Dr. Santanu Pal

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About Me

PhD with extensive experience as a Research and Development Scientist, specializing in Natural Language Processing (NLP), Deep Machine Learning, and Artificial Intelligence. My research focuses on Machine Translation and Generative AI, with a commitment to advancing innovative, scalable AI solutions and refining complex methodologies. I am dedicated to contributing to and leading high-impact research initiatives and mentoring the next generation of scholars. My goal is to push the boundaries of AI technology through collaborative efforts in cutting-edge research teams while fostering a dynamic learning environment.

Current Status

Lead Scientist and Senior Architect at Lab45, Wipro, London, UK.

- Leading projects:
  - Persuasion Engine for Health care (For Chronic Patients)
  - Talent matching in dynamic labour market.
  - Domain agnostic real time Fake news detection, verification and explanation based on evidences.
  - Meme entity identification, role (Hero, Villain, Victim) labelling and explanation Generation.
  - Empathy, emotion polarity and intensity in conversational AI systems
  - Document level Machine Translation
- Industry-Academia projects: Hate, Hyperpartisan, and Hyperpluralism Elicitation and Observer System (**HELIOS**).
- Member of IEEE Standardization for Indian Languages

Skills

- **Languages:** Strong reading, writing and speaking competencies for English, Bengali, Hindi. German (A1.2)
- **Artificial Intelligence:** Natural Language Processing, Deep Machine Learning, Neural Network, Reinforcement Learning, Generative AI, Machine Translation, Large Language Models, Alignments and Prompt Engineering, Retrieval Augmented Generation.
- **Coding:** Python, Pytorch, Java, Flask.
- **Tools and Libraries** HuggingFace, Langchain, Streamlit, git, docker, NumPy, Pandas, Spacy, Scikit-learn.
- **Databases:** MySQL,SQLite.
- **Web Dev:** HTML, CSS, JavaScript, Apache Web Server, Tomcat Web Server.
- **Misc.:** Industrial and Academic research, teaching, consultation, and publishing.

Experience

Industry

To Date ↑ 02.03.2020 — **Senior Architect & Lead Scientist**, *Wipro AI R&D, Lab45, Wipro Pvt. Ltd.*, London, UK.
Industry-Academia Project – HELIOS, Persuasion for behavior change and habit formation in health care
Internal-Project – Talent Match Engine, Supply-Demand Recommendation System.

2004–2008 — **Web developer**, *The Eye Within*, Kolkata.

Academic

29.02.2020 ↑ 01.12.2017 — **Post Doctoral Researcher**, *Universiät des Saarlandes*, Saarbrücken, Germany.
Project: "Multi-modal and Language Technology Based Post-Editing Support for Machine Translation" sponsored by the German Research Foundation (DFG).

31.10.2019 **Researcher**, *German Research Foundation for Artificial Intelligence (DFKI)*, SB, Germany.
↑ **Project1:** DEEPLE: Deep Learning for Language Technology End-to-End Applications
01.09.2018 **Project2:** APE++: Neural Automatic Post-Editing

30.11.2017 **Research Assistant**, *Universiät des Saarlandes*, Saarbrücken, Germany.
↑ **Project:** "Multi-modal and Language Technology Based Post-Editing Support for Machine Translation"
01.03.2017 sponsored by the German Research Foundation (DFG).

30.09.2016 **Research Assistant**, *Universiät des Saarlandes*, Saarbrücken, Germany.
↑ **Project:** "EXPloiting Empirical appRoaches to Translation" (EXPERT) sponsored by Marie Curie (Grant
01.11.2013 agreement no.: 317471).

31.08.2013 **Research Engineer**, *Jadavpur University*, Kolkata, India.
↑ **Project:** "Development of English to Indian Language Machine Translation (EILMT) System", funded by
02.09.2008 the Department of Electronics and Information Technology (DEITY), Ministry of Communications and Information Technology (MCIT), Government of India.

Education

PhD in Language Science and Technology

01.04.2014 **Grade: Magna cum laude**, *Universiät des Saarlandes*, Saarbrücken, *Germany*.
| **Thesis:** A Hybrid Machine Translation Framework for an Improved Translation Workflow
27.11.2017 **Supervisor:** Prof. Josef van Genabith , Universiät des Saarlandes, Saarbrücken, Germany
Date of Graduation: 27.11.2017
Supported by: Marie Curie ITN (FP7/2007-2013) under REA grant agreement no 317471

M.Tech in Computer Technology

2010–2013 **Grade: 1st Class, 75.9%**, *Jadavpur University*, Kolkata, *India*.
Thesis Title: Improved Alignment in Phrase Based Statistical Machine Translation System

One year Certification course in Linguistics

2010–2011 **Grade: 1st Class, 9.17 CGPA**, *Jadavpur University*, Kolkata, *India*.

B.Tech in Computer Science and Technology

2000–2004 **Grade: 1st Class, 76.28%**, *Kalyani University*, *India*.

Invited Lectures

- Delivered talk on **"NLP using Deep Learning: Attention Models"** at AICTE ATAL Faculty Development Program
- Delivered talk on **"Attention Mechanisms"** at workshop on Natural Language Processing (NLP) : Tools and Techniques organized by the Department of Computer Science and Engineering, Assam University in collaboration with IEEE Student Branch, Assam University, Silchar, India.
- Delivered lecture on **Neural Machine Translation** at IIT Patna, India.
- Delivered lecture on **Neural Machine Translation** in a Summer school: "Applied NLP and Unstructured Data Analytics" organized by International Centre for Free and Open Source Software, Kerala, India.
- Delivered lecture on **Automatic Post Editing** at Jadavpur University, India

Internships

Dublin City University, Dublin, Ireland (Aug–Oct, 2012 and Sep–Nov, 2014); Translated SRL, Rome, Italy (Apr–May, 2015); Pangeanic, Valencia, Spain (Apr, 2016)

Conference and Journal Reviewer

- CHI, NAACL, IJCAI, ACL, EMNLP, IJCNLP, COLING, EACL, ICON, WMT, ARR.
- Journals: Computer Speech and Language (CSL), Journal of Natural Language Engineering, Transaction of Asian and Low-Resource Language Information Processing (TALIP), MDPI, IEEE, Machine Translation.

Area Chair/Senior Program Committee/Program Committee Member

- Area Chair: ICON 2022
- Senior Program Committee Member: IJCAI 2020, 2021
- Program Committee Member:
  - IJCAI 2020, 2021 Senior Program Committee Member (SPC), ECAI 2020, AAAI 2024
  - AAAI-2020–23 Student Abstract Program program committee Member.
  - WMT 2019@ACL2019, WMT 2020@EMNLP2020, WMT 2021@EMNLP2021, WMT 2023@EMNLP2023

Professional Profiles

Google Scholar [**h**-Index: **21**] | *LinkedIn*

Conference Organizer

- Co-organizer of similar language translation task with Conference on Machine Translation (WMT 19 – 21)
- Co-organizer of Indic language translation task with Conference on Machine Translation (WMT 23 – 24)

References

Prof. Josef Van Genabith
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Prof. Asif Ekbal
- Indian Institute of Technology (IIT Patna)
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- Jadavpur University
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Dr. Debasis Ganguly
- University of Glasgow
- Glasgow, UK
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Publications

JOURNAL

[1] A. Phukan, S. Pal, and A. Ekbal, "Hybrid Quantum-Classical Neural Network for Multi-Modal Multi-Task Sarcasm, Emotion and Sentiment Analysis," *IEEE Transactions on Computational Social Systems (Impact Factor=4.5)*, 2024.

[2] G. Kumari, D. Bandyopadhyay, A. Ekbal, S. Pal, A. Chatterjee, and B. Vinutha, "Let's All Laugh Together: A Novel Multitask Framework for Humor Detection in Internet Memes," *IEEE Transactions on Computational Social Systems (Impact Factor=4.5)*, 2024.

[3] P. Kapil, G. Kumari, A. Ekbal, S. Pal, A. Chatterjee, and B. Vinutha, "HHSD: Hindi Hate Speech Detection Leveraging Multi-Task Learning," *IEEE Access (Impact Factor=3.4)*, pp. 101460–101473, 2023.

[4] P. Kapil, G. Kumari, A. Ekbal, S. Pal, A. Chatterjee, and B. Vinutha, "HHLD: Hateful posts Identification in Hindi Language leveraging multi task learning," *IEEE Access (Impact Factor=3.4)*, 2023.

[5] N. Herbig, S. Pal, A. Krüger, and J. van Genabith, "Multi-modal estimation of cognitive load in post-editing of machine translation," *Translation, interpreting, cognition*, p. 1, 2021.

[6] N. Herbig, S. Pal, M. Vela, A. Krüger, and J. van Genabith, "Multi-modal Indicators for Estimating

Perceived Cognitive Load in Post-Editing of Machine Translation," *Machine Translation Journal*, vol. 33, pp. 1–25, 3 2019.

CONFERENCE

[1] R. Appicharla, B. Gain, S. Pal, A. Ekbal, and P. Bhattacharyya, "A case study on context-aware neural machine translation with multi-task learning," in *Proceedings of the 25th Annual Conference of The European Association for Machine Translation*, (University of Sheffield, UK), European Association for Machine Translation, 2024.

[2] P. Pakray, S. Pal, A. Vetagiri, R. Krishna, A. K. Maji, S. Dash, L. Laitonjam, L. Sarah, and R. Manna, "Findings of wmt 2024 shared task on low-resource indic languages translation," in *Proceedings of the Ninth Conference on Machine Translation*, pp. 654–668, 2024.

[3] P. K. Adhikary, B. Sugandhi, S. Ghimire, S. Pal, and P. Pakray, "TRAVID: An End-to-End Video Translation Framework," in *System Demonstrations, IJCNLP-AACL 2023*, (Bali, Indonesia), pp. 1–9, Asian Federation of Natural Language Processing, November 2023.

[4] S. Pal, P. Pakray, S. R. Laskar, L. Laitonjam, V. Khenglawt, S. Warjri, P. K. Dadure, and S. K. Dash, "Findings of the wmt 2023 shared task on low-resource indic language translation," in *Proceedings of the Eighth Conference on Machine Translation*, pp. 682–694, 2023.

[5] D. Suman, A. Mandal, S. Pal, and S. K. Naskar, "Iacs-Irilt: Machine translation for low-resource indic languages," in *Proceedings of the Eighth Conference on Machine Translation*, pp. 972–977, 2023.

[6] A. S. Srinivas, N. Barua, and S. Pal, "Team_Hawk at WASSA 2023 Empathy, Emotion, and Personality Shared Task: Multi-tasking Multi-encoder based transformers for Empathy and Emotion Prediction in Conversations," in *Proceedings of the 13th Workshop on Computational Approaches to Subjectivity, Sentiment, & Social Media Analysis*, pp. 542–547, 2023.

[7] R. Appicharla, B. Gain, S. Pal, and A. Ekbal, "A case study on context encoding in multi-encoder based document-level neural machine translation," in *Proceedings of Machine Translation Summit XIX: Research Track*, 2023.

[8] D. Bandyopadhyay, G. Kumari, A. Ekbal, S. Pal, A. , Chatterjee, and V. BN, "Zombies eat brains, you are safe: A knowledge infusion based multitasking system for sarcasm detection in meme," in *ECIR 2023: European Conference on Information Retrieval*, (Dublin, Ireland), p. Accepted, 2023.

[9] F. Akhbardeh, A. Arkhangorodsky, M. Biesialska, O. Bojar, R. Chatterjee, V. Chaudhary, M. R. Costa-jussà, C. España-Bonet, A. Fan, C. Federmann, *et al.*, "Findings of the 2021 conference on machine translation (wmt21)," in *Proceedings of the Sixth Conference on Machine Translation*, pp. 1–88, 2021.

[10] S. Pal, H. Xu, N. Herbig, S. K. Naskar, A. Krüger, and J. van Genabith, "The Transference Architecture for Automatic Post-Editing," in *Proceedings of COLING 2020, the 27th International Conference on Computational Linguistics: Technical Papers*, (Barcelona, Spain), pp. 5963–5974, December 2020.

[11] N. Herbig, T. Düwel, S. Pal, K. Meladaki, M. Monshizadeh, A. Krüger, and J. van Genabith, "MMPE: A Multi-Modal Interface for Post-Editing Machine Translation," in *Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics*, (Online), pp. 1691–1702, Association for Computational Linguistics, July 2020.

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[13] L. Barrault, M. Biesialska, O. Bojar, M. R. Costa-jussà, C. Federmann, Y. Graham, R. Grundkiewicz, B. Haddow, M. Huck, E. Joanis, T. Kocmi, P. Koehn, C.-k. Lo, N. Ljubešić, C. Monz, M. Morishita, M. Nagata, T. Nakazawa, S. Pal, M. Post, and M. Zampieri, "Findings of the 2020 Conference on Machine Translation (WMT20)," in *Proceedings of the Fifth Conference on Machine Translation*, (Online), pp. 1–55, Association for Computational Linguistics, November 2020.

[14] M. Vela, S. Pal, M. Zampieri, S. Naskar, and J. van Genabith, "Improving CAT tools in the translation workflow: New approaches and evaluation," in *Proceedings of Machine Translation Summit XVII Volume 2: Translator, Project and User Tracks*, (Dublin, Ireland), pp. 8–15, European Association for Machine Translation, 19–23 Aug. 2019.

[15] L. Barrault, O. Bojar, M. R. Costa-jussà, C. Federmann, M. Fishel, Y. Graham, B. Haddow, M. Huck, P. Koehn, S. Malmasi, C. Monz, M. Müller, S. Pal, M. Post, and M. Zampieri, "Findings of the 2019 conference on machine translation (wmt19)," in *Proceedings of the Fourth Conference on Machine Translation*, (Florence, Italy), pp. 128–188, Association for Computational Linguistics, August 2019.

[16] N. Herbig, S. Pal, J. van Genabith, and A. Krüger, "Multi-modal approaches for post-editing machine translation," in *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, pp. 231–240, ACM, 2019.

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[18] S. Pal, H. Xu, N. Herbig, A. Krüger, and J. van Genabith, "Usaar-dfki – the transference architecture for english–german automatic post-editing," in *Proceedings of the Fourth Conference on Machine Translation*, (Florence, Italy), pp. 822–829, Association for Computational Linguistics, August 2019.

[19] S. Pal, M. Zampieri, and J. van Genabith, "Uds–dfki submission to the wmt2019 czech–polish similar language translation shared task," in *Proceedings of the Fourth Conference on Machine Translation*, (Florence, Italy), pp. 917–921, Association for Computational Linguistics, August 2019.

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[33] S. Pal, S. K. Naskar, and J. van Genabith, "Forest to String Based Statistical Machine Translation with Hybrid Word Alignments," in *17th International Conference on Intelligent Text Processing and Computational Linguistics*, Springer, 2016.

[34] S. Pal and S. K. Naskar, "Hybrid word alignment," in *Hybrid Approaches to Machine Translation*, pp. 57–75, Springer, 2016.

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[36] T. Nayek, S. K. Naskar, S. Pal, M. Zampieri, M. Vela, and J. van Genabith, "Catalog: New approaches to tm and post editing interfaces," *RANLP 2015*, p. 36, 2015.

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