UKRAS20: the 3rd UK Robotics and Autonomous Systems Conference

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On behalf of the Organising and Advisory Committee we take great pleasure in welcoming students, researchers and experts in Robotics to UKRAS20, the 3rd UK-RAS Conference for PhD Students and Early-Career Researchers, organised by the EPSRC UK-RAS network in collaboration with the AgriFoRwArdS and FARSCOPE Centres for Doctoral Training.

I. Conference aims

The conference is specifically for PhD students and early-career robotics researchers of the UK-RAS Network and will foster progress in the field of robotics research at what promises to be a very comprehensive and exciting meeting. The aim of the UKRAS20 conference is to promote quality research, networking, and community building for PhD students and practitioners at the frontier of science and technology in intelligent robots and systems, by discussing the latest advancements in this fast growing and exciting field.

II. Topics

This year's theme is 'Robots into the Real World', exploring how robotics can make a positive difference to societal challenges, from fundamental enabling technologies to real-world applications, such as working in challenging and extreme environments; enabling healthy / independent living; ensuring safe, efficient transport; developing next-generation manufacturing; feeding a growing population and ensuring a safe environment for the future. Presentations have been grouped into three sessions within this theme:

Artificial Intelligence and Robotics. Keynote speaker Ingmar Posner (Oxford) will discuss autonomous vehicles. The oral presentation topics are Enhancing Unsupervised Natural Language Grounding through Explicit Teaching [1], Enhancing Unsupervised Natural Language Grounding through Explicit Teaching [2], An incremental learning approach for physical Human-Robot Collaboration [3], Plastic 'personalities' for effective field swarm [4], and Reliability-Aware Multi-UAV Coverage Path Planning Using Integer Linear Programming [5].

Field and Service Robotics. Keynote speaker Fumiya Iida (Cambridge) will discuss agricultural robotics. The oral presentation topics are Towards Intention Recognition for Human-Interacting Agricultural Robots [6], Feasibility Study of In-Field Phenotypic Trait Extraction for Robotic Soft-Fruit Operations [7], Enabling Deep Personalisation for a Heterogeneous Ambient Assisted Living Landscape [8], Automated Topological Mapping for Agricultural Robots [9], and Trajectory Tracking and Control of Multiple Robot Arms on a Free-Floating Spacecraft for Debris Removal [10].

Novel and Emerging Robotics Technologies. Keynote speaker Adam Stokes (Edinburgh) will discuss Biologically Inspired Robotic Systems for Extreme Environments. The oral presentation topics are Biologically Inspired Robotic Systems for Extreme Environments [11], Analysis of two wheeled robot morphology for a slope environment [12], The Goods and Bads in Dyadic Co-Manipulation: Identifying Conflict-Driven Interaction Behaviours in Human-Human Collaboration [13], Expression of Grounded Affect in a Hexapod Robot [14], and Optimising Soft Fin Ray Robotic Fingers using Finite Element Analysis to Reduce Object Slippage [15].

These sessions and topics present an overview of current areas of interest across the UK robotics community in 2020.

III. Selection process

Accepted authors from previous UKRAS conferences were invited to review, with additional reviewers from the host institution, University of Lincoln, having one or more previous publications in TAROS, IROS or ICRA. Reviewers were free to delegate reviews to any others having publications in these venues. All submissions have been reviewed by two or three reviewers, scoring between 3 (strong accept) and -3 (strong reject), with 0 as borderline. The conference aims to be inclusive so all papers with average scores of 0 or greater have been accepted. Additional reviewers were invited where reviewer opinions differed strongly between accept and reject. Reviewers were instructed that papers should contain some novelty, such as presenting new results and/or new contexualisations of previous results, such as reviewing previous work to present one's whole PhD or research project to the UK community as a whole. Reviewers from the host institution were not assigned to papers from the host institution. All other review assignment is random, as a conference aim is for the whole UK robotics community to understand each others work in a single track event. The 15 highest scoring papers were selected for oral presentation, subject to a limit of no more than one oral presentation per author, and excluding four papers authored by the General Chair and Programme Chair ([16], [17], [18], [19]). Keynotes were invited at the discretion of the programme committee. Awards will be given to the best paper and poster presentation as selected by a committee comprising members of the UK-RAS network and senior programme committee members of UKRAS20.

Charles Fox is Programme Chair, UKRAS20, University of Lincoln, UK. Tom Duckett is General Chair, UKRAS202, University of Lincoln, UK. Arthur Richards is Technical Chair, UKRAS20, University of Bristol, and UK-RAS Network.

IV. Conference statistics

67 submissions were received, of which 15 were accepted as oral presentations and 41 as poster presentations. (Acceptance rate 88%). Accepted papers are from 22 UK universities, with ratios shown in fig. 1. 44% of papers have two reviews, and 56% have three or more reviews. There were 45 participating reviewers from 28 UK universities whose affiliations are shown in fig. 2. The UKRAS20 host institution, University of Lincoln, and previous year's UKRAS19 host institution, University of Loughborough, are both highly represented in both presentations and reviewers.

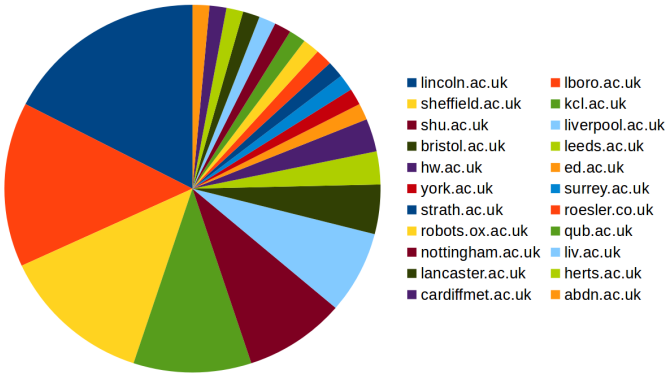

Fig. 1: Affiliations of accepted paper authors

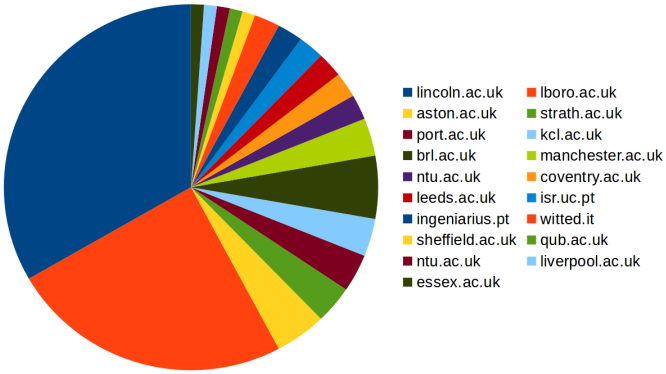

Fig. 2: Affiliations of reviewers

V. Reviewers

Paul Baxter, Nicola Bellotto, Jordan Bird, Fanta Camara, Grzegorz Cielniak, Heriberto Cuayahuitl, Gautham Das, Daniel DeBarrie, Johann Dichtl, Khaled Elgeneidy, Yinfeng Fang, Diego Faria, Manuel Fernandez-Carmona, Joo Filipe Ferreira, Khaled Goher, Laura Justham, Marc Hanheide, Christos Kouppas, Weeding Li, Honghai Liu, Neils Lohse, Ahmad Lotfi, Mufti Mahmud, Luis J. Manso, Sarah Mghames, Alan Millard, Ben Mitchinson, Hctor A. Montes, Harit Pandya, Simon Parsons, Martin Pearson, Riccardo Polvera, Mithun Poozhiyil, David Portugal, Mini Saaj, Baris Serhan, Elizabeth Sklar, Aravinda Srinivasan, Cuebong Wong, Erfu Yang, Shigang Yue, Tsvetan Zhivkov, Melanie Zimmer.

VI. Local arrangements

Due to the 2020 COVID-19 pandemic it is being held remotely as a teleconference. We ask all participants to study and respect teleconference etiquette. In particular this means that as with a physical conference, participants should devote their full day exclusively to attending the presentation and networking sessions. It is rude to perform other work on computers at the same time. Teleconferencing can deliver information and build communities as well as physical meetings if suitable etiquette is applied, and that it also reduces carbon emissions, fuel use, travel times, and attendance costs.

References

[1] O. Roesler, "Enhancing unsupervised natural language grounding through explicit teaching," in *Proceedings of The 3rd UK-RAS Conference*, 2020.

[2] G. Miyauchi and E. Sklar, "A study assessing the impact of task duration on performance metrics for multi-robot teams," in *Proceedings of The 3rd UK-RAS Conference*, 2020.

[3] A. Buerkle, A. Al-Yacoub, and P. Ferreira, "An incremental learning approach for physical human-robot collaboration," in *Proceedings of The 3rd UK-RAS Conference*, 2020.

[4] E. Hunt, "Plastic 'personalities' for effective field swarm," in *Proceedings of The 3rd UK-RAS Conference*, 2020.

[5] M. Li, A. Richards, and M. Sooriyabandara, "Reliability-aware multi-uav coverage path planning using integer linear programming," in *Proceedings of The 3rd UK-RAS Conference*, 2020.

[6] A. Gabriel and P. Baxter, "Towards intention recognition for human-interacting agricultural robots," in *Proceedings of The 3rd UK-RAS Conference*, 2020.

[7] R. Kirk, M. Mangan, and G. Cielniak, "Feasibility study of in-field phenotypic trait extraction for robotic soft-fruit operations," in *Proceedings of The 3rd UK-RAS Conference*, 2020.

[8] R. Smith, "Enabling deep personalisation for a heterogeneous ambient assisted living landscape," in *Proceedings of The 3rd UK-RAS Conference*, 2020.

[9] W. Mandil, K. Heiwolt, G. Cielniak, and M. Hanheide, "Automated topological mapping for agricultural robots," in *Proceedings of The 3rd UK-RAS Conference*, 2020.

[10] A. Babu, A. Rathinam, and Z. Hao, "Trajectory tracking and control of multiple robot arms on a free-floating spacecraft for debris removal," in *Proceedings of The 3rd UK-RAS Conference*, 2020.

[11] J. Hulas and C. Zho, "Improving quadrupedal locomotion on granular material using genetic algorithm," in *Proceedings of The 3rd UK-RAS Conference*, 2020.

[12] R. Woolley, J. Timmis, and A. Tyrell., "Analysis of two wheeled robot morphology for aslope environment," in *Proceedings of The 3rd UK-RAS Conference*, 2020.

[13] I. Issak and A. Kucukyilmaz, "The goods and bads in dyadic co-manipulation: Identifying conflict-driven interaction behaviours in human-human collaboration," in *Proceedings of The 3rd UK-RAS Conference*, 2020.

[14] L. Hickton, M. Lewis, and L. Canamero, "Expression of grounded affect in a hexapod robot," in *Proceedings of The 3rd UK-RAS Conference*, 2020.

[15] J. Emerson and K. Elgeniedy, "Optimising soft fin ray robotic fingers using finite element analysis to reduce object slippage," in *Proceedings of The 3rd UK-RAS Conference*, 2020.

[16] Z. Hobbs, T. Duckett, S. Pearson, and M. Mangan., "Towards bio-inspired fruit detection for agriculture," in *Proceedings of The 3rd UK-RAS Conference*, 2020.

[17] H. Rogers and C. Fox, "An open source seeding agri-robot," in *Proceedings of The 3rd UK-RAS Conference*, 2020.

[18] X. Li, C. Fox, and S. Coutts, "Deep learning for robotic strawberry harvesting," in *Proceedings of The 3rd UK-RAS Conference*, 2020.

[19] F. Camara and C. Fox, "Game theory for self-driving cars," in *Proceedings of The 3rd UK-RAS Conference*, 2020.