Devendra Singh Chaplot

CONTACT — Website: https://devendrachaplot.github.io/ — E-mail: dc@mistral.ai

EDUCATION

Carnegie Mellon University — Aug 2017 - Dec 2020
Ph.D. in Machine Learning, Machine Learning Dept., School of Computer Science
- Advisor: Prof. Ruslan Salakhutdinov

Carnegie Mellon University — Aug 2015 - Aug 2017
Master's of Language Technology, Language Technologies Inst., School of Computer Science
- **CGPA: 4.04/4.0**
- Advisor: Prof. Kenneth R. Koedinger

Indian Institute of Technology, Bombay — Jul 2010 - Aug 2014
Bachelor of Technology (B.Tech.) in **Computer Science & Engineering** with Honours
- **CGPA: 9.51/10.0 (core)**, 9.34/10.0 (overall)
- Minor in **Applied Statistics and Informatics**
- Advisor: Prof. Pushpak Bhattacharyya

PROFESSIONAL EXPERIENCE

Mistral AI, Paris, France — Since Aug '23
Research Scientist

Facebook AI Research, Menlo Park, CA — Apr '21 - Aug '23
Research Scientist, FAIR

Facebook AI Research, Menlo Park, CA — May '18 - Dec '20
Research Intern & Student Researcher, FAIR

Apple, CA — Jun '17 - Aug '17
Research Intern, Special Projects Group

Samsung Electronics HQ, South Korea — Sep '14 - Aug '15
Research Associate, Software R&D Center

AWARDS & ACHIEVEMENTS

- **Winner NeurIPS 2022 Habitat Rearrangement Challenge**
- **Winner CVPR 2020 Habitat ObjectNav Challenge**
- **Facebook Graduate Fellowship** 2020
- **Nvidia Graduate Fellowship** 2020 (declined)
- **Facebook Research Award** on PyRobot: Democratizing Robotics (2020)
- **Winner CVPR 2019 AI-Habitat Navigation Challenge**: Winner in both RGB and RGB-D tracks
- **Best Paper Award**, CVPR 2018 Deep Learning for Visual SLAM Workshop
- **Best Demo Award**, AAAI 2017
- **Visual Doom AI Competition, 2017**: Winner in Full Deathmatch
- **Research Fellowship** with full tuition waiver and stipend for Master's in LTI at CMU (2015-2017)
- **All India Rank 25** in IITJEE-2010 (amongst 0.5 million students)
- **All India Rank 96** in AIEEE-2010 (amongst 1.1 million students)
- **CBSE Merit Scholar** [2010-2014]: Awarded to 300 students amongst 1.1 million candidates
- **NTSE Scholar** [2008-2014]: Awarded to 775 students amongst 0.3 million candidates
- **International Rank 5** in 3rd International Mathematics Olympiad, Science Olympiad Foundation
- **Gold Medal** at 2nd International Young Mathematicians Convention (IYMC)

PUBLICATIONS

- Mistral 7B.
  Albert Q. Jiang, Alexandre Sablayrolles, Arthur Mensch, Chris Bamford, **Devendra Singh Chaplot**, Diego de las Casas, Florian Bressand, Gianna Lengyel, Guillaume Lample, Lucile Saulnier, Lélio Renard Lavaud, Marie-Anne Lachaux, Pierre Stock, Teven Le Scao, Thibaut Lavril, Thomas Wang, Timothée Lacroix, William El Sayed
  arXiv preprint arXiv:2310.06825

- Navigating to Objects in the Real World.
  Theophile Gervet, Soumith Chintala, Dhruv Batra, Jitendra Malik, **Devendra Singh Chaplot**
  Science Robotics 8 (79), eadf6991 (2023)

- Habitat-Matterport 3D Semantics Dataset. (**highlight**)
  Karmesh Yadav, Ram Ramrakhya, Santhosh Kumar Ramakrishnan, Theo Gervet, John Turner, Aaron Gokaslan, Noah Maestre, Angel Xuan Chang, Dhruv Batra, Manolis Savva, Alexander William Clegg, **Devendra Singh Chaplot**
  Computer Vision and Pattern Recognition (CVPR, 2023)

- Galactic: Scaling End-to-End Reinforcement Learning for Rearrangement at 100k Steps-Per-Second.
  Vincent-Pierre Berges, Andrew Szot, **Devendra Singh Chaplot**, Aaron Gokaslan, Roozbeh Mottaghi, Dhruv Batra, Eric Undersander
  Computer Vision and Pattern Recognition (CVPR, 2023)

- Multi-skill Mobile Manipulation for Object Rearrangement. (**spotlight**)
  Jiayuan Gu, **Devendra Singh Chaplot**, Hao Su, Jitendra Malik
  International Conference on Learning Representations (ICLR, 2023)

- PONI: Potential Functions for ObjectGoal Navigation with Interaction-free Learning. (**oral**)
  Santhosh Ramakrishnan, **Devendra Singh Chaplot**, Ziad Al-Halah, Jitendra Malik, Kristen Grauman
  Computer Vision and Pattern Recognition (CVPR, 2022)

- FILM: Following Instructions in Language with Modular Methods.
  So Yeon Min, **Devendra Singh Chaplot**, Pradeep Ravikumar, Yonatan Bisk, Ruslan Salakhutdinov
  10th International Conference on Learning Representation (ICLR, 2022)

- SEAL: Self-supervised Embodied Active Learning using Exploration and 3D Consistency.
  Devendra Singh Chaplot, Murtaza Dalal, Saurabh Gupta, Jitendra Malik, Ruslan Salakhutdinov
  Neural Information Processing Systems (NeurIPS, 2021)

- No RL, No Simulation: Learning to Navigate without Navigating.
  Meera Hahn, **Devendra Singh Chaplot**, Shubham Tulsiani, Mustafa Mukadam, James M. Rehg, Abhinav Gupta
  Neural Information Processing Systems (NeurIPS, 2021)

- Habitat 2.0: Training Home Assistants to Rearrange their Habitat.
  Andrew Szot, Alex Clegg, Eric Undersander, Erik Wijmans, Yili Zhao, John Turner, Noah Maestre, Mustafa Mukadam, **Devendra Singh Chaplot**, Oleksandr Maksymets, Aaron Gokaslan, Vladimir Vondrus, Sameer Dharur, Franziska Meier, Wojciech Galuba, Angel Chang, Zsolt Kira, Vladlen Koltun, Jitendra Malik, Manolis Savva, Dhruv Batra
  Neural Information Processing Systems (NeurIPS, 2021)

- Differentiable Spatial Planning using Transformers.
  Devendra Singh Chaplot, Deepak Pathak, Jitendra Malik.
  38th International Conference on Machine Learning (ICML, 2021)

- Object Goal Navigation using Goal-Oriented Semantic Exploration.
  Devendra Singh Chaplot, Dhiraj Gandhi, Abhinav Gupta, Ruslan Salakhutdinov
  Neural Information Processing Systems (NeurIPS, 2020)
  Also presented at CVPR-20 Habitat Embodied Agents Workshop (**winning entry talk**)

- Semantic Curiosity for Active Visual Learning. (**spotlight**)
  Devendra Singh Chaplot*, Helen Jiang*, Saurabh Gupta, Abhinav Gupta
  European Conference on Computer Vision (ECCV, 2020)

- Neural Topological SLAM for Visual Navigation.
  Devendra Singh Chaplot, Ruslan Salakhutdinov, Abhinav Gupta, Saurabh Gupta
  Computer Vision and Pattern Recognition (CVPR, 2020)
  Also presented at the CVPR-20 Workshop on 3D Scene Understanding (**invited talk**)

- Learning to Explore using Active Neural SLAM.
  Devendra Singh Chaplot, Dhiraj Gandhi, Saurabh Gupta, Abhinav Gupta, Ruslan Salakhutdinov
  8th International Conference on Learning Representation (ICLR, 2020)
  Also presented at CVPR-19 Habitat Embodied Agents Workshop (**winning entry talk**)

- Embodied Multimodal Multitask Learning.
  Devendra Singh Chaplot, Lisa Lee, Ruslan Salakhutdinov, Devi Parikh, Dhruv Batra
  29th International Joint Conferences on Artificial Intelligence (IJCAI, 2020)

- Gated Path Planning Networks.
  Lisa Lee, Emilio Parisotto, **Devendra Singh Chaplot**, Eric Xing, Ruslan Salakhutdinov
  35th International Conference on Machine Learning (ICML, 2018)

- Learning Cognitive Models using Neural Networks. (**oral**)
  Devendra Singh Chaplot, Christopher MacLellan, Ruslan Salakhutdinov, Kenneth Koedinger
  19th International Conference on Artificial Intelligence in Education (AIED, 2018)

- Global Pose Estimation with an Attention-based Recurrent Network. (**Best Paper Award**)
  Emilio Parisotto*, **Devendra Singh Chaplot***, Jian Zhang, Ruslan Salakhutdinov
  CVPR-18, Deep Learning for Visual SLAM workshop (CVPR workshop, 2018)

- Active Neural Localization.
  Devendra Singh Chaplot, Emilio Parisotto, Ruslan Salakhutdinov
  6th International Conference on Learning Representation (ICLR, 2018)
  Also presented at the NIPS-17 Deep RL Symposium (**contributed talk**)

- Gated-Attention Architectures for Task-Oriented Language Grounding. (**oral**)
  Devendra Singh Chaplot, Kanthashree Mysore Sathyendra, Rama Kumar Pasumarthi,
  Dheeraj Rajagopal, Ruslan Salakhutdinov
  32nd AAAI Conference on Artificial Intelligence (AAAI, 2018)

- Knowledge-based Word Sense Disambiguation using Topic Models. (**oral**)
  Devendra Singh Chaplot, Ruslan Salakhutdinov
  32nd AAAI Conference on Artificial Intelligence (AAAI, 2018)

- Playing FPS Games with Deep Reinforcement Learning.
  Guillaume Lample*, **Devendra Singh Chaplot***
  31st AAAI Conference on Artificial Intelligence (AAAI, 2017)

- Arnold: An Autonomous Agent to play FPS Games. (**Best Demo Award**)
  Devendra Singh Chaplot*, Guillaume Lample*
  31st AAAI Conference on Artificial Intelligence (AAAI 2017, demo)

- Transfer Deep Reinforcement Learning in 3D Environments: An Empirical Study.
  Devendra Singh Chaplot, Guillaume Lample, Kanthashree Mysore Sathyendra, Ruslan Salakhutdinov
  30th Neural Information Processing Systems, Deep RL Workshop (NIPS workshop, 2016)

- Data-driven Automated Induction of Prerequisite Structure Graphs.
  Devendra Singh Chaplot, Yiming Yang, Jaime Carbonell, Kenneth Koedinger
  9th International Conference on Educational Data Mining (EDM, 2016)

- Personalized Adaptive Learning using Neural Networks.
  Devendra Singh Chaplot, Eunhee Rhim, Jihie Kim
  3rd ACM Conference on Learning at Scale (L@S, 2016)

- Predicting Student Attrition in MOOCs using Sentiment Analysis and Neural Networks.
  Devendra Singh Chaplot, Eunhee Rhim, Jihie Kim
  17th International Conference on Artificial Intelligence in Education, 4th Workshop on Intelligent Support for Learning in Groups (AIED workshop, 2015)

- SAP: Student Attrition Predictor
  Devendra Singh Chaplot, Eunhee Rhim, Jihie Kim
  8th International Conference on Educational Data Mining (EDM-15, demo), Madrid, Spain.

- Unsupervised Word Sense Disambiguation using Markov Random Field and Dependency Parser.
  Devendra Singh Chaplot, Pushpak Bhattacharyya, Ashwin Paranjape
  29th AAAI Conference on Artificial Intelligence (AAAI, 2015)

- IndoWordnet Visualizer.
  Devendra Singh Chaplot, Sudha Bhingardive, Pushpak Bhattacharyya. (2014)
  In Proceedings of 7th Global WordNet Conference (GWC-14), Tartu, Estonia.

- Comparing Model Comparison Methods.
  Holger Schultheis, Ankit Singhaniya, **Devendra Singh Chaplot**
  35th Annual Conference of the Cognitive Science Society (CogSci, 2013)

Technical Reports

- On Evaluation of Embodied Navigation Agents.
  Peter Anderson, Angel Chang, **Devendra Singh Chaplot**, Alexey Dosovitskiy, Saurabh Gupta, Vladlen Koltun, Jana Kosecka, Jitendra Malik, Roozbeh Mottaghi, Manolis Savva, Amir R. Zamir
  arXiv preprint arXiv:1807.06757

Patents

- Method and device for improved localization and mapping.
  Emilio Parisotto, Jian Zhang, Ruslan Salakhutdinov, **Devendra Singh Chaplot**
  US Patent 10,776,948, 2020

Talks

Navigating to Objects in the Real World
CMU VASC Seminar — May '23

Building Intelligent Autonomous Navigation Agents
Facebook AI Research — Oct '20

Object Goal Navigation using Goal-Oriented Semantic Exploration
CVPR 2020 Embodied AI Workshop, winning entry for Habitat ObjectNav Challenge — Jun '20

Neural Topological SLAM for Visual Navigation
CVPR 2020 Main Conference — Jun '20
CVPR 2020 Workshop on 3D Scene Understanding (invited talk) — Jun '20

Embodied Multimodal Multitask Learning
Facebook FAIAR Seminar (invited talk) — May '20

Learning to Explore using Active Neural SLAM
ICLR 2020 — Apr '20
Five.ai, Oxford (invited talk) — Apr '20
CVPR 2019 Habitat Embodied Agents Workshop, winning entry — Jun '19

Learning Cognitive Models using Neural Networks
AIED 2018, London — Jun '18

Playing FPS Games with Deep Reinforcement Learning
Nvidia GTC 2018, San Jose (invited talk) — Mar '18

Doom and Unreal Game Engines
Embodied Agents and Environments Workshop, Facebook AI Research, Menlo Park (invited talk) Feb '18

Gated-Attention Architectures for Task-Oriented Language Grounding
AAAI 2018, New Orleans Feb '18

Knowledge-based Word Sense Disambiguation using Topic Models
AAAI 2018, New Orleans Feb '18

Selected Media Coverage

Object Goal Navigation using Goal-Oriented Semantic Exploration
TechCrunch, Gizmodo, The Hindu, The South African, CMU News

Learning to Explore using Active Neural SLAM
VentureBeat, Synced, Analytics India Mag

Gated-Attention Architectures for Task-Oriented Language Grounding
MIT TechReview, Inverse

Playing FPS Games with Deep Reinforcement Learning
TechCrunch, Popular Science, Engadget, Daily Mail, Salon, Kotaku, Futurism, ScienceAlert, Pittsburgh Post-Gazette, Inverse, CMU News

Teaching

Tutorial on Deep Reinforcement Learning at the Machine Learning Summer School at the Tepper School of Business, CMU (May 2019)

Guest Lecture on Training Neural Networks in the Intro to Machine Learning class (10315), Fall 2019

Teaching Assistant
- Intermediate Deep Learning (CMU 10417/10617)
- Introduction to Machine Learning (PhD) (CMU 10701)
- Data Structures and Algorithms (IITB CS 213)
- Computer Networks & Lab (IITB CS 348 & CS 378)
- Computer Programming and Utilization (IITB CS 101)

Service

Workflow Chair, International Conference on Machine Learning (ICML) 2019

Area Chair, Neural Information Processing System (NeurIPS) 2023

Workshop Organizer, Embodied AI Workshop, CVPR 2022, 2023

Challenge Organizer, Habitat Challenges, CVPR 2022, 2023

Book Reviewer, MIT Press

Conference and Journal Reviewing:
- International Conference on Learning Representations (ICLR): 2019, 2020, 2021, 2022
- Computer Vision and Pattern Recognition (CVPR): 2020, 2021, 2022
- Neural Information Processing Systems (NeurIPS): 2018 (top 30%), 2019 (top 50%), 2020, 2021, 2022
- International Conference on Computer Vision (ICCV): 2021
- International Joint Conference on Artificial Intelligence (IJCAI): 2021
- European Conference on Computer Vision (ECCV): 2020, 2022
- International Conference on Machine Learning (ICML): 2020, 2021
- IEEE Robotics and Automation Letters (RA-L) 2019, 2020, 2021
- International Conference on Intelligent Robots and Systems (IROS) 2019, 2020, 2021

Workshop Program Committee:
- NeurIPS Deep RL Workshop 2018, 2019, 2020
- NeurIPS Meta Learning Workshop, 2019
- ICLR Structures & Priors Workshop, 2019
- ICLR Beyond Tabula Rasa in Reinforcement Learning, 2020
- ACL Workshop on Advances in Language and Vision Research, 2020

Speaking Skills Committee, Machine Learning Department, CMU 2018-2020