

EMNLP 2021

**Fourth Workshop on Computational Models of
Reference, Anaphora and Coreference**

Proceedings of the Workshop

November 10–11, 2021
Punta Cana, Dominican Republic

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209 N. Eighth Street
Stroudsburg, PA 18360
USA
Tel: +1-570-476-8006
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acl@aclweb.org

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Message from the Program Chairs

This is the fourth edition of the Workshop on Computational Models of Reference, Anaphora and Coreference (CRAC). CRAC was first held in New Orleans three years ago in conjunction with NAACL HLT 2018. But the workshop series dates back to its predecessor, the Coreference Resolution Beyond OntoNotes (CORBON) that started in 2016, and have arguably become the primary forum for coreference researchers to present their latest results since the demise of the Discourse Anaphora and Anaphor Resolution Colloquium series in 2011. While CORBON focused on under-investigated coreference phenomena, CRAC has a broader scope, covering all cases of computational modeling of reference, anaphora, and coreference.

CRAC 2021 continued to attract a large number of very high quality papers. Specifically, we received 19 submissions which were rigorously reviewed by two to three program committee members. Based on their recommendations, we initially accepted 13 papers and conditionally accepted 3 papers. The three conditionally accepted papers were eventually accepted to the workshop after we made sure that the authors adequately addressed the reviewers' comments in the final camera-ready version. Overall, we were pleased with the large number of submissions as well as the quality of the accepted papers.

In 2021 we continued the two initiatives we started last year. First, with the goal of having a broad technical program, we introduced different paper categories. In addition to research papers, we welcomed survey papers, position papers, challenge papers, and demo papers. In each of these paper categories, authors were expected to report completed work. To encourage researchers to report work in progress and/or late-breaking results, we introduced another submission type, extended abstracts. Our second initiative involved recognizing outstanding research submitted to the workshop via a best paper award.

This is the first year where we have organized a joint CODI-CRAC shared task on modeling coreference in dialog. In addition, this year we have several EMNLP *findings* papers that are going to be presented at the workshop. This should allow researchers who did not participate in the workshop to disseminate their work to a smaller and more focused audience which should promote interesting discussions.

We are grateful to the following people, without whom we could not have assembled an interesting program for the workshop. First, we are indebted to our program committee members. This year we were able to recruit enough reviewers that the reviewing load was on an average of two papers per reviewer. All of them did the incredible job of completing their reviews in a short reviewing period. Second, we thank Ido Dagan for accepting our invitation to be this year's invited speaker. Ido will give a talk on *Modeling informational relations across multiple texts*. Third, we thank Massimo Poesio for agreeing to chair a plenary session that focuses on the topic of developing Universal Anaphora (UA), a unified, language-independent markup scheme that reflects common cross-linguistic understanding of reference-related phenomena. Motivated by Universal Dependencies, UA aims to facilitate referential analysis of the similarities and idiosyncrasies among typologically different languages, support comparative evaluation of anaphora resolution systems and enable comparative linguistic studies. Finally, we would like to thank the workshop participants for joining in.

We hope you will enjoy it as much as we do!

— Sameer Pradhan, Maciej Ogrodniczuk, Yulia Grishina, and Vincent Ng

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Yilun Zhu, Georgetown University
Heike Zinsmeister, University of Hamburg

Invited Speaker:

Ido Dagan, Bar-Ilan University, Israel

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Workshop Program

Wednesday, November 10, 2021

9:05–9:30 Session 1: Welcome

9:05–9:30 *The CODI-CRAC 2021 Shared Task on Anaphora, Bridging, and Discourse Deixis in Dialogue*

Sopan Khosla, Juntao Yu, Ramesh Manuvinakurike, Vincent Ng, Massimo Poesio, Michael Strube and Carolyn Rosé

9:30–10:30 Session 2: System Talks (part 1)

9:30–9:45 *Neural Anaphora Resolution in Dialogue*

Hideo Kobayashi, Shengjie Li and Vincent Ng

9:45–10:00 *Anaphora Resolution in Dialogue: Description of the DFKI-TalkingRobots System for the CODI-CRAC 2021 Shared-Task*

Tatiana Anikina, Cennet Oguz, Natalia Skachkova, Siyu Tao, Sharmila Upadhyaya and Ivana Kruijff-Korabayova

10:00–10:15 *The Pipeline Model for Resolution of Anaphoric Reference and Resolution of Entity Reference*

Hongjin Kim, Damrin Kim and Harksoo Kim

10:15–10:30 *An End-to-End Approach for Full Bridging Resolution*

Joseph Renner, Priyansh Trivedi, Gaurav Maheshwari, Rémi Gilleron and Pascal Denis

10:30–11:00 Coffee Break

11:00–11:15 Session 3: System Talks (part 2)

11:00–11:15 *Adapted End-to-End Coreference Resolution System for Anaphoric Identities in Dialogues*

Liyan Xu and Jinho D. Choi

Wednesday, November 10, 2021 (continued)

11:15–11:45 Session 4: Analysis Papers

11:15–11:30 *Anaphora Resolution in Dialogue: Cross-Team Analysis of the DFKI-TalkingRobots Team Submissions for the CODI-CRAC 2021 Shared-Task*

Natalia Skachkova, Cennet Oguz, Tatiana Anikina, Siyu Tao, Sharmila Upadhyaya and Ivana Kruijff-Korbayova

11:30–11:45 *The CODI-CRAC 2021 Shared Task on Anaphora, Bridging, and Discourse Deixis Resolution in Dialogue: A Cross-Team Analysis*

Shengjie Li, Hideo Kobayashi and Vincent Ng

11:45–12:00 Session 5: Visioning and Discussion

Thursday, November 11, 2021

9:00–9:05 Opening Remarks

Maciej Ogrodniczuk, Sameer Pradhan, Massimo Poesio, Yulia Grishina
and Vincent Ng

9:05–10:30 Paper Session 1

9:05–9:20 *A Brief Survey and Comparative Study of Recent Development of Pronoun Coreference Resolution in English*

Hongming Zhang, Xinran Zhao and Yangqiu Song

9:20–9:35 *Coreference Resolution for the Biomedical Domain: A Survey*

Pengcheng Lu and Massimo Poesio

9:35–9:50 *FantasyCoref: Coreference Resolution on Fantasy Literature Through Omniscient Writer's Point of View*

Sooyoun Han, Sumin Seo, Minji Kang, Jongin Kim, Nayoung Choi, Min Song and Jinho D. Choi

9:50–10:00 *(Findings) CDLM: Cross-Document Language Modeling*

Avi Caciularu, Arman Cohan, Iz Beltagy, Matthew Peters, Arie Cattan and Ido Dagan

10:00–10:15 *DramaCoref: A Hybrid Coreference Resolution System for German Theater Plays*

Janis Pagel and Nils Reiter

10:15–10:30 *A Hybrid Rule-Based and Neural Coreference Resolution System with an Evaluation on Dutch Literature*

Andreas van Cranenburgh, Esther Ploeger, Frank van den Berg and Remi Thüss

10:30–11:00 Coffee Break

11:00–12:00 Invited Talk

Modeling Informational Relations across Multiple Texts

Ido Dagan

12:00–1:00 Lunch Break

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13:00–13:10 *Lazy Low-Resource Coreference Resolution: a Study on Leveraging Black-Box Translation Tools*
Semere Kiros Bitew, Johannes Deleu, Chris Develder and Thomas Demeester

13:10–13:20 *(Findings) Collecting a Large-Scale Gender Bias Dataset for Coreference Resolution and Machine Translation*
Shahar Levy, Koren Lazar and Gabriel Stanovsky

13:20–13:30 *(Findings) Do UD Trees Match Mention Spans in Coreference Annotations?*
Martin Popel, Zdeněk Žabokrtský, Anna Nedoluzhko, Michal Novák and Daniel Zeman

13:30–13:40 *(Findings) End-to-end Neural Information Status Classification*
Yufang Hou

13:40–13:50 *Resources and Evaluations for Danish Entity Resolution*
Maria Barrett, Hieu Lam, Martin Wu, Ophélie Lacroix, Barbara Plank and Anders Søgaard

13:50–14:05 *CoreLM: Coreference-aware Language Model Fine-Tuning*
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Abdulrahman Aloraini and Massimo Poesio

14:20–14:30 *Exploring Pre-Trained Transformers and Bilingual Transfer Learning for Arabic Coreference Resolution*
Bonan Min

14:30–14:45 Mini Break

Thursday, November 11, 2021 (continued)

14:45–14:55 Universal Anaphora Panel

14:45–14:55 *Introduction*
Massimo Poesio

14:55–15:05 *The Universal Anaphora Extension of the CoNLL-U Markup Scheme*
Anna Nedoluzhko, Martin Popel, Zdeněk Žabokrtský, Amir Zeldes and Dan Zeman

15:05–15:15 *The Universal Anaphora Scorer*
Juntao Yu

15:15–15:25 *The CODI/CRAC Shared Task on Anaphora Resolution in Dialogue*
Sopan Khosla, Juntao Yu, Ramesh Manuvinakurike, Vincent Ng, Massimo Poesio, Michael Strube and Carolyn Rosé

15:25–15:45 Discussion

15:45–16:15 Best Paper Session

15:45–16:00 *Event and Entity Coreference using Trees to Encode Uncertainty in Joint Decisions*
Nishant Yadav, Nicholas Monath, Rico Angell and Andrew McCallum

16:00–16:15 *On Generalization in Coreference Resolution*
Shubham Toshniwal, Patrick Xia, Sam Wiseman, Karen Livescu and Kevin Gimpel

16:15–16:45 Coffee Break

Thursday, November 11, 2021 (continued)

16:45–17:50 Paper Session 3

16:45–17:00 *Improving Span Representation for Domain-adapted Coreference Resolution*

Nupoor Gandhi, Anjalie Field and Yulia Tsvetkov

17:00–17:15 *Coreference by Appearance: Visually Grounded Event Coreference Resolution*

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Yilun Zhu, Sameer Pradhan and Amir Zeldes

17:30–17:40 *Understanding Mention Detector-Linker Interaction in Neural Coreference Resolution*

Zhaofeng Wu and Matt Gardner

17:40–17:50 *(Findings) Coreference-aware Surprisal Predicts Brain Response*

Evan Jaffe, Byung-Doh Oh and William Schuler

17:50–18:00 Closing Remarks

Maciej Ogrodniczuk, Sameer Pradhan, Massimo Poesio, Yulia Grishina and Vincent Ng