

Eleventh International Workshop Modelling and Reasoning in Context

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MRC 2020 took place on 29-08-2020 at ECAI 2020, the 24th European Conference on Artificial Intelligence, Europe's premier AI Research venue. Like so many events this year, the conference was affected by the ongoing COVID-19 pandemic. After first being moved in time, ECAI's format was finally changed from a face-to-face meeting in Santiago de Compostela, Galicia, Spain to a digital event (still centred around Santiago de Compostela, but being attended virtually).

The call for papers for the workshop invited original submissions that were not previously published or accepted for publication elsewhere. At least three members of the program committee did review each submission. A review form directed committee members to evaluate submissions for appropriateness, technical strength, originality, presentation, and to provide an overall score.

Despite the uncertainties, the workshop attracted nine submissions. We were able to accept five papers outright. Since the move to a fully online event meant that we could extend our original deadlines significantly, we were able to accept an additional two papers after the authors made recommended changes. Therefore, the final lineup consisted of seven papers, which left ample time for the interactive discussions MRC is known for.

Room for such discussion is always needed since the mere mention of context is as likely to start a debate as it is to solve a problem. Indeed, despite being necessary for the solution of so many problems, context remains incredibly difficult to define and model (Benerecetti et. al, 2000). Context is one of those concepts that always seem to be broad and ill-defined partly because that is the nature of context. Context is, by definition, that which is around and about the object of our research. Each research project arrives at their own working definition and model of context that works for them, for their particular problem, leaving us with a multitude of small snapshots of context. To move beyond this, we need some means by which to step back and see how all of these snapshots connect with each other, to see the broad picture of context.

In outlining Adobe's research focus, Brdiczka (2019), argued that contextual AI is the next frontier in a move towards human-centric AI, because context is key to making it possible for humans to work together with AI. As humans, context is what enables us to make sense of interactions, to make decisions quickly and efficiently with very little 'computing power' and to understand our environment.

Within a human-centric approach to AI, the focus is on designing around humans, and at the core of this is understanding the individual and their psychology; their beliefs, values, goals, desires, and emotions. In doing so, we learn something about the motivations for their actions, behaviours and practices and this allows for the development of technology that can anticipate this and begin to understand it in a contextualised way.

In their paper, Kola, Jonker, Tielman and van Riemsdijk (this volume) look at how situations can be grouped according to their psychological characteristics to give us the potential to work back towards personal values for a more personalised AI. Likewise, Moonen and Tielman (this volume) consider how value categories and actions can be linked in order to make value elicitation easier. These studies provide us with a means for considering the very personal side of human-centric AI, the beliefs and values that guide our actions and behaviours within a situation. The internal context that we bring to bear on our decisions.

Humans however rarely operate as single entities, indeed as Halliday (1978) points out, it is through language and our interaction with others that we become not merely organisms but persons. Modelling context for this complex interaction becomes more and more difficult. As Heimerl, Baur and André (this volume) show, it is necessary to model context for the individuals and their interaction. In their research they outline a framework for developing automated context-sensitive recognition of conversational engagement. Engagement is something that humans signal in a variety of different and multimodal ways depending on the situation that they are in and the contextual parameters of that situation.

Blohm, Cassens and Wegener (this volume) also look at situated multiparticipant interaction and how the dialogic nature of explanations vary contextually even in very similar situations. They consider how a better understanding of this

multimodal interaction in a learning environment might enable us to optimise human-machine interaction as it pertains to explainable AI and might aid the development of better training systems for learning complex motor skills in high risk environments such as surgery or emergency medicine.

Serious games can be used for training in high risk environments, but as Żuchowska, Kutt, Geleta, Bobek and Nalepa (this volume) show, serious games can also be used as an experimental framework. In their research they show that affective games have the potential to provide controllable context and can thus be used for research purposes. In this case, the game mechanics provide a framework for developing a controllable context where things like emotion and reaction can be measured in context. This approach to context looks at the individual with respect to context, and if we look at Shen, Teso, Zhang, Xu and Giunchiglia (this volume), we see that context is also necessary if we want to personalise the reaction of applications like personal assistants. They discuss the difficulties of the task of context recognition and present a four dimensional model.

Finally, Soviany (this volume) demonstrates how context is relevant for machine learning. Here, a curriculum can provide a context for machine learning for supervised computer vision tasks. Curriculum learning approaches are a solution for improving accuracy and Soviany presents novel curriculum sampling strategy which takes into consideration the diversity of the training data together with the difficulty of the inputs.

MRC always aims to bring together researchers and practitioners from different communities, both industry and academia, to study, understand, and explore issues surrounding context and to share problems, techniques and solutions across a broad range of areas. By working together we can get a better understanding of context to be able to model and formalise it, to make it computable and to work towards a human-centric contextual AI.

The organisers would like to thank all the authors for submitting their papers and the members of the program committee as well as the additional reviewers for their valuable review contribution.

Workshop website
mrc.kriwi.de

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Jörg Cassens, Rebekah Wegener, Anders Kofod-Petersen

References

- Benerecetti, M., Bouquet, P., & Ghidini, C. (2000). Contextual reasoning distilled. *Journal of Experimental & Theoretical Artificial Intelligence*, 12(3), 279-305.
- Brdiczka, O. (2019). *Contextual AI-The Next Frontier Towards Human-Centric Artificial Intelligence*. Machine Learning@Georgia Tech Seminars, 2019-02-28, Georgia Tech, USA.
- Halliday, M. A. K. (1978). *Language as Social Semiotic: The Social Interpretation of Language and Meaning*. London: Edward Arnold.

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