Vishnu **Karakkat Narayanan**

2-2-2 Hikaridai, Keihanna Science City, Kyoto 619-0288, JAPAN
+81 774 95 2626 | vishnu@atr.jp | www.irc.atr.jp/ vishnu/ | Google Scholar: https://goo.gl/dQ2Mv4

Research Scientist
Intelligent Robotics and Communication Laboratories
Advanced Telecommunications Research Institute International

Areas: Robotics, Applied Computer Vision & Machine Learning.

Education

Doctor of Philosophy in Computer Science — *Rennes, France*
Institut National des Sciences Appliquées de Rennes — *November 2016*
Advisors: Dr. Marie Babel and Dr. Anne Spalanzani.
Thesis: *Characterizing assistive shared control through vision-based and human-aware designs for wheelchair navigation assistance*
Affiliation: **INRIA Rennes - Bretagne Atlantique**

Master of Science in Mechanical Engineering — *Gainesville, U.S.A.*
University of Florida — *May 2013*
Advisor: Dr. Carl D. Crane III
Thesis: *Vision based on-road vehicle detection and tracking via active learning*

Bachelor of Technology in Mechanical Engineering — *Coimbatore, India*
Amrita Vishwa Vidyapeetham — *May 2011*
Graduated within the Top 10 % of the class

Experience

ATR Intelligent Robotics and Communication Laboratories — *Kyoto, Japan*
Research Scientist - Mobile Robotics — *Apr. 2017 - PRESENT*
- Harmonizing wireless communication constraints within mobile robot navigation in large human-populated environments such as ambient shopping malls (U1, C9).
- Pedestrian-aware robot navigation conducted by investigating functional solutions especially aimed at real world robot deployment (C7).
- *Responsible for the developing and maintaining the robotic hardware consisting of a set of robotized powered wheelchairs, as well as the robot perception and control software suites.*

iCeiRa Lab. (Robotics Lab.) at National Taiwan University (NTU) — *Taipei, Taiwan*
Visiting Student Researcher — *Apr. 2015 - Oct. 2015*
- Hosted by Dr. Ren C. Luo, currently a CTO of AsusTek Computer Inc.
- Experimental validation of a robot navigation strategy for equitably approaching to join a group of interacting humans (C3).

INRIA Rennes - Bretagne Atlantique (LAGADIC Team - Robot Vision) — *Rennes, France*
Doctoral Student/Researcher — *Oct. 2013 - Nov. 2016*
- Worked on semi-autonomous indoor navigation schemes for powered mobility devices such as intelligent wheelchairs, initially within a vision-based framework, and eventually within generalized commercializable architectures (J2, J3, C4, C6, W1, T2).
- Focused on designing shared control navigation paradigms by taking into account the human-in-the-loop while consequently learning to adapt to user intention (C2, C5, U3).

Center for Intelligent Machines and Robotics, University of Florida — *Gainesville, U.S.A.*
Graduate Student Researcher — *Sept. 2011 - May 2013*
- Developed a real-time solution for monocular vision-based on-road vehicle detection & tracking, using an active learning based strategy, for complementing LiDaR-based system equipped on the Gator Toyota Self-driving car (C1, T1).

Toyota Kirloskar Auto Parts LTD. *Bangalore, India*
Summer Intern *June 2009*
- An exploratory internship at the Transmission Manufacturing Unit.

Robert Bosch Asia Pacific Training Center *Bangalore, India*
Winter Intern *Nov 2009*
- An introduction to newer technologies in diesel and gasoline engines.

Publications

Under Review

U1 **Vishnu K. Narayanan**, Takahiro Miyashita, and Norihiro Hagita (2018). 'Harmonizing Wireless Communication Constraints within Human-Aware Robot Navigation using Transient Goals'

Refereed Conference Proceedings

C9 **Vishnu K. Narayanan**, Takahiro Miyashita, Yukiko Horikawa and Norihiro Hagita (2018). 'A Transient-Goal driven Communication-aware Navigation Strategy for Large Human-Populated Environments'
IEEE Intl. Conference on Intelligent Robots and Systems (**IROS**).

C8 Louise Devigne, François Pasteau, Marie Babel, **Vishnu K. Narayanan**, Sylvain Guegan, Philippe Gallien (2018). 'Design of a haptic guidance solution for assisted power wheelchair navigation'
IEEE Intl. Conference on Systems, Man and Cybernetics (**SMC**).

C7 **Vishnu K. Narayanan**, Takahiro Miyashita, and Norihiro Hagita (2018). 'Formalizing a Transient-Goal driven approach to Pedestrian-Aware Navigation'
IEEE Intl. Symposium on Robot and Human Interactive Communication (**RO-MAN**).

C6 Louise Devigne, Marie Babel, Florian Nouviale, **Vishnu K. Narayanan**, François Pasteau and Philippe Gallien (2017). 'Design of an immersive simulator for assisted power wheelchair driving'
IEEE/RAS-EMBS Intl. Conference on Rehabilitation Robotics (**ICORR**).

C5 **Vishnu K. Narayanan**, Anne Spanalzani and Marie Babel (2016). 'A semi-autonomous framework for human-aware and user intention driven wheelchair mobility assistance'
IEEE Intl. Conference on Intelligent Robots and Systems (**IROS**).

C4 Louise Devigne, **Vishnu K. Narayanan**, François Pasteau and Marie Babel (2016). 'Low complex shared-control for power wheelchair navigation'
IEEE Intl. Conference on Intelligent Robots and Systems (**IROS**).

C3 **Vishnu K. Narayanan**, Anne Spalanzani, Ren C. Luo and Marie Babel (2016). 'Analysis of an adaptive strategy for equitably approaching and joining human interactions'
IEEE Intl. Symposium on Robot and Human Interactive Communication (**RO-MAN**).

C2 **Vishnu K. Narayanan**, Anne Spalanzani, François Pasteau and Marie Babel (2015). 'On equitably approaching and joining a group of interacting humans'
IEEE Intl. Conference on Intelligent Robots and Systems (**IROS**).

C1 **Vishnu K. Narayanan** and Carl D. Crane III (2013). 'Active Relearning for Vision based Vehicle Detection and Tracking'
IEEE Intl. Conference on Control, Automation, and Systems (ICCAS).

Refereed Journal Articles

J3 **Vishnu K. Narayanan**, François Pasteau, Maud Marchal, Alexandre Krupa and Marie Babel (2016). 'Vision-based adaptive assistance and haptic guidance for safe wheelchair corridor following'
Computer Vision and Image Understanding (**CVIU**), 149, pp. 171-185.

J2 François Pasteau, **Vishnu K. Narayanan**, Marie Babel and François Chaumette (2016). 'A visual servoing approach for autonomous corridor following and doorway passing in a wheelchair'
Robotics and Autonomous Systems (**RAS**), 75, pp. 28-40.

J1 Radhika N, Babu Devasenapathi , Subramanian R, Rahul Subramany and **Vishnu K. Narayanan** (2013). 'Pattern recognition based surface roughness prediction in turning Hybrid Metal Matrix Composite using Random Forest algorithm' *Industrial Lubrication and Tribology*, 65(1):5.

Workshop Papers, Posters & Non-Refereed Conference Proceedings

W5 Ankur Deka, **Vishnu K. Narayanan**, Takahiro Miyashita and Norihiro Hagita (2018). 'Adaptive Attention-aware Pedestrian Trajectory Prediction for Robot Planning in Human Environments'
IEEE IROS Workshop: From freezing to jostling robots: Current challenges and new paradigms for safe robot navigation in dense crowds (CrowdNav).

W4 **Vishnu K. Narayanan**, Takahiro Miyashita and Norihiro Hagita (2018). 'On Transient-Goal Selection for Communication-Aware Robotic Navigation in Large Human-Populated Environments'
JSME Robotics and Mechatronics Conference (ROBOMECH).

W3 **Vishnu K. Narayanan**, François Pasteau, Marie Babel and François Chaumette (2014). 'Lyapunov-based visual servoing for autonomous doorway passing in a wheelchair'
IEEE IROS Workshop on Assistance and Service Robotics in a Human Environment.

W2 **Vishnu K. Narayanan**, Rahul Subramany, Babudevasenapati S and Radhika N. (2011). 'Studies on tree based classifiers for the prediction of surface roughness in turning Aluminium Metal Matrix Composites'
International Conference on Recent Advances in Mechanical Engineering.

W1 Rahul Subramany, **Vishnu K. Narayanan** and Babudevasenapati S. (2011). 'Condition Monitoring of an end mill cutter using Decision Tree algorithm'
International Conference on Recent Advances in Mechanical Engineering.

Thesis

T2 **Vishnu K. Narayanan** (2016). 'Characterizing assistive shared control through vision-based and human-aware designs for wheelchair mobility assistance'
Ph.D. Thesis, Institut National des Sciences Appliquées de Rennes.

T1 **Vishnu K. Narayanan** (2013). 'Vision based Robust Vehicle Detection and Tracking VIA Active Learning.'
M.Sc. Thesis, University of Florida.

Skills

Programming	*Advanced:* C/C++, Python and *Intermediate:*Java, LISP, Prolog
OS	Linux (*Advanced*), Windows
Utilities	ROS, OpenCV, TensorFlow, Matlab, Git, gdb, SVN, LaTeX, CMake
Core Areas	Robotics, Human-Robot Interaction, Dynamics and Control, Vision-based Control, Machine Learning specifically Reinforcement Learning, Deep Learning
Hardware	5+ years extensive experience on various robot hardware/sensor systems, especially on *robotized* electric wheelchairs equipped with a range of proprioceptive sensors such as 2D & 3D Laser Scanners, RGB-(D) Cameras etc.
Misc	AutoCAD, Solid Edge, PRO Engineer, EdgeCAM, ANSYS, WEKA
Languages	My mother tongue is **Malayalam**. I am fully proficient in **English** and fairly proficient in **Hindi**. I can manage conversations in **French** and **Tamil**, and I am working towards conversational level **Japanese**

Awards

2011	Achievement Award for Academic Merit University of Florida
2008	Bronze Medal, Aero Modelling Tier I Soc. of Auto. Engineers (SAE)
2006	Kerala State Rank 6 All India Green Olympiad
2005	All India Rank 37 Math Olympiad by K.V. Sanghatan, India

Mentoring / Supervision

ATR 2018	Ankur Deka Student at Indian Institute of Technology, Guwahati *on Pedestrian-aware Robot Navigation*
INRIA 2015-16	Louise Devigne Ph.D Student at INSA de Rennes *on Shared Control for Assisted Wheelchair Navigation*
INRIA 2015-16	Valentin Bureau Masters Student of INSA de Rennes *on Haptic Feedback for Ultrasound-assisted Wheelchair Navigation*
INRIA 2014	Clement Leboulanger Masters Student of INSA de Rennes *on Haptic Feedback for Semi-autonomous Wheelchair Navigation*

Misc

REVIEWING	IEEE Transactions on Human-Machine Systems, IEEE/RSJ International Conference on Intelligent Robots and Systems, IEEE International Conference on Robot and Human Interactive Communication
AFFILIATIONS	*Current*: IEEE Member, JSME Member *Previous*: IEEE Student Member, SAE Student Member
TEACHING etc.	Assisted teaching duties at INSA de Rennes, Dept. of Computer Science. Reinforcement Learning Seminar - ATR

Invited Talks/Posters

POSTER	JSME Robotics and Mechatronics Conference (2018) On Transient-Goal Selection for Communication-Aware Robotic Navigation in Large Human-Populated Environments
TALK	National Taiwan University (2015) On equitably approaching and joining a group of interacting humans.
TALK	INRIA Bordeaux (2014) Assistive shared control for powered wheelchairs
TALK	INRIA Grenoble (2014) Vision-based assistance for corridor navigation in a wheelchair
POSTER	International Computer Vision Summer School, Sicily (2014) A visual servoing approach for doorway passing in a wheelchair
POSTER	Journee D5 IRISA (2014) Lyapunov-based visual servoing for doorway passing in a wheelchair

References upon request.