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 (Silicon Valley) is offering research internships to highly motivated PhD (and qualified MS) 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!

How to Apply: Please send an e-mail to careers@honda-ri.com with the following:
- Subject line including the job number(s) you are applying for
- Recent CV

Candidates must have the legal right to work in the U.S.A.

Human action and intention recognition (Job Number: P17INT-07):
This project focuses on development of computer vision and machine learning algorithms for pedestrian action and intention prediction for next generation mobility systems with emphasis on traffic scenes and indoor environments that accommodate interaction of humans and robots. The project also involves supporting creation of a benchmark dataset that considers human actions, gestures, cognitive state, intention, environment semantics, joint attention, and social dynamics to model non-verbal communication cues that are important in modeling human-machine interaction.

Qualifications:
- MS or PhD candidate computer science, electrical engineering, or related field
- Strong familiarity and research experience in human action, activity, or intention recognition
- Highly proficient in software engineering using C++ and Python
- Experience in open-source Deep Learning frameworks such as TensorFlow or Caffe preferred

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3D computer vision in dynamic traffic scenes (Job Number: P17INT-08):
This project focuses on development of computer vision and machine learning algorithms related to processing and fusion of 2D video and 3D point cloud data, including segmentation, recognition, registration, and tracking. The project scope includes analysis, reconstruction, and interpretation of 3D dynamic scenes through fusion of video and LiDAR point cloud data.

Qualifications:
- MS or PhD candidate computer science, electrical engineering, or related field
- Strong familiarity and research experience in 3D computer vision and machine learning
- Hands-on experience in one or more of the following: LIDAR data processing, simultaneous localization and mapping (SLAM), perception, sensor fusion
- Highly proficient in software engineering using C++ and Python

- Experience with Point Cloud Library (PCL), Robot Operating System (ROS), and GPU programming preferred
- Experience in open-source Deep Learning frameworks such as TensorFlow or Caffe preferred

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Traffic scene classification from video (Job Number: P17INT-09)
This project focuses on research and development of computer vision and machine learning algorithms for video based classification/recognition of road scenes, including places, road surface and weather conditions, and spatial relationships. This core technology is to be used for higher level understanding of traffic scenes, including temporal event detection, action recognition, video captioning, and localization.

Qualifications:
- MS or PhD candidate computer science, electrical engineering, or related field
- Strong familiarity with machine learning techniques pertaining to visual recognition, place recognition, and/or video classification
- Highly proficient in software engineering using C++ and Python
- Experience in TensorFlow (or Caffe) and CAD rendering tools preferred

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Captioning and retrieval of events in traffic scenes (Job Number: P17INT-10)
In a related project at HRI, researchers are developing computer vision and machine learning algorithms for classification of atomic actions of ego-vehicles, traffic participants, and their interaction. The aim of this project is to use these atomic actions to describe (or caption) more complex events that are important in traffic scene understanding and enable retrieval of these events based on key-words, linguistic description, graphical representation, or video similarity based search methods.

Qualifications:
- MS or PhD candidate computer science, electrical engineering, or related field
- Strong familiarity with machine learning techniques pertaining to video captioning and retrieval
- Highly proficient in software engineering using C++ and Python
- Experience in TensorFlow (or Caffe) and CAD rendering tool preferred

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Machine learning on time series data (video/car sensor signals) (Job Number: P17INT-11)
The title includes multiple positions which focus on developing and evaluating novel machine learning frameworks using on-road driving data collected from our highly advanced test-vehicles. The candidate is expected to work on one of the following topics:
- Infer salient objects/regions of the driving video that should attract driver's visual attention
- Model driver situational awareness from scene saliency and driver gaze behavior
- Supervised/unsupervised learning of driving behaviors
- Supervised/unsupervised detection of anomalies

Qualifications:
- PhD or MS candidate in computer science, electrical engineering, or related field
- Research experience in computer vision, machine learning and video analytics
- Strong background in temporal and multimodal data (e.g. video + time series) processing
- Experience designing deep neural networks using TensorFlow, Keras or similar tools
- Excellent programming skills in Python (C++)

- Strong publication record in top tier conference/journal in computer vision and machine learning areas preferred

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Simulation based human factors study (Job Number: P17INT-12)
This position offers the opportunity to design and conduct human-factors study to prototype in-car HMIs on our experimental simulator setups.

Responsibilities:
- Design and conduct the human-factors study to evaluate our prototype HMIs
- Data analysis to compare subjects' driving behavior and perception of each HMI

Qualification:
- PhD in human factor engineering, or related field
- Research experience in automotive HMI evaluation

Human-based computation and crowdsourcing (Job Number: P17INT-13)
This position offers the opportunity to study human-computing for crowdsourcing based methods to accelerate data acquisition and quality control for machine learning applied to computer vision-based systems.

Responsibilities:
- Study and design crowdsourcing interfaces and analyze collected data
- Apply machine learning-based data cleaning/selection algorithm to the collected data
- Train machine-learning algorithm using the collected data and compare performances

Qualification:
- PhD candidate in computer science, electrical engineering, or related field
- Research experience in computer vision, machine learning, human machine interaction
- Experience designing deep neural networks using TensorFlow, Keras or similar tools
- Excellent programming skills in Python (C++)
- Strong publication record in top tier conference/journal in computer vision and machine learning areas preferred

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Robotics navigation in a crowded environment (Job Number: P17INT-14)
This internship position focuses on formulating and developing algorithms, and running experiments on the topic of Robotic "mobility decision making" (e.g. global planning, local movement strategies) in human crowds.

Candidates with experience in any of the following areas are especially desirable:
- An understanding of the game theoretic/psychological principles governing robotic movement in human spaces
- Machine learning methods for detecting human contextual/interactive cues
- Machine learning for human activity forecasting, e.g., predicting trajectories in crowded spaces
- Designing global to local planning hierarchies that have desirable theoretical properties in human environments

Qualifications:
- PhD or highly qualified MS candidate in computer science, electrical engineering, or related field
- Experience in motion planning, manipulation/grasping, and machine learning
- Experience in setting up simulation environment and executing real robot experiments
- Good programming skills in either C++ or Python
- Experience in Robot Operating System (ROS)

Physical human-robot interaction (Job Number: P17INT-15)
This internship position focuses on formulating and developing algorithms, and running experiments of physical human-robot interaction (pHRI). The candidate is expected to work on one or more of the following topics:
- Human-to-robot motion retargeting considering contact forces
- Whole-body force control of a torque-controlled, dual-arm robot
- Interaction modeling from human motion data
- Human intention recognition for pHRI

Qualifications:
- PhD or highly qualified MS candidate in computer science, mechanical engineering, or related field
- Experience in robot kinematics/dynamics, force control, or human motion analysis
- Experience in setting up simulation environment and executing real robot experiments using ROS
- Good programming skills in C++ or Python

Robotic manipulation of deformable objects (Job Number: P17INT-16)

Key responsibilities:
Formulate and develop algorithms into codes, and run experiments using mobile robot platform in the area of deformable object manipulation deep reinforcement learning

Qualifications:
- PhD or highly qualified MS candidate in computer science, electrical engineering, or related field
- Experience in motion planning, manipulation/grasping, and machine learning
- Experience in setting up simulation environment and executing real robot experiments
- Good programming skills in either C++ or Python
- Experience with ROS, and deep RL preferred

Robotics tactile manipulation (Job Number: P17INT-18)

Key responsibilities:
Formulate and develop algorithms into codes, and run experiments using manipulator with tactile sensors in the area of tactile manipulation and machine learning

Qualifications:
- PhD or highly qualified MS candidate in computer science, electrical engineering, or related field
- Experience in tactile sensing, manipulation/grasping, and machine learning and deep reinforcement learning

- Experience in setting up simulation environment and executing real robot experiments
- Good programming skills in either C++ or Python
- Experience with ROS and hierarchical learning preferred

Motion planning / decision making (Job Number: P17INT-19)

Key responsibilities:
- Develop RL algorithms to develop decision making and motion planning algorithms
- Develop IRL/LfD/Behavior Cloning algorithms to address driving scenarios

Qualifications:
- Excellent programming skills in Python and C++
- Research expertise in Machine Learning related techniques including RL and IRL/LfD/Behavior Cloning
- Experience in TensorFlow or PyTorch preferred

Vehicle motion prediction (Job Number: P17INT-20)

This position will focus on long-term vehicle motion prediction using probabilistic or learning-based methods. We will use both simulated data as well real data gather from on-board sensors to predict the intention and future trajectory of surrounding vehicles. Key responsibilities include: (1) literature survey (2) problem formulation and modeling (3) performing proof-of-concept using simulation, and (4) code development and validation using real sensor data.

Qualifications:
- Good programming skills in either C++ or Python
- Solid understanding of probabilistic methods such as Kalman filters, Particle filters, HMM, DBN, SLDS
- Working knowledge of machine learning techniques such as SVM, CNN, RNN