able to work independently within a multicultural environment
- Experience with physiological data acquisition systems
- Experience with online subject research platforms, such as Amazon Mechanical Turks

**Years of Work Experience Required:** 2-5 years

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## Human-AI Teaming Research Intern (Job Number: P22INT-40)

Explore and advance the collaboration and interaction between humans and AI systems. Project work will involve conducting research, developing, and designing frameworks that optimize the synergy between humans and AI technology.

### Key Responsibilities:

- Conduct in depth research on human-AI teaming, exploring topics such as behavior, explainability, distraction, cognitive overload, emotion, computational modeling.
- Develop and execute experiments and studies to evaluate the effectiveness and impact of human-AI collaboration.
- Explore and propose frameworks, guidelines, and best practices for effective human-AI collaboration.

- Develop strategies to distribute tasks, responsibilities, and decision-making between humans and AI systems to maximize synergy and performance.
- Apply human-centered design principles to create interaction models, and communication frameworks that support collaboration between humans and AI systems.
- Incorporate user feedback and iterate on designs to optimize usability and user experience.

**Minimum Qualifications:**

- PhD student in human-computer interaction, artificial/emotional intelligence, and psychology, or similar disciplines
- Strong research experience in explore and advance the collaboration and interaction between humans and AI systems.
- Experience in research and AI systems that enhance human communication, decision making, and effective/affective collaboration.
- Excellent programming skills in Python and/or C++, or other similar languages
- Research experience in the automotive and mobility domain, human state evaluation, and design and analysis of subjective data

**Bonus Qualifications:**

- Passion for learning new software tools and languages
- Strong problem-solving skills
- Excellent communication skills
- Be able to work independently within a multicultural environment
- Experience with physiological data acquisition systems
- Experience with online subject research platforms, such as Amazon Mechanical Turks

**Years of Work Experience Required:** 2-5 years

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**Affective Computing and Driver State Estimation (Job Number: P23INT-02)**

This position is a research intern, where you will conduct research with multimodal human sensing data, such as eye gaze, peripheral physiological data, and mobility simulator data. The major goal of the project is to investigate estimating human states with these multimodal signals, through machine learning and deep learning methods.

**Key Responsibilities**

- Signal processing and feature extraction on multimodal signals
- Machine learning and deep learning on related affective computing targets, including satisfaction, trust, and arousal
- Be a team player in a team of scientists and engineers, to efficiently communicate with teammates
- Write good quality publications

**Minimum Qualifications**

- M.S or Ph.D in Computer Science, Computer Engineering, Electrical Engineering, Mechanical Engineering, Applied Mathematics, or related fields
- Good programming skills in Python, with deep understanding on machine learning and deep learning
- Good publication record on affective computing, human computer interaction, machine learning, computer vision, or related fields

**Bonus Qualifications**

- Previous experiences with eye gaze, physiological data processing
- Previous experiences with transportation research, or human participant experiments

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**Machine Learning/AI****Research Intern: Interaction Aware Motion Planning (Job Number: P22INT-39)**

This position investigates a decision-making and motion planning algorithms for autonomous driving. This will include research and development for combinatorial approaches of data-driven and control-theoretic methods. This is an opportunity for applied work in optimizations, deep learning, and controls. During the time of the internship, you are expected to:

- Design and develop a decision-making and motion-planning pipeline for autonomous driving
- Implement the algorithm on a state-of-the-art traffic simulator
- Analyze and diagnose the performance of the system

**Qualifications:**

- MS or Ph.D. candidate in computer science, electrical engineering, robotics, or other related fields
- Strong familiarity and research experience in optimizations, controls, and deep learning
- Excellent programming skills in either Python or C++

**Bonus Qualifications:**

- Ph.D. candidate in computer science, electrical engineering, robotics, or other related fields
- Experience with ROS (Robot Operating System)
- Publication record of motion planning for autonomous vehicles

**Duration:** 3 months

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**Generative models for scene synthesis (Job Number: P22INT-42)**

This project is about synthesizing driving scenes with state-of-the-art generative models. The scenes to be generated include both static and dynamic objects, in either 2D or 3D, and may be used for various perception, prediction, and planning tasks.

**Key Responsibilities**

- Develop generative models that can synthesis both static and dynamic objects
- Develop controllable generation methods that can reflect interactions among objects
- Synthesize scenes that are important for ADAS tasks
- Propose new methods to advance the state-of-the-art generative models in one or multiple aspects

**Minimum Qualifications**

- M.S. degree in computer science, electrical engineering, robotics, or related fields
- Development experience in generative models
- Knowledge in computer vision and 3D geometry
- Strong programming skills in Python and Pytorch

### **Bonus Qualifications**

- Ph.D. candidate in computer science, electrical engineering, robotics, or related fields
- Research experience in diffusion models or other state-of-the-art generative models
- Research experience in controlled or conditional generative models
- Research experience in 3D computer vision, e.g. 3D reconstruction, pose estimation, SLAM, neural radiance field (NeRF)
- Research experience in behavior prediction and planning

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### **Scene understanding and causal reasoning for ADAS (Job Number: P22INT-43)**

This project focuses on the driving scene understanding from the ego driver's perspective, and the prediction of risks to the ego vehicle.

#### **Key Responsibilities**

- Develop scene understanding methods with both static and dynamic objects.
- Construct causal generative and predictive models for vehicle, bike, pedestrian, and ego driver behaviors.
- Identify or predict potential risks to the ego vehicle based on the scene understanding and causal reasoning results.
- Generate explainable warnings to the ego driver.

#### **Minimum Qualifications**

- M.S. student in computer science, electrical engineering, robotics, mathematics, or related fields
- Experience in statistical inference and machine learning
- Excellent programming skills in Python and C++

#### **Bonus Qualifications**

- Ph.D. candidate in computer science, electrical engineering, robotics
- Research experience in probabilistic graphical models, causal inference, and causal structure discovery
- Research experience in computer vision
- Research experience in vehicle planning and collision avoidance
- Experience in vehicle simulators, e.g. Carla

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### **Driver Behavior and Intent Prediction Intern (Job Number: P23INT-01)**

This position involves the research in the field of human behavior and intent prediction for autonomous vehicle technology. This Behavior prediction technology will be used to help further the understanding of driver interaction in complex driving scenes and help advance the field of interaction aware motion planning. The intern will have an opportunity to work with real world data and use a combination of data driven learning-based models that will support development of AD/ADAS technology.

#### **Key Responsibilities**

- Develop a driving behavior prediction model using real world driving data.
- Integrate the developed Driver behavior model into a simulation environment to support high fidelity AD/ADAS technology software testing.

- Evaluate the developed driving behavior models against existing state of the art models from literature.
- Will have opportunity to publish relevant results in conference proceedings or journals.

#### **Minimum Qualifications**

- M.S. candidate in Robotics, Computer Science or related field
- Experience in driver behavior modelling and motion forecasting.
- Programming skills in MATLAB & Simulink, Python

#### **Bonus Qualifications**

- Ph.D. candidate in Robotics, Computer Science, Civil Engineering or Mechanical Engineering
- Experience with using Bayesian models, Game Theory and other A.I. techniques for interaction modelling.
- Strong publication record
- Experience working with ROS framework

**Years of Work Experience Required:** 1+ year

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## **Robotics**

### **Intention Estimation for Teleoperation (action, task recognition and prediction) (Job Number: P22INT-31)**

This internship focuses on the development, implementation, and testing of algorithms to model and infer the intentions of a human operator (including the operator's target, action, and task) during object manipulation by a tele-operated robot. The modeling and inference may involve the use of probabilistic methods and data-driven models. During the time of the internship, you are expected to:

- Develop algorithms to model human behaviors using multimodal input and prior knowledge for inferring human intentions (including the operator's target, action, and task) in robot teleoperation.
- Implement and validate the algorithms in simulation and on hardware.
- Conduct a literature survey on related work.
- Prepare written and oral reports on the code and results.
- Publish the algorithms and results in top-tier conferences and journals in robotics and machine learning.

#### **Qualifications:**

- Ph.D. or highly qualified M.S. candidate in robotics, computer science, electrical engineering, or related fields.
- Experience in probabilistic models, Bayesian models, machine learning, and neural networks.
- Excellent programming skills in either C++ or Python.
- Experience in conducting hardware experiments using ROS.

#### **Bonus Qualifications:**

- Research experience with Deep Learning, Transfer Learning, and foundational models.
- Research experience with human motion/action/task recognition.
- Research experience with task procedure modeling.

- Experience in conducting human-robot interaction experiments in teleoperation environment.
- Experience with PyTorch, TensorFlow, or Pyro.

**Duration:** 3 months

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### **Physical Human-Robot Interaction (Job Number: P22INT-32)**

The focus of this research is to model and control the interaction between a robotic arm/hand and human body, and develop, implement, and validate algorithms to enable a safe physical human-robot interaction. During the time of the internship, you are expected to:

- Research, ideate, and implement novel model- and learning-based robot behaviors and pHRI interaction control algorithms with guaranteed safety and embedded adaptability on robotic arms and hands to enable safe physical interactions between humans and robots. Validate the results on hardware.
- Publish research results at top-tier conferences and journals in robotics as well as machine learning.

#### **Qualifications:**

- Ph.D. or highly qualified M.S. candidate in mechanical engineering, electrical engineering, robotics, computer science, or a related field.
- Excellent knowledge of interaction control design for pHRI including admittance and impedance control, robot kinematics, dynamics, control systems, and haptics.
- Hands-on experience with implementation of real-time control algorithms on robotic systems.
- Experienced in ROS.
- Very good programming skills in C++ or Python.
- Experience in machine learning methods.

#### **Bonus Qualifications:**

- Experience in interaction control for pHRI applications.
- Experience in exoskeleton control.

**Duration:** 3 months

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### **Visuotactile Perception for Robotic Manipulation (Job Number: P22INT-33)**

This project aims to enhance the capabilities of robots in object manipulation through the integration of vision and tactile sensor data. The focus is on developing perception algorithms to estimate object states and finger-object contact states using visuotactile information. The successful candidate will contribute to the development of these algorithms in simulation and ensure their seamless integration with planning and control. They will also be responsible for deploying the algorithms on advanced robotic platforms with multi-fingered hands and ensuring their performance on the robot matches that of the simulations. During the time of the internship, you are expected to:

- Develop algorithms to fuse vision and tactile data to perceive finger-object contact conditions
- Explore temporal approaches to improve the stability of the estimates over time
- Implement and validate the developed algorithms in simulation and on hardware
- Publish research results in top-tier conferences and journals in robotics and machine learning

**Qualifications:**

- Ph.D. or highly qualified M.S. candidate in computer science or a related field
- Experience in deep learning and other machine learning methods
- Good programming skills in Python
- Experience with Robot Operating System (ROS)

**Bonus Qualifications:**

- Experience with sim-to-real approaches
- Experience with deep learning approaches such as GNNs and LSTMs
- Experience in perceiving object properties using force and pressure data from tactile sensors
- Experience with PyTorch

**Duration:** 3 months

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**Interpersonal Dynamics Understanding in Human-Human-Robot Interaction (Job Number: P22INT-34)**

This project aims to develop and implement machine learning algorithms to model human-human-robot interactions. Using visual, audio, and physiological data, the focus is on estimating human emotion and relational states. These estimates will be utilized by robots to enhance human-human-robot interaction. During the time of the internship, you are expected to:

- Analyze subjective and objective human behavioral data to draw inferential conclusions
- Develop and implement algorithms to estimate humans' emotional and relational states from sensor data
- Develop and implement algorithms that use the estimated emotional state to improve human-robot interaction
- Publish research results at top-tier conferences and journals in robotics and human-machine interaction

**Qualifications:**

- Ph.D. or highly qualified M.S. candidate in computer science or a related field
- Experience with deep learning and other machine learning methods
- Good programming skills in Python or C++
- Experience in deep learning frameworks such as PyTorch

**Bonus Qualifications:**

- Experience with Robot Operating System (ROS)
- Experience with analyzing human behavioral data from visual, audio, and physiological sensors

**Duration:** 3 months

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**Deep Learning Based Dexterous Manipulation (Job Number: P22INT-36)**

The main objective of this research is to advance machine learning methods, specifically behavior cloning and reinforcement learning, to enable multi-fingered robot hands to dexterously manipulate objects in unstructured human environments utilizing practical sensing (visual and tactile) and actuation components.

The candidate is expected to leverage both simulation and real hardware to implement, evaluate, and refine the learned policy. During the time of the internship, you are expected to:

- Develop methods to learn sensorimotor policies for dexterous object manipulation using multi-fingered robot hands.
- Implement and validate the developed methods in simulation and on hardware.
- Implement baselines and perform benchmarking to evaluate the learned policy.
- Contribute to the creation and evaluation of various related technologies.
- Contribute to academic publications for top-tier conferences and journals in robotics and machine learning.

**Qualifications:**

- Ph.D. or highly qualified M.S. candidate in robotics, computer science, mechanical engineering, or a related field.
- Experience in robot manipulation, control, and planning.
- Experience with building simulated environments (e.g., in Isaac Gym or MuJoCo) and training manipulation policies in simulation.
- Experience with policy deployment on real world robots.
- Proficient with Python and C++.
- Experience with Robot Operating System (ROS)
- Proficient with PyTorch or TensorFlow.

**Bonus Qualifications:**

- Experience with learning representations using RGB, RGB-D, and tactile data as inputs.
- Experience with robotic in-hand dexterous manipulation.
- Knowledge in contact dynamics and contact mode switching.
- Experience in online reinforcement learning with hardware robot.
- Experience with Sim2Real approaches.

**Duration:** 3 months

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**Robotic Dexterous Manipulation (Job Number: P22INT-38)**

The focus of this research is to develop, implement, and validate robust algorithms for planning and controlling dexterous manipulation considering dynamic behaviors and uncertainties. During the time of the internship, you are expected to:

- Develop algorithms for reducing the Sim2Real gap for dexterous manipulation
- Develop robust model-based and learning-based algorithms for planning and control under uncertainties
- Model dynamic behaviors for contact-rich dexterous manipulation
- Implement and validate the developed algorithms in simulation and on hardware
- Publish research results at top-tier conferences and journals in robotics as well as machine learning.

**Qualifications:**

- Ph.D. or highly qualified M.S. candidate in mechanical engineering, robotics, computer science, or a related field.
- Excellent knowledge of robot kinematics, dynamics, control, and reinforcement learning is required.

- Excellent programming skills in C++ or Python.
- Experienced in ROS.

**Bonus Qualifications:**

- Experience in robotic manipulation and grasping.
- Experience with deep reinforcement learning and sim-to-real approaches and libraries.
- Experience with implementation of real-time control algorithms on robotic systems.

**Duration:** 3 months

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**Multi-robot Team Formation Research Intern (Job Number: P22INT-47)**

We are seeking a skilled and innovative researcher to join our team and contribute to the advancement of distributed team-formation among robots. The ideal candidate should possess a strong background in robotics, artificial intelligence, or a related field, with expertise in distributed algorithms, coordination mechanisms, and team coordination. Excellent problem-solving skills, a passion for innovation, and the ability to work effectively both independently and as part of a team are essential for success in this role.

**Key Responsibilities**

- During the time of the internship, you are expected to:
- Explore and developing novel algorithms, methodologies, and techniques to enable efficient and effective formation of autonomous robot teams in a distributed manner
- Collaborate with a multidisciplinary team of researchers to design and implement cutting-edge solutions.
- Publish your research findings in top-tier conferences and journals.

**Minimum Qualifications**

- M.S./Ph.D. candidate in mechanical engineering, electrical engineering, computer science, or similar fields.
- Proven experience in researching and developing algorithms and methodologies for autonomous robot team-formation.
- In-depth knowledge and practical experience in game theory, market-based approaches, consensus algorithms, or resource allocation and their applications to distributed decision-making and coordination among autonomous agents.
- Excellent programming skills in Python, C++.
- Experience in modeling and simulating multi-agent systems using tools such as ROS (Robot Operating System), or similar frameworks.

**Bonus Qualifications**

- Familiarity with machine learning and artificial intelligence techniques applied to distributed team-formation problems.
- Familiarity with various approaches to distributed decision-making, including game theory, market-based approaches, and distributed consensus algorithms.
- Familiarity with related work and state of the art, including research papers, conferences, and current trends in distributed team-formation among robots.
- Strong publication record in the topics related to team formation

**Years of Work Experience Required:** 1-2 years

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## **Software Engineering**

### **Autonomous Systems (Job Number: P22INT-24)**

The project involves design and development of software modules for our Autonomous Driving activities. The candidate will be involved in the research and development of state-of-the-art motion planning and multi-agent decision making algorithms, and sim to real transfer.

#### **Key Responsibilities**

- Implement low-latency and high-performance software prototype modules, integrate, deploy, and test them in simulation.
- Develop software infrastructure and tools, such as test scenarios, baseline algorithms, module interfaces, etc. to facilitate team's development efforts.
- Be an essential member of a team of engineers and scientists that develop autonomous driving technologies in a fast-paced software development environment.

#### **Minimum Qualifications**

- M.S. or Ph.D. candidate in computer science, electrical engineering or related field.
- Expertise in autonomous systems research and in one or more of the following: robot motion planning, multi-agent decision making, sim to real transfer, system of systems.
- Ability to architect a full system including software components and hardware platforms.
- Excellent programming skills in C++ and Python.
- Experience with Robot Operating System (ROS).
- Familiar with modern software engineering tools such as Git, CI/CD, Containers (Docker, Kubernetes).

#### **Bonus Qualifications**

- Hands-on experience in real-world robotics applications.
- Experience with vehicle simulators such as Carla, Carmaker, etc.
- Experience with software engineering tools and processes (Jira, Agile, Scrum, Kanban, etc.)

**Duration: 3 ~ 4 months**

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### **Robotics Software Engineering Intern (Job Number: P22INT-44)**

The Robotics Software Engineering Intern will support the building of the software stack for autonomous vehicle behavior planning and decision-making algorithms.

#### **Key Responsibilities**

- Implement low-latency and high-performance software prototype modules, integrate, deploy, and test them in simulation.
- Develop software infrastructure and tools, such as test scenarios, baseline algorithms, module interfaces, etc. to facilitate team's development efforts.
- Be an essential member of a team of engineers and scientists that develop autonomous driving technologies in a fast-paced software development environment.

**Minimum Qualifications**

- M.S. candidate in computer science, electrical engineering or related field.
- Expertise in autonomous systems research.
- Ability to architect a full system including software components and hardware platforms.
- Excellent programming skills in C++ and Python.
- Experience with Robot Operating System (ROS).
- Familiar with modern software engineering tools such as Git, Containers (Docker, Kubernetes).

**Bonus Qualifications**

- Ph.D. candidate in computer science, Robotics, or related field.
- Hands-on experience in real-world robotics applications.
- Experience with vehicle simulators such as Carla, Carmaker, etc.
- Experience with software engineering tools and processes (Jira, Agile, Scrum, Kanban, etc.)

**Years of Work Experience Required:** 1+ years