

BioNLP 2019

**SIGBioMed Workshop on
Biomedical Natural Language Processing**

Proceedings of the 18th BioNLP Workshop and Shared Task

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Sesame Street at BioNLP 2019

Dina Demner-Fushman, Kevin Bretonnel Cohen, Sophia Ananiadou, and Junichi Tsujii

Recent years have seen an explosion of workshops, community challenges, corpora and publicly available tools in the biomedical and clinical language processing domain. That trend continues in 2019. In a significant advance, this year the original BioNLP-ST challenge matured into an open platform capable of providing technical support and sustaining any group that is interested in organizing a biomedical language processing challenge [1], while the BioNLP Special Interest Group continues supporting Shared Tasks in emerging areas of research through the annual meeting. This year, BioNLP-ST presents research directions explored by 72 teams for inference and entailment in the medical domain, and their contribution to domain-specific information retrieval and question answering systems [2].

The BioNLP meeting has now been ongoing for 18 years. BioNLP continues to stay the flagship and the generalist meeting in biomedical language processing, accepting noteworthy work independently of the tasks and sublanguages studied. BioNLP also continues promoting research in languages other than English, this year presenting work in Romanian, Portuguese, Spanish, and Chinese [3, 4, 5, 6], primarily covering development of resources for these languages.

The quality of submissions continues to impress the program committee and the organizers. BioNLP 2019 received 72 submissions to the workshop, and 21 for the Shared Task. Of the work submitted to the workshop, 14 papers were accepted for oral presentation and 24 as poster presentations. This year, various deep learning architectures are explored in all papers, with continuing focus on interesting new models and in-depth exploration of the state-of-the-art publicly available tools. Most of the work uses BERT [7] or BERT models trained on PubMed, with one paper exploring BERT and ELMo on ten biomedical benchmarking datasets [8] and many others using and exploring embeddings and neural networks for chemical recognition [9], concept extraction and coding [10], relation extraction [11, 12, 13], and phenotyping [14].

As for the past several years, the themes in this year's papers and posters continue to focus equally on clinical text and biological language processing. They also reveal sustained interest in social media and consumer language processing [15].

As it has been for the past 18 years, the workshop is truly a community-wide effort of the authors producing high quality work that is already contributing to acceleration of foundational biomedical research [16, 17, 18, 19] and clinical practice [20, 21, 22, 23] through improvements in information retrieval and extraction, question answering, diagnosis and clinical decision support [24]. We are equally happy to see sustained contributions from those who started forming the field of BioNLP research, and first-time contributions that show the increasing interest in the domain. We are particularly indebted to our reviewers who reviewed a higher than usual workload in a very short time. Their judgments resulted in a program that will undoubtedly advance both the BioNLP research and the practical areas that it serves. Due to space and time constraints, we could only accept the papers that were recommended for acceptance by at least two reviewers. We hope that the authors of the papers that could not be accepted received good feedback that will help them improve their work.

References

- [1] *BioNLP-OST* <https://2019.bionlp-ost.org>. Last accessed 10 Jun 2019
- [2] Ben Abacha A, Shivade C, Demner-Fushman D. *Overview of the MEDIQA 2019 Shared Task on Textual Inference, Question Entailment and Question Answering*.

- [3] Mitrofan M, et al. *MoNERo: a Biomedical Gold Standard Corpus for the Romanian Language*.
- [4] Lopes F, et al. *Contributions to Clinical Named Entity Recognition in Portuguese*.
- [5] Campillos-Llanos L. *First Steps towards Building a Medical Lexicon for Spanish with Linguistic and Semantic Information*.
- [6] Tian Y, et al. *ChiMed: A Chinese Medical Corpus for Question Answering*.
- [7] Devlin J, et al. *BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding*. NAACL 2019 Proc.
- [8] Peng Y, et al. *Transfer Learning in Biomedical Natural Language Processing: An Evaluation of BERT and ELMo on Ten Benchmarking Datasets*.
- [9] Zhai Z, et al. *Improving Chemical Named Entity Recognition in Patents with Contextualized Word Embeddings*.
- [10] Wiegrefe S, et al. *Clinical Concept Extraction for Document-Level Coding*.
- [11] Koroleva A, Paroubek P. *Extracting relations between outcomes and significance levels in Randomized Controlled Trials (RCTs) publications*.
- [12] Chauhan G, et al. *REflex: Flexible Framework for Relation Extraction in Multiple Domains*.
- [13] Khachatryan H, et al. *BioRelEx 1.0: Biological Relation Extraction Benchmark*.
- [14] Liu D, et al. *Two-stage Federated Phenotyping and Patient Representation Learning*.
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- [17] Neumann M, et al. *ScispaCy: Fast and Robust Models for Biomedical Natural Language Processing*.
- [18] Kotitsas S, et al. *Embedding Biomedical Ontologies by Jointly Encoding Network Structure and Textual Node Descriptors*. BioNLP 2019 Proc.
- [19] Koptient A, et al. *Simplification-induced transformations: typology and some characteristics*.
- [20] Ormerod M, et al. *Analysing Representations of Memory Impairment in a Clinical Notes Classification Model*.
- [21] Yuwono SK., et al. *Learning from the Experience of Doctors: Automated Diagnosis of Appendicitis Based on Clinical Notes*.
- [22] Newman-Griffis D, et al. *Classifying the reported ability in clinical mobility descriptions*.
- [23] Soni S, Roberts K. *A Paraphrase Generation System for EHR Question Answering*.
- [24] Apostolova E, et al. *Combining Structured and Free-text Electronic Medical Record Data for Real-time Clinical Decision Support*.

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Denis Newman-Griffis, Ayah Zirikly, Guy Divita and Bart Desmet

9:00–9:15 *Learning from the Experience of Doctors: Automated Diagnosis of Appendicitis Based on Clinical Notes*
Steven Kester Yuwono, Hwee Tou Ng and Kee Yuan Ngiam

9:15–9:30 *A Paraphrase Generation System for EHR Question Answering*
Sarvesh Soni and Kirk Roberts

9:30–9:45 *REflex: Flexible Framework for Relation Extraction in Multiple Domains*
Geeticka Chauhan, Matthew B.A. McDermott and Peter Szolovits

9:45–10:00 *Analysing Representations of Memory Impairment in a Clinical Notes Classification Model*
Mark Ormerod, Jesús Martínez-del-Rincón, Neil Robertson, Bernadette McGuinness and Barry Devereux

10:00–10:15 *Transfer Learning in Biomedical Natural Language Processing: An Evaluation of BERT and ELMo on Ten Benchmarking Datasets*
Yifan Peng, Shankai Yan and Zhiyong Lu

10:15–10:30 *Combining Structured and Free-text Electronic Medical Record Data for Real-time Clinical Decision Support*
Emilia Apostolova, Tony Wang, Tim Tschampel, Ioannis Koutroulis and Tom Velez

10:30–11:00 *Coffee Break*

Thursday August 1, 2019 (continued)

11:00–12:00 Poster Session

MoNERo: a Biomedical Gold Standard Corpus for the Romanian Language

Maria Mitrofan, Verginica Barbu Mititelu and Grigorina Mitrofan

Domain Adaptation of SRL Systems for Biological Processes

Dheeraj Rajagopal, Nidhi Vyas, Aditya Siddhant, Anirudha Rayasam, Niket Tandon and Eduard Hovy

Deep Contextualized Biomedical Abbreviation Expansion

Qiao Jin, Jinling Liu and Xinghua Lu

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Query selection methods for automated corpora construction with a use case in food-drug interactions

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Enhancing biomedical word embeddings by retrofitting to verb clusters

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Aditya Joshi, Sarvnaz Karimi, Ross Sparks, Cecile Paris and C Raina MacIntyre

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Julien Fauqueur, Ashok Thillaisundaram and Theodosia Togia

First Steps towards Building a Medical Lexicon for Spanish with Linguistic and Semantic Information

Leonardo Campillos-Llanos

Incorporating Figure Captions and Descriptive Text in MeSH Term Indexing

Xindi Wang and Robert E. Mercer

Thursday August 1, 2019 (continued)

BioRelEx 1.0: Biological Relation Extraction Benchmark

Hrant Khachatryan, Lilit Nersisyan, Karen Hambardzumyan, Tigran Galstyan, Anna Hakobyan, Arsen Arakelyan, Andrey Rzhetsky and Aram Galstyan

Extraction of Lactation Frames from Drug Labels and LactMed

Heath Goodrum, Meghana Gudala, Ankita Misra and Kirk Roberts

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Two-stage Federated Phenotyping and Patient Representation Learning

Dianbo Liu, Dmitriy Dligach and Timothy Miller

Thursday August 1, 2019 (continued)

Transfer Learning for Causal Sentence Detection

Manolis Kyriakakis, Ion Androutsopoulos, Artur Saudabayev and Joan Ginés i Ametllé

12:00–12:30 Session 2: Ontology and Typology

12:00–12:15 *Embedding Biomedical Ontologies by Jointly Encoding Network Structure and Textual Node Descriptors*

Sotiris Kotitsas, Dimitris Pappas, Ion Androutsopoulos, Ryan McDonald and Marianna Apidianaki

12:15–12:30 *Simplification-induced transformations: typology and some characteristics*

Anaïs Koptient, Rémi Cardon and Natalia Grabar

12:30–14:00 Lunch break

14:00–15:30 Session 3: Literature mining approaches and models

14:00–14:15 *ScispaCy: Fast and Robust Models for Biomedical Natural Language Processing*

Mark Neumann, Daniel King, Iz Beltagy and Waleed Ammar

14:15–14:30 *Improving Chemical Named Entity Recognition in Patents with Contextualized Word Embeddings*

Zenan Zhai, Dat Quoc Nguyen, Saber Akhondi, Camilo Thorne, Christian Druckendrodt, Trevor Cohn, Michelle Gregory and Karin Verspoor

14:30–14:45 *Improving classification of Adverse Drug Reactions through Using Sentiment Analysis and Transfer Learning*

Hassan Alhuzali and Sophia Ananiadou

14:45–15:00 *Exploring Diachronic Changes of Biomedical Knowledge using Distributed Concept Representations*

Gaurav Vashisth, Jan-Niklas Voigt-Antons, Michael Mikhailov and Roland Roller

15:00–15:15 *Extracting relations between outcomes and significance levels in Randomized Controlled Trials (RCTs) publications*

Anna Koroleva and Patrick Paroubek

15:30–16:00 Coffee Break

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16:00–17:00 Session 4: Shared Task

16:00–16:15 *Overview of the MEDIQA 2019 Shared Task on Textual Inference, Question Entailment and Question Answering*
Asma Ben Abacha, Chaitanya Shivade and Dina Demner-Fushman

16:15–16:30 *PANLP at MEDIQA 2019: Pre-trained Language Models, Transfer Learning and Knowledge Distillation*
Wei Zhu, Xiaofeng Zhou, Keqiang Wang, Xun Luo, Xiepeng Li, Yuan Ni and Guotong Xie

16:30–16:45 *Pentagon at MEDIQA 2019: Multi-task Learning for Filtering and Re-ranking Answers using Language Inference and Question Entailment*
Hemant Pugalija, Karan Saxena, Shefali Garg, Sheetal Shalini, Prashant Gupta, Eric Nyberg and Teruko Mitamura

16:45–17:00 *DoubleTransfer at MEDIQA 2019: Multi-Source Transfer Learning for Natural Language Understanding in the Medical Domain*
Yichong Xu, Xiaodong Liu, Chunyuan Li, Hoifung Poon and Jianfeng Gao

17:00–18:00 Shared Task Poster Session

Surf at MEDIQA 2019: Improving Performance of Natural Language Inference in the Clinical Domain by Adopting Pre-trained Language Model
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Zhaofeng Wu, Yan Song, Sicong Huang, Yuanhe Tian and Fei Xia

KU_ai at MEDIQA 2019: Domain-specific Pre-training and Transfer Learning for Medical NLI
Cemil Cengiz, Ulaş Sert and Deniz Yuret

DUT-NLP at MEDIQA 2019: An Adversarial Multi-Task Network to Jointly Model Recognizing Question Entailment and Question Answering
Huiwei Zhou, Xuefei Li, Weihong Yao, Chengkun Lang and Shixian Ning

DUT-BIM at MEDIQA 2019: Utilizing Transformer Network and Medical Domain-Specific Contextualized Representations for Question Answering
Huiwei Zhou, Bizun Lei, Zhe Liu and Zhuang Liu

Dr.Quad at MEDIQA 2019: Towards Textual Inference and Question Entailment using contextualized representations
Vinayshekhar Bannihatti Kumar, Ashwin Srinivasan, Aditi Chaudhary, James Route, Teruko Mitamura and Eric Nyberg

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Sieg at MEDIQA 2019: Multi-task Neural Ensemble for Biomedical Inference and Entailment

Sai Abishek Bhaskar, Rashi Rungta, James Route, Eric Nyberg and Teruko Mitamura

IIT-KGP at MEDIQA 2019: Recognizing Question Entailment using Sci-BERT stacked with a Gradient Boosting Classifier

Prakhar Sharma and Sumegh Roychowdhury

ANU-CSIRO at MEDIQA 2019: Question Answering Using Deep Contextual Knowledge

Vincent Nguyen, Sarvnaz Karimi and Zhenchang Xing

MSIT_SRIB at MEDIQA 2019: Knowledge Directed Multi-task Framework for Natural Language Inference in Clinical Domain.

Sahil Chopra, Ankita Gupta and Anupama Kaushik

UU_TAILS at MEDIQA 2019: Learning Textual Entailment in the Medical Domain

Noha Tawfik and Marco Spruit

UW-BHI at MEDIQA 2019: An Analysis of Representation Methods for Medical Natural Language Inference

William Kearns, Wilson Lau and Jason Thomas

Saama Research at MEDIQA 2019: Pre-trained BioBERT with Attention Visualisation for Medical Natural Language Inference

Kamal raj Kanakarajan, Suriyadeepan Ramamoorthy, Vaidheeswaran Archana, Soham Chatterjee and Malaikannan Sankarasubbu

IITP at MEDIQA 2019: Systems Report for Natural Language Inference, Question Entailment and Question Answering

Dibyanayan Bandyopadhyay, Baban Gain, Tanik Saikh and Asif Ekbal

LasigeBioTM at MEDIQA 2019: Biomedical Question Answering using Bidirectional Transformers and Named Entity Recognition

Andre Lamurias and Francisco M Couto

NCUEE at MEDIQA 2019: Medical Text Inference Using Ensemble BERT-BiLSTM-Attention Model

Lung-Hao Lee, Yi Lu, Po-Han Chen, Po-Lei Lee and Kuo-Kai Shyu

ARS_NITK at MEDIQA 2019:Analysing Various Methods for Natural Language Inference, Recognising Question Entailment and Medical Question Answering System

Anumeha Agrawal, Rosa Anil George, Selvan Suntiha Ravi, Sowmya Kamath and Anand Kumar