ČESKÝ INSTITUT INFORMATIKY ROBOTIKY A KYBERNETIKY ČVUT V PRAZE

CACORR

Thursday, January 23, 2025

Program

9:00 **10 min**	**Colloquium introduction (Zdeněk Hanzálek)** **9:00 – 9:10** **Vladimír Mařík: CIIRC Research Strategy**
9:10 – 10:20 **70 min**	**Robotics and machine perception (RMP, Václav Hlaváč)** **9:10 - 9:11** Václav Hlaváč: RMP Department Introduction **9:11 - 9:12** 37241 ROP - head Karla Štěpánová **9:12 - 9:18** G. Šejnová, M. Vavrečka and K. Štepánová, "Bridging Language, Vision and Action: Multimodal VAEs in Robotic Manipulation Tasks," 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Abu Dhabi, United Arab Emirates, 2024, pp. 12522-12528, doi: 10.1109/IROS58592.2024.10802160. (CORE A conference) **9:18 - 9:24** O. Holešovský, R. Škoviera and V. Hlaváč, "MovingCables: Moving Cable Segmentation Method and Dataset," in IEEE Robotics and Automation Letters, vol. 9, no. 8, pp. 6991-6998, Aug. 2024, doi: 10.1109/LRA.2024.3416800.(Q1/Q2 journal) **9:24 - 9:25** 37242 IMR - head Libor Přeučil **9:25 – 9:31** T. Pivoňka, L. Přeučil (2024); „On Model-Free Re-ranking for Visual Place Recognition with Deep Learned Local Features“; IEEE Transactions on Intelligent Vehicles (D1 journal) **9:31 – 9:37** J. Mikula, M. Kulich, L. Přeučil (IROS 2024); „TriVis: Versatile, Reliable, and High-Performance Tool for Computing Visibility in Polygonal Environments“; 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Abu Dhabi (CORE A conference)

9:37 – 9:38 37243 AAG - head Tomáš Pajdla

9:38 – 9:45 Zehao Yu, Anpei Chen, Binbin Huang, Torsten Sattler, Andreas Geiger, "Mip-splatting: Alias-free 3d gaussian splatting", Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition 2024. *Best Student Paper Award.*

9:45 – 9:51 Jonas Kulhanek, Songyou Peng, Zuzana Kukelova, Marc Pollefeys, Torsten Sattler, "Wildgaussians: 3d gaussian splatting in the wild". Advances in Neural Information Processing Systems (NeurIPS 2024).

9:51 – 9:58 Timothy Duff, Kathlén Kohn, Anton Leykin & Tomas Pajdla. PL1P: Point-Line Minimal Problems under Partial Visibility in Three Views. IJCV 2024. (D1 journal)

9:58– 9:59 37244 IMPACT head Josef Šivic

9:59 – 10:06 Roman Bushuiev, Anton Bushuiev, Niek F de Jonge, Adamo Young, Fleming Kretschmer, Raman Samusevich, Janne Heirman, Fei Wang, Luke Zhang, Kai Dührkop, Marcus Ludwig, Nils A Haupt, Apurva Kalia, Corinna Brungs, Robin Schmid, Russell Greiner, Bo Wang, David S Wishart, Li-Ping Liu, Juho Rousu, Wout Bittremieux, Hannes Rost, Tytus D Mak, Soha Hassoun, Florian Huber, Justin JJ van der Hooft, Michael A Stravs, Sebastian Böcker, Josef Sivic, Tomáš Pluskal; „MassSpecGym: A benchmark for the discovery and identification of molecules", Advances in Neural Information Processing Systems (NeurIPS 2024), (CORE A* conference, Spotlight paper)

10:06 – 10:13 K Zorina, V Priban, M Fourmy, J Sivic, V Petrik; „Temporally Consistent Object 6D Pose Estimation for Robot Control"; IEEE Robotics and Automation Letters, (Q1/Q2 journal)

10:13 – 10:20 T Soucek, JB Alayrac, A Miech, I Laptev, J Sivic; „Multi-Task Learning of Object States and State-Modifying Actions from Web Videos"; IEEE Transactions on Pattern Analysis and Machine Intelligence (2024) (D1 journal)

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10:20 – 11:00 40 min	**Industrial informatics (IID, Zdeněk Hanzálek)** **10:20 - 10:24** Zdeněk Hanzálek: Overview of department results **10:24 - 10:33** Pavlína Koutecká, Přemysl Šůcha, Jan Hůla, Broos Maenhout: A machine learning approach to rank pricing problems in branch-and-price, European Journal of Operational Research, Volume 320, Issue 2 (https://doi.org/10.1016/j.ejor.2024.07.029) **10:33 – 10:42** Farnaz Sohrabi, Mohammad Rohaninejad, Július Bemš, and Zdeněk Hanzálek: Electrification of transportation: A hybrid Benders/SDDP algorithm for optimal charging station trading. International Journal of Hydrogen Energy Vol 89, 1060-1074. (https://doi.org/10.1016/j.ijhydene.2024.09.345) **10:42 – 10:51** Jakub Med, Lukáš Chrpa, Michael Morak and Wolfgang Faber. Weak and Strong Reversibility of Non-deterministic Actions: Universality and Uniformity. In Proceedings of the International Conference on Automated Planning and Scheduling, 2024, volume 34, 369–377. AAAI Press. URL: https://doi.org/10.1609/icaps.v34i1.31496 **10:51 – 11:00** Ondřej Mamula, Petr Stejskal, Přemysl Šůcha, David Hrycej, Jitka Stoklasová: Control algorithm for hybrid power plant Energy Nest https://www.decci.cz/tag/energy-nest/ - Application result
11:00 - 11:10	**Break**

11:10 - 11:50 **40 min**	**Industrial production and automation (IPA, Michael Valášek)** **11:10 – 11:14** IPA introduction and results 2024(4 min) **11:14 – 11:23** Černý, J., Navrátil, J., Valášek, M. (2023). Compliant object manupulation. Proceedings of 33rd Workshop of Applied Mechanics, November 24th, 2023. (10 min) **11:23 – 11:32** Saldanha, A., Michiels, W., Kuře, M., Bušek, J., & Vyhlídal, T. (2024). Stability optimization of time-delay systems with zero-location constraints applied to non-collocated vibration suppression. Mechanical Systems and Signal Processing, 208, 110886. https://doi.org/10.1016/j.ymssp.2023.110886 (10 min) **11:32 – 11:41** Čermák A. (2024). Ultra-short pulse lasers in micromachinig applications. Applied results of a contract research. (8 min) **11:41 – 11:50** Chládek Š. (2024). Special functions of laser cutting machine control system. Applied result of a contract research. (8 min)
11:50 - 12:40 **50 min**	**Intelligent systems (INTSYS, Vladimír Mařík)** **11:50 – 11:59** Martin Macaš: Transforming Waste Management: Advanced Tools for Detection, Forecasting, and Optimization The project, set to conclude in September 2025, is already improving waste management in Prague with an application that identifies anomalies in container fill-level time series, validates automated detections, and optimizes collection schedules to reduce costs and enhance ecological and citizen benefits. It also provides forecasts for dynamic planning using heuristics, machine learning, particle swarm optimization, and ARX models. Currently used by municipal experts, the tool supports collaboration with waste collection companies and sensor providers while enabling testing and refinement of methods for integration into the GOLEMIO system. - Application result **11:59 - 12:08** Václav Jirkovský, Martin Jílek, Petr Kadera: Automating the process of special car equipment weight increments specification - Škoda Auto. The weight increments are computed for PR number families, independent of the weight key. PR numbers, families, and conditions in the form of implications using PR numbers (also known as Regels) form MBT system. SAT model of MBT system was proposed and implemented to decide about the independence of families and also the admissibility of the PR number combinations defining unambiguously a car. This solution speeds up the overall process,

	makes weight increments more accurate, and fully automates the previously manual process. - Application result **12:08 - 12:17** Sára Strakošová, Petr Novák, Petr Kadera: Product Digital Twin Supporting End-of-life Phase of Electric Vehicle Batteries Utilizing Product-Process-Resource Asset Network. In: IEEE 22nd International Conference on Industrial Informatics (INDIN 2024), 2024. **12:17 - 12:26** Tomáš Kořínek, Jiří Závorka, Martin Lovecký, Radek Škoda: Relaxation effects in nuclear fuel coupled calculations using Serpent-OpenFOAM codes. Progress in Nuclear Energy 173, 2024. https://doi.org/10.1016/j.pnucene.2024.105258 **12:26 - 12:35** Ing. Ondřej Mamula, MBA, Ing. David Hrycej, CSc, Ing. Tomáš Vlk, Ing. Martin Vajsar, Doc. Ing. Přemysl Šůcha, Ph.D, Ing. Petr Stejskal, Ing. Jitka Stoklasová; Energy nest: the story of successful implementation of R&D results in practice **12:35 - 12:44** Jan Šedivý; Guardrails: Training LLMs for Safe and Trusted Python generation
12:44 - 13:20	**Lunch - Respirium**
13:20 –14:00 40 min	**Department of Artificial intelligence (AIF, Josef Urban)** **13:20 - 13:24** Josef Urban: Overview of department results **13:24 – 13:33** Jiří Kubalík: SymFormer: End-to-End symbolická regrese pomocí architektury založené na transformátorech. [IEEE Access 12: 37840-37849 (2024), autoři: Martin Vaštl, Jonáš Kulhánek, Jiří Kubalík, Erik Derner, Robert Babuska; https://doi.org/10.1109/ACCESS.2024.3374649] **13:33 – 13:42** Jan Hula: Porozumění GNN pro booleovskou splnitelnost pomocí aproximačních algoritmů. [CIKM 2024: 953-961, autoři: Jan Hůla, David Mojžíšek, Mikoláš Janota; https://doi.org/10.1145/3627673.3679813] **13:42 – 13:51** František Koutenský: Odemykání designu přírody prostřednictvím neuronálních celulárních automatů. [ALIFE 2024, online. (str. 122). ASME. Autoři: František Koutenský, Petr Šimánek, Alexander Kovalenko; https://doi.org/10.1162/isal_a_00831] **13:51 - 14:00** Jan Jakubuv: Strojové učení pro výběr kvantifikátoru

	v cvc5. [EÚD 2024: 4336-4343. Autoři: Jan Jakubův, Mikoláš Janota, Jelle Piepenbrock, Josef Urban; https://doi.org/10.3233/FAIA241009]
14:00 - 14:22 22 min	**Scientific management of platforms (PLAT, TESTBED, RICAIP) Vladimír Kučera)** **14:00 – 14:04** Vladimír Kučera: Platforms – Introduction **14:04 – 14:12** Vladimír Kučera, Can the system's zeros be altered by feedback?; Modification of infinite and unstable invariant zeros in linear systems using stability-preserving state feedback. IEEE Transactions on Automatic Control 69 (2024), 10, 7166-7173. (https://ieeexplore.ieee.org/document/10510043). (PLAT) **14:12 - 14:14** Tomáš Jochman, seznam výsledků za 2024 Testbed **14:14 – 14:22** Vít Zeman: Object Pose Estimation Using Implicit Representation For Transparent Objects na základě publikace: Varun Burde, Artem Moroz, Vit Zeman, Pavel Burget: Object Pose Estimation Using Implicit Representation For Transparent Objects. European Conference on Computer Vision workshop, 2024. (TESTBED)
14:22 –14:30	**Break**
14:30 - 15:20 50 min	**Cognitive systems and neurosciences (COGSYS, Lenka Vysloužilová)** **Biomedical Engineering and Assistive Technology (Beat, Olga Štěpánková)** **14:30 - 14:34** Lenka Vysloužilová: Overview of department results **14: 34- 14:38** Olga Štěpánková: Overview of department results **14:38 - 14:48** Vojtěch Sedlák, Milan Němý, Martin Májovský, … a David Netuka: Stav IDH v mozkových gliomech lze předpovědět technikou sférického průměru MRI. Americký žurnál neuroradiologie. (https://doi.org/10.3174/ajnr.A8432) **14:48 - 14:58** Brian Grunau, Daniel Rob, Michal Huptych, Jan Pudil, Štěpán Havránek, Petra Kaválková, Jana Šmalcová, Jan Bělohlávek, Časově závislá výtěžnost invazivních vs. standardních resuscitačních strategií: Sekundární analýza pražské mimonemocniční studie srdeční

	zástavy, Resuscitace, ročník 203, 2024, 110347, ISSN 0300-9572, https://doi.org/10.1016/j.resuscitation.2024.110347. - Q1 **14:58 - 15:08** Hlúbik, J.; Vysloužilová, L.; Studnička, F.; Vychodil, R.; Lhotská, L.; Pilotní studie k posouzení hydratace u geriatrických pacientů pomocí bioimpedance In: Ekosystémy telehealth v praxi. Amsterdam: IOS Press, 2023. str. 250-254. Studium zdravotnických technologií a informatiky. sv. 309. ISSN 1879-8365. **15:08 - 15:18** Cui, J., Mivalt, F., Sladký, V., Kim, J., Richner, T. J., Lundstrom, B. N., Van Gompel, J. J., Wang, H.-L., Miller, K. J., Gregg, N., Wu, L. J., Denison, T., Winter, B., Brinkmann, B. H., Kremen, V., & Worrell, G. A. (2024). Akutní až dlouhodobé charakteristiky impedančních záznamů během neurostimulace u lidí. *Žurnál neuronového inženýrství*, *21*(2). https://doi.org/10.1088/1741-2552/ad3416
15:20	**End of the meeting**