Madhumita Sushil

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My research interest is to apply machine learning algorithms to understand natural language text, with a current focus on clinical text. In particular, I am investigating different deep learning techniques to learn semantic representations at the patient level. In the clinical domain, an important requirement is often making predictions explainable. Consequently, my second focus involves developing model-agnostic interpretability methods to better understand these representations and how they affect downstream prediction tasks.

Education

Sep '16 – present **PhD in Computational Linguistics**
University of Antwerp, Belgium.
Supervisors: Prof. Dr. Walter Daelemans, Dr. Simon Šuster

Oct '13 – Feb '16 **Master of Science in Language Science and Technology**
Saarland University, Germany, *1.5/5 (1.0 highest, lower is better)*.
Thesis — Recognizing Textual Entailment
- Developed subword distance-based and embedded vectors-based lexical alignment algorithms to align text and hypothesis segments for textual entailment classification.

Supervisors: Prof. Dr. Günter Neumann, Prof. Dr. Dietrich Klakow

July '09 – May '13 **Bachelor of Technology in Computer Science and Engineering**
VIT University, Vellore, India, *8.98/10*.

Work Experience

Apr '16 – Dec '17 **Junior Research Developer**
Antwerp University Hospital, Antwerp, Belgium.
Natural Language Processing for clinical applications (Project *Accumulate* funded by VLAIO, Belgium).
- Developed techniques for unsupervised patient representation learning with gradient-based analysis for model interpretability.
- Developed classifiers for automated psychiatric symptom severity identification.

Dec '13 – Nov '15 **Research Assistant**
German Research Center for Artificial Intelligence, Saarbrücken, Germany.
- Designed and implemented a textual entailment engine for English (Project *Excitement* funded by the EU).
- Designed and developed the website: `http://www.qt21.eu`.

Jan '13 – May '13 **SDE Intern**
TCorpus Analytics, Technology Business Incubator, Vellore, India.
- Designed and implemented an analytics platform for financial text data.

Publications

Madhumita Sushil, Simon Šuster, and Walter Daelemans. Rule induction for global explanation of trained models. In *Proceedings of the 2018 EMNLP Workshop BlackboxNLP: Analyzing and Interpreting Neural Networks for NLP*, pages 82–97. Association for Computational Linguistics, 2018.

Simon Šuster, **Madhumita Sushil**, and Walter Daelemans. Revisiting neural relation

classification in clinical notes with external information. In *Proceedings of the Ninth International Workshop on Health Text Mining and Information Analysis*, pages 22–28. Association for Computational Linguistics, 2018.

Madhumita Sushil, Simon Šuster, Kim Luyckx, and Walter Daelemans. Patient representation learning and interpretable evaluation using clinical notes. *Journal of Biomedical Informatics*, 84:103 – 113, 2018.

Madhumita Sushil, Simon Šuster, Kim Luyckx, and Walter Daelemans. Unsupervised patient representations from clinical notes with interpretable classification decisions. *Workshop on Machine Learning for Health, NeurIPS, arXiv preprint arXiv:1711.05198*, 2017.

Elyne Scheurwegs, **Madhumita Sushil**, Stéphan Tulkens, Walter Daelemans, and Kim Luyckx. Counting trees in random forests: Predicting symptom severity in psychiatric intake reports. *Journal of Biomedical Informatics*, 75:S112 – S119, 2017. A Natural Language Processing Challenge for Clinical Records: Research Domains Criteria (RDoC) for Psychiatry.

Neha Tekriwal, **Madhumita Sushil**, and P. Venkata Krishna. Integration of safety and smartness using cloud services: An insight to future. In Khaled Elleithy and Tarek Sobh, editors, *Innovations and Advances in Computer, Information, Systems Sciences, and Engineering*, pages 293–303, New York, NY, 2013. Springer New York.

Service

Program committee Workshop on Machine Learning for Health, NeurIPS '17, '18.

Reviewer ACL SRW '19, Widening NLP (WiNLP) Workshop at ACL '19.

Student board EACL '19 – '20.

Mentor Google Summer of Code '19.
To an under-privileged girl in rural India through the initiative *e-shishya* (`http://e-shishya.com/`), Jul '18 – Dec '18.

Volunteer Interspeech '15.

Co-organizer Indian country evening, Saarland University, '14.

Vice President Computer Society of India, VIT University, '11 – '12.

Core committee Computer Society of India, VIT University, '09 – '11.

Participation

Training Google's summer development program — Get Ahead '19.

Summer school Lisbon Machine Learning school (LxMLS) '16.

Awards

Student achiever VIT University, '12.

Finalist One of the top 22 teams across India in the *Intel India Embedded Challenge* '12 for the project *Smartphone for the visually impaired*.

Winner Hackathon, *Exebit* '12, IIT Madras.