Pain communication varies, with some patients being highly expressive regarding their pain and others exhibiting stoic forbearance and minimal verbal account of discomfort. Considerable progress has been made in defining behavioral indices of pain [1-3]. An abundant literature shows that a limited subset of facial movements, in several non-human species, encode pain intensity across the lifespan [2]. To advance reliable pain monitoring, automated assessment of pain is emerging as a powerful mean to realize that goal. Though progress has been made, this field remains in its infancy. The workshop aims to promote current research and support growth of interdisciplinary collaborations to advance this ground-breaking research.

2 WORKSHOP CONTENT

After a double blind peer review process, the third edition of the International Workshop on Automated Assessment of Pain (AAP) includes six presentations covering a range of topics in AAP. These include two per reviewed and accepted papers and four keynote presentations:

• “Towards Automated Pain Assessment using Embodied Conversational Agents” by Ricken et al. [7], presents a study that investigates the value of an embodied conversation agent for automated pain assessment. A Wizard of Oz system is used with 9 participants, and compared with a protocol where the system displays the reported pain intensity to the user at the end of the assessment interaction. Preliminary findings indicate that individuals are comfortable reporting their pain experiences to the agent, and are largely satisfied with this assessment methodology. They also find evidence that individuals prefer the conversational empathic summary to the standard self-report measures. The paper further presents an analysis of gestures used by users in narrating their pain experience, highlighting the richness of the information encapsulated in these gestures. These preliminary findings could inform the design of embodied conversational agents for enhanced patient experience during automated assessment of patients’ outcomes in home settings.

• “Pain Recognition Differences between Female and Male Subjects: An Analysis based on the Physiological Signals of the X-ITE Pain Database” by Tobias et al. [8], investigates the differences in automatic pain detection performance between male and female participants as well as between second-level and minute-level pain stimuli. The work is based on a dataset captured from healthy people during experimentally-induced thermal and electric pain experiences and uses different modalities (unimodal and multimodal). Their findings suggest that accuracy for female pain threshold and tolerance levels were generally higher with the shorter-term thermal stimuli than the accuracy for male suggesting value in accounting for gender in the automated measurement of pain intensity.
In addition to the peer-reviewed and accepted papers described above, the workshop also invited four keynote speakers:

- Benedikt Schick - Clinic of Anesthesiology and Intensive Care Medicine, University Hospital Ulm, Germany.
- Claus Deissler - KPUNKT Technologie Marketing GmbH, Stuttgart, Germany.
- Lola Cañamero - Paris-Seine INEX Chair Neuroscience and Robotics, France.

The speakers bring a unique and complementary perspective of future directions for research into automated assessment of pain that would address the conceptual and practical reasons for interest in automated assessment of pain.

ACKNOWLEDGMENTS

We would like to thank the authors for their submissions and for making this workshop a valuable source of information for the research community. We would like to thank the reviewers for their invaluable time and effort. We also thank Benedikt Schick, Claus Deissler, Albert Ali Salah, and Lola Cañamero for their invaluable contribution as keynote speakers. Many thanks go to the Workshop Chairs Theodora Chaspari and Giovanna Varni for their help during the preparation of this Workshop. This work was supported in part by the National Institute Of Nursing Research of the National Institutes of Health under Award Number R01NR018451. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

REFERENCES