

Rudra Poudel

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Education

- 2010–2014 **PhD in Computer Science**, *Bournemouth University*, UK
Subjects: machine learning, computer vision
Thesis: 3D Hand Tracking
- 2008–2009 **MSc in Evolutionary and Adaptive Systems**, *University of Sussex*, UK
Subjects: artificial life, intelligence in animals and machines, computational neuroscience, neural networks, machine learning, computer vision
- 2001–2003 **Masters in Business Studies**, *Tribhuvan University*, Nepal
Subjects: management information systems, decision support systems
- 1997–2000 **BSc in Computer Science**, *Tribhuvan University*, Nepal
Subjects: computer science, maths, statistics

Research Interests

Machine Learning, Computer Vision, Robotics, Artificial Intelligence.

- Causality
- World Models
- Unsupervised Learning
- Embodied AI
- Multimodal Representation Learning
- Reinforcement Learning

Experience

- Sep 2016 - **Senior Research Scientist**, *Cambridge Research Laboratory, Toshiba Europe*, UK
- Present Senior Research Scientist (Apr-2020), Researcher (Sep-2016)
- Research in vision-and-language, self-supervised learning, multimodal representation learning, causality, world model, reinforcement learning, generative AI, embodied AI
 - Research application targets: robotics navigation and manipulation, autonomous systems
 - Mentoring/hiring researchers and interns
 - PhD students supervision in Oxford and Cambridge universities
- Sep 2014 - **Research Associate**, *King's College London*, UK
- Aug 2016
- Research in machine learning and deep learning for medical image analysis
 - Research application targets: cancer detection, heart disease diagnosis
 - Supervision and examination of MSc thesis
- Sep 2013 - **Research Intern**, *Microsoft Research*, Cambridge, UK
- Jan 2014
- Research in deep learning for hand pose estimation
 - Research in convolutional neural networks for sign language classification

- Apr 2010 - **Research Intern, Siemens Corporate Research, NJ, USA**
- Oct 2010
 - Research in object detection and segmentation
 - Research in organ detection and segmentation from medical images
 - Research in early cancer prediction from time series scans
- Jul 2007 - **Chief Architect- R&D, Co-Founder, Elvsys, Nepal**
- Aug 2008
 - R&D in big data analysis and data migration
 - Coordinated with international clients
- May 2000 - **Project Manager, Software Engineer, Nepal**
- Jun 2007
 - Major responsibilities included system analysis and software development
 - Design and developed distributed poker game engine, ads analytics, and more

Teaching

- 2003 - 2008 **Lecturer, NCCS, Tribhuvan University, Nepal**
 - FY03 - FY08: Object Oriented Programming with C++
- 2006 - 2007 **Lecturer, Sanker Dev Campus, Tribhuvan University, Nepal**
 - FY06 - FY07: Management Information Systems
 - FY06 - FY07: Operations Management
- 2006 - 2007 **Lecturer, Ace Institute of Management, Pokhara University, Nepal**
 - FY06 - FY07: Management Information System

Entrepreneurship

- 2007 - 2011 Co-founder, Elvsys, Nepal *Scaled to 30 people company*

Technical Skills

- Programming Python, C/C++, C#, ASP.net, Java
- Database SQL, SQLite, SQL Server, Oracle
- Libraries PyTorch, Tensorflow, ROS, OpenCV, PCL

Languages

- English Excellent
- Nepalese Native
- Hindi Excellent
- Bengali Intermediate

Funding and Awards

Scholarships

- 2010 - 2014 Bournemouth Studentship for PhD, Bournemouth University, UK
- 2008 - 2009 Chancellor's International Scholarship for MSc, University of Sussex, UK
- 2002 - 2002 Microhard Scholarship for Diploma in Computer Application, India

Mentoring

PhD: 2, MPhil: 1, MSc: 3, Intern: 2

PhD

2018 - 2022 Alasdair Paren, University of Oxford, jointly with M Pawan Kumar

2018 - 2022 Anthony Hu, University of Cambridge, jointly with Roberto Cipolla

MPhil

2024 Nanze Chen, University of Cambridge

Intern

2021 Alasdair Paren, University of Oxford

2020 Steven Morad, University of Arizona

Public Services

Program Committee Member

2022 AAAI Conference on Artificial Intelligence

Journal Articles Reviewing

2020 International Journal of Computer Vision (IJCV)

2020 Pattern Recognition

2019 Transactions on Image Processing

2019 Journal on Advances in Signal Processing

Conference Papers Reviewing

CVPR 2023, 2024

ECCV 2024

WACV 2024

IROS 2021, 2022, 2023, 2024

ICRA 2021, 2022

Selected Presentations and Talks

2024 *World Models for Embodied Agents*, Imperial College London, UK, May 2024

2024 *World Models*, The British Machine Vision Association (BMVA) Symposium, UK, April 2024

2024 *Effective Presentation Skills*, SONE, UK, Jan 2024

2023 *AI in a Digital Age: Exploring in Nepalese Horizon for ICT*, Keynote, Engineer's Day, NEA, Nepal, July 2023

- 2023 *AI Is All You Need*, SONE, UK, Jan 2023
- 2019 *Fast-SCNN: Fast Semantic Segmentation Network*, British Machine Vision Conference (BMVC), Cardiff, UK, Sep 2019
- 2018 *ContextNet: Exploring Context and Detail for Semantic Segmentation in Real-time*, British Machine Vision Conference (BMVC), Newcastle, UK, Sep 2018
- 2018 *Artificial Intelligence for Humanity*, Artificial Intelligence for Development, Kathmandu, Nepal, April 2018
- 2013 *A Unified Framework for 3D Hand Tracking*, International Symposium on Visual Computing (ISVC), Crete, Greece, July 2013
- 2012 *Region-Based Skin Color Detection*, International Conference on Computer Vision Theory and Applications (VISAPP), Rome, Italy, Feb 2012

Patents

- [4] **Apparatus and Method for Performing a Task**
US Patent App. 17/819,468, 2024
Harit Pandya, Rudra P.K. Poudel, and Stephan Liwicki
- [3] **Task Performing Agent Systems and Methods**
US Patent App. 17/183,669, 2022
Steven D. Morad, Roberto Mecca, Rudra P.K. Poudel, Stephan Liwicki, and Roberto Cipolla
- [2] **Computer Vision System and Method**
US Patent App. 16/741,804, 2020
Rudra P.K. Poudel, Stephan Liwicki, and Roberto Cipolla
- [1] **Computer Vision System and Method**
US Patent App. 16/176,801, 2020
Rudra P.K. Poudel, Ujwal Bonde, Stephan Liwicki, and Christopher Zach

Publications [Google Scholar]

Journals

- [5] **Faking Interpolation Until You Make It**
Transactions of Machine Learning Research (TMLR), 2022
Alasdair Paren, Rudra P.K. Poudel, and M. Pawan Kumar
- [4] **A Stochastic Bundle Method for Interpolation**
The Journal of Machine Learning Research (JMLR), 23(15):1–57, 2022
Alasdair Paren, Leonard Berrada, Rudra P.K. Poudel, and M. Pawan Kumar
- [3] **Embodied Visual Navigation with Automatic Curriculum Learning in Real Environments**
IEEE Robotics and Automation Letters (RA-L), 6(2):683–690, 2021
Steven D. Morad, Roberto Mecca, Rudra P.K. Poudel, Stephan Liwicki, and Roberto Cipolla

- [2] **Predicting Brain Age with Deep Learning from Raw Imaging Data Results in a Reliable and Heritable Biomarker**
NeuroImage, 163:115–124, 2017
James H. Cole, Rudra P.K. Poudel, Dimosthenis Tsagkrasoulis, Matthan W.A. Caan, Claire Steves, Tim D. Spector, and Giovanni Montana
- [1] **Skin Color Detection using Region-Based Approach**
International Journal of Image Processing (IJIP), 7(4):385, 2013
Rudra P.K Poudel, Jian J Zhang, David Liu, and Hammadi Nait-Charif

Conference Proceedings and Pre-Prints

- [13] **ReCoRe: Regularized Contrastive Representation Learning of World Model**
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2024
Rudra P.K. Poudel, Harit Pandya, Stephan Liwicki, Roberto Cipolla
- [12] **Generalized Autonomous Optimization for Quantum Transmitters with Deep Reinforcement Learning**
Photonics West: Quantum Computing, Communication, and Simulation, 2024
Yuen San Lo, Robert Woodward, Taofiq Paraiso, Rudra P.K. Poudel, Andrew Shields
- [11] **LanGWM: Language Grounded World Model**
arXiv, 2023
Rudra P.K. Poudel, Harit Pandya, Chao Zhang, Roberto Cipolla
- [10] **Contrastive Unsupervised Learning of World Model with Invariant Causal Features**
Neural Information Processing Systems (NeurIPS) Workshop, 2022
Rudra P.K. Poudel, Harit Pandya, and Roberto Cipolla
- [9] **Training Binary Neural Networks the Easy Way**
British Machine Vision Conference (BMVC), 2022
Alasdair Paren and Rudra P.K. Poudel
- [8] **CoMBiNED: Multi-Constrained Model Based Planning for Navigation in Dynamic Environments**
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2022
Harit Pandya, Rudra P.K. Poudel, and Stephan Liwicki
- [7] **Fast-SCNN: Fast Semantic Segmentation Network**
British Machine Vision Conference (BMVC), 2019
Rudra P.K. Poudel, Stephan Liwicki, and Roberto Cipolla
- [6] **ContextNet: Exploring Context and Detail for Semantic Segmentation in Real-time**
British Machine Vision Conference (BMVC), 2018
Rudra P.K. Poudel, Ujwal Bonde, Stephan Liwicki, and Christopher Zach
- [5] **Recurrent Fully Convolutional Neural Networks for Multi-slice MRI Cardiac Segmentation**
Medical Image Computing and Computer Assisted Interventions Conference (MICCAI) Workshop, 2016
Rudra P.K. Poudel, Pablo Lamata, and Giovanni Montana

- [4] **3D Hand Tracking**
PhD Thesis, 2014
Rudra P.K. Poudel
- [3] **A Unified Framework for 3D Hand Tracking**
International Symposium on Visual Computing (ISVC), 2013
Rudra P.K. Poudel, Jose A Fonseca, Jian J Zhang, and Hammaid Nait-Charif
- [2] **Region-Based Skin Color Detection**
International Conference on Computer Vision Theory and Applications (VISAPP), 2012
Rudra P.K. Poudel, Hammadi Nait-Charif, Jian J Zhang, and David Liu
- [1] **Real-Time Hand Gesture Recognition for Low Resource Devices**
MSc Thesis, 2009
Rudra P.K. Poudel