2017 Joint IEEE International Conference on Development and Learning and Epigenetic Robotics (ICDL-EpiRob 2017)

Lisbon, Portugal
18 – 21 September 2017
Tuesday, September 19

**Location:** Instituto Superior Técnico, Congress Center, Main Amphitheater

08:30–09:00 Early Registration (all day)

09:00-09:10 Welcome and Intro

09:10-10:10 Tamar Flash, Weizmann Institute of Science, Israel

*Chair: Santos-Victor, José*

**10:10-11:00 Talks Session I: Sensorimotor Learning and Control**

*Chair: Kuipers, Benjamin*

*Co-Chair: Wermter, Stefan*

10:10-10:35 **Explanation of the Perceptual Oblique Effect Based on the Fidelity of Oculomotor Control During Saccades.....15**

*Nguyen, Khuong; Liu, Xi; Komogortsev, Oleg; Gutierrez-Osuna, Ricardo; Choe, Yoonsuck*

10:35-11:00 **Learning of Active Binocular Vision in a Biomechanical Model of the Oculomotor System.....21**

*Klimmasch, Lukas; Lelais, Alexander; Lichtenstein, Alexander; Shi, Bertram Emil; Triesch, Jochen*

11:00-11:30 Coffee Break

**11:30-12:20 Talks Session II: Sensorimotor Learning and Control**

*Chair: Wermter, Stefan*

*Co-Chair: Kuipers, Benjamin*

11:30-11:55 **Autonomous, Self-Calibrating Binocular Vision Based on Learned Attention and Active Efficient Coding.....27**

*Zhu, Qingpeng; Triesch, Jochen; Shi, Bertram Emil*

11:55-12:20 **A Computational Model of Crossmodal Processing for Conflict Resolution.....33**

*Parisi, German Ignacio; Barros, Pablo; Kerzel, Matthias; Wu, Haiyan; Yang, Guochun; Li, Zhenghan; Liu, Xun; Wermter, Stefan*
12:20-13:00 Poster Highlights Session I: Sensorimotor, Babybot

13:00-14:30 Lunch Break

14:30-15:30 Rod Grupen, University of Massachusetts Amherst, USA

Chair: Ugur, Emre

15:30-17:00 Poster Session I: Sensorimotor, Babybot

16:00-17:00 Coffee Break

17:00-18:00 BabyBot Challenge

Chair: Lockman, Jeffrey J
Co-Chair: Oudeyer, Pierre-Yves

17:10-17:35 Development of Reaching to the Body in Early Infancy: From Experiments to Robotic Models.....112

Hoffmann, Matej; Chinn, Lisa; Somogyi, Eszter; Heed, Tobias; Fagard, Jacqueline; Lockman, Jeffrey J; O’Regan, J. Kevin

17:35-18:00 Self-Organization Based on Auditory Feedback Promotes Acquisition of Babbling.....120

Takimoto, Tomohiro; Kawai, Yuji; Park, Jihoon; Asada, Minoru

18:00-18:10 Closing

18:10-19:00 Lab Visit

19:00-21:00 Welcome Reception
Wednesday, September 20

Location: Instituto Superior Técnico, Congress Center, Main Amphitheater

08:30–09:00 Early Registration (all day)
09:00-09:10 Welcome and Intro

09:10-10:10 Donald Pfaff, The Rockefeller University, USA

Chair: Sandini, Giulio

10:10-11:00 Talks Session III: Neural Networks

Chair: Tani, Jun
Co-Chair: Schöner, Gregor

10:10-10:35 Echo in a Small-World Reservoir: Time-Series Prediction Using an Economical Recurrent Neural Network.....126

Kawai, Yuji; Tokuno, Tatsuya; Park, Jihoon; Asada, Minoru

10:35-11:00 Predictive Coding-Based Deep Dynamic Neural Network for Visuomotor Learning.....132

Hwang, Jungsik; Kim, Jinhyung; Ahmadi, Ahmадreza; Choi, Minkyu; Tani, Jun

11:00-11:30 Coffee Break

11:30-12:20 Talks Session IV: Reward and Value Systems

Chair: Seymour, Ben
Co-Chair: Rolf, Matthias

11:30-11:55 Parallel Reward and Punishment Control in Humans and Robots: Safe Reinforcement Learning Using the MaxPain Algorithm.....140

Elfwing, Stefan; Seymour, Ben

11:55-12:20 The Effects on Adaptive Behaviour of Negatively Valenced Signals in Reinforcement Learning.....148

Navarro-Guerrero, Nicolás; Lowe, Robert; Wermter, Stefan

12:20-13:00 Poster Highlights Session II: Neural Network and Models, Language
13:00-14:30 Lunch Break

14:30-15:45 Talks Session V: Language

Chair: Asada, Minoru
Co-Chair: Scheutz, Matthias

14:30-14:55 Unsupervised Learning for Spoken Word Production Based on Simultaneous Word and Phoneme Discovery without Transcribed Data.....156
Miyuki, Yuusuke; Hagiwara, Yoshinobu; Taniguchi, Tadahiro

14:55-15:20 Comparative Study of Feature Extraction Methods for Direct Word Discovery with NPB-DAA from Natural Speech Signals.....164
Tada, Yuki; Hagiwara, Yoshinobu; Taniguchi, Tadahiro

15:20-15:45 An Embodied Incremental Bayesian Model of Cross-Situational Word Learning.....172
Sadeghi, Sepideh; Scheutz, Matthias; Krause, Evan

15:45-17:15 Poster Session II: Neural Network and Models, Language

16:00-17:00 Coffee Break

17:15-18:05 Talks Session VI: Exploration

Chair: Hafner, Verena Vanessa
Co-Chair: Hoffmann, Matej

17:15-17:40 Online-Learning and Planning in High Dimensions with Finite Element Goal Babbling.....247
Loviken, Pontus; Hemion, Nikolas

17:40-18:05 Social Reinforcement in Intrinsically Motivated Sensorimotor Exploration for Embodied Agents with Constraint Awareness.....255
Acevedo-Valle, Juan Manuel; Hafner, Verena Vanessa; Angulo, Cecilio

18:05-18:55 Talks Session VII: Developmental Disorders

Chair: Nagai, Yukie
Co-Chair: Ogata, Tetsuya
18:05-18:30 Pain and Self-Preservation in Autonomous Robots: From Neurobiological Models to Psychiatric Disease.....263

Piccolo, Luca; Dalla Libera, Fabio; Bonarini, Andrea; Seymour, Ben; Ishiguro, Hiroshi

18:30-18:55 Reduced Behavioral Flexibility by Aberrant Sensory Precision in Autism Spectrum Disorder: A Neurorobotics Experiment.....271

Idei, Hayato; Murata, Shingo; Chen, Yiwen; Yamashita, Yuichi; Tani, Jun; Ogata, Tetsuya

18:55-19:00 Closing

20:00-23:00 Social Dinner
Thursday, September 21

Location: Instituto Superior Técnico, Congress Center, Main Amphitheater

08:30–09:00 Early Registration (all day)
09:00-09:10 Welcome and Intro

09:10-10:10 Josep Call, University of St Andrews, UK
  Chair: Jamone, Lorenzo

10:10-11:00 Talks Session VIII: Grounding of Knowledge
  Chair: Bernardino, Alexandre
  Co-Chair: Taniguchi, Tadahiro

10:10-10:35 Grounded Representations through Deep Variational Inference and Dynamic Programming.....277
  Olier, Juan Sebastian; Barakova, Emilia I.; Rauterberg, Matthias; Marcenaro, Lucio; Regazzoni, Carlo

10:35-11:00 Learn, Plan, Remember: A Developmental Robot Architecture for Task Solving.....283
  Antunes, Alexandre; Saponaro, Giovanni; Morse, Anthony; Jamone, Lorenzo; Santos-Victor, José; Cangelosi, Angelo

11:00-11:30 Coffee Break

11:30-12:45 Talks Session IX: Visual Object Learning
  Chair: Santos-Victor, José
  Co-Chair: Lee, Mark

11:30-11:55 An Egocentric Perspective on Active Vision and Visual Object Learning in Toddlers.....290
  Bambach, Sven; Crandall, David; Linda, Smith; Yu, Chen

11:55-12:20 Building Representations of Proto-Objects with Exploration of the Effect on Fixation Times.....296
  Braud, Raphaël; Giagkos, Alexandros; Shaw, Patricia; Lee, Mark; Shen, Qiang
12:20-12:45 Incremental Online Learning of Objects for Robots Operating in Real Environments.....304
Part, Jose Luis; Lemon, Oliver

12:45-13:30 Poster Highlights Session III: Grounding, Prediction, Interaction

13:30-14:30 Lunch Break

14:30-15:20 Talks Session X: Predictive Models
Chair: Sandini, Giulio
Co-Chair: Ugur, Emre

14:30-14:55 DeepEfference: Learning to Predict the Sensory Consequences of Action through Deep Correspondence.....311
Shamwell, Earl Jared; Nothwang, William; Perlis, Donald

14:55-15:20 On Robots Imitating Movements through Motor Noise Prediction.....318
Pico Villalpando, Antonio; Schillaci, Guido; Hafner, Verena Vanessa; Lara, Bruno

15:20-16:50 Poster Session III: Grounding, Prediction, Interaction

16:00-17:00 Coffee Break

16:50-17:40 Talks Session XI: Interaction
Chair: Jamone, Lorenzo
Co-Chair: Grzyb, Beata Joanna

16:50-17:15 Visual 3D Tracking of Child-Adult Social Interactions.....399
   Chong, Eunji; Southerland, Audrey; Kundu, Abhijit; Jones, Rebecca; Rozga, Agata; Rehg, James

17:15-17:40 Towards Temporal Cognition for Robots: A Neurodynamics Approach.....407
   Wojtak, Weronika; Ferreira, Flora; Louro, Luis; Bicho, Estela; Erlhagen, Wolfram

17:40-18:00 Closing

18:30-21:00 Farewell Reception
Posters List

Poster Session I (14 posters)

- Curiosity Driven-Exploration-Enhances-Motor-Skills-of-Continuous-Actor Critic-Learner......39
  
  Hafez, Muhammad Burhan; Weber, Cornelius; Wermter, Stefan

- An-Improved-LPTC-Neural-Model-for-Background-Motion-Direction-Estimation......47
  
  Wang, Hongxin; Peng, Jigen; Yue, Shigang

- Action-Recognition-with- Unsynchronised-Multi Sensory-Data.....53
  
  Camilleri, Daniel; Prescott, Tony J

- A-Scalable-Method-for-Multi Stage-Developmental-Learning-for-Reaching......60
  
  Burger, Wolfgang; Wieser, Erhard; Dean-Leon, Emmanuel; Cheng, Gordon

- Imitation-Learning-and-Attentional-Supervision-of-Dual Arm-Structured-Tasks......66
  
  Caccavale, Riccardo; Saveriano, Matteo; Fontanelli, Giuseppe Andrea; Ficuciello, Fanny; Lee, Dongheui; Finzi, Alberto

- Enactive-Self:-A-Study-of-Engineering-Perspectives-to-Obtain-the-Sensorimotor-Self-through-Enaction.....72
  
  Lanillos, Pablo; Dean-Leon, Emmanuel; Cheng, Gordon

- Tapping-the-Sensorimotor-Trajectory......79
  
  Berthold, Oswald; Hafner, Verena Vanessa

  An-Icub-Robot-Experiment......86
  
  sanchez fibla, marti; Moulin-Frier, Clément; Verschure, Paul

- Activity-Recognition-in-a-Physical-Interactive-RoboGame......92
  
  Lopes Silva de Oliveira, Ewerton; Orrù, Davide; Nascimento, Tiago; Bonarini, Andrea

- Shape Based-Attention-for-Identification-and-Localization-of-Cylindrical-Objects.....98
  
  Pimentel de Figueiredo, Rui; Dehban, Atabak; Bernardino, Alexandre; Santos-Victor, José; Araujo, Helder
Look-and-Learn:-Modeling-Gaze Contingent-Learning.....N/A
Murakami, Max; Bolhuis, Jantina; Kolling, Thorsten; Knopf, Monika; Triesch, Jochen

Muscle-Activation-Influences-the-Development-of-Prereaching-Movements.....N/A
Eijlander, Wouter; Wijnen, Luc; van Maris, Anouk; Grzyb, Beata Joanna

Infant-Development-of-Integrated-Sensorimotor-and-Visual-Body-Maps.....N/A
Chinn, Lisa; Leed, Jackleen; Schlichenmeyer, Micaela; Lockman, Jeffrey J

Sensitivity-to-Sensorimotor-Contingencies-in-Infants:-A-Paradigm for-Robotic/psychology-Collaboration.....N/A
Jacquey, Lisa; Montone, Guglielmo; Somogyi, Eszter; Fagard, Jacqueline; Esseily, Rana; O’Regan, J. Kevin

Poster Session II (14 posters)

Seepanomwan, Kristsana; Santucci, Vieri Giuliano; Baldassarre, Gianluca

Zhong, Junpei; Ogata, Tetsuya; Cangelosi, Angelo; YANG, Chenguang

A-Growing-Multi Expert-Structure-for-Open Ended-Unsupervised-Learning-of-Sensory-State-Spaces.....190
Kubisch, Matthias

Developing-Ground-Goals-through-Instant-Replay-Learning.....196
Meeden, Lisa; Blank, Doug

Baraka, Kim; Melo, Francisco S.; Veloso, Manuela

Agent Advising-Approaches-in-an-Interactive-Reinforcement-Learning-Scenario.....209
Cruz, Francisco; Wüppen, Peter; Magg, Sven; Fazrie, Alvin; Wermter, Stefan

Syntactic-Reanalysis-in-Language-Models-for-Speech-Recognition.....215
Twiefel, Johannes; Hinaut, Xavier; Wermter, Stefan

• Computational-Models-of-Tutor-Feedback-in-Language-Acquisition.....221
  Nevens, Jens; Spranger, Michael

• Epsilon Greedy-Babbling.....227
  Kim, Chyon Hae; Watanabe, Kanta; Nishide, Shun; Gouko, Manabu

• Local-Over Connectivity-Reduces-the-Complexity-of-Neural-Activity:-Toward-a-
  Constructive-Understanding-of-Brain-Networks-in-Patients-with-Autism-Spectrum-
  Disorder.....233
  Ichinose, Koki; Park, Jihoon; Kawai, Yuji; Suzuki, Junichi; Mori, Hiroki; Asada, Minoru

• Habits-That-Contradict-Rewards.....N/A
  Benureau, Fabien; Boraud, Thomas; Rougier, Nicolas

• ANNABELL-Meets-Icub:-A-Large-Scale-Grounded-Language-Learning-System.....N/A
  Golosio, Bruno; Cangelosi, Angelo; Gamotina, Olesya; Masala, Giovanni Luca

• Assessing-Phonological-Learning-in-COSMO,-a-Bayesian-Model-of-Speech-
  Communication.....N/A
  Barnaud, Marie-Lou; Schwartz, Jean-Luc; Diard, Julien; Bessière, Pierre

• DNN Based-Language-Acquisition-for-Object-Manipulation-Task.....N/A
  Ye, Kyaw Thu; Takabuchi, Kenta; Iwahashi, Naoto

Poster Session III (14 posters)

• Embodied-Artificial-Intelligence-through-Distributed-Adaptive-Control:-An-
  Integrated-Framework.....324
  Moulin-Frier, Clément; Puigbo, Jordi-Ysard; Arsiwalla, Xerxes D.; sanchez fibla, marti; Verschure, Paul

• Learning-at-the-Ends:-From-Hand-to-Tool-Affordances-in-Humanoid-Robots.....331
  Saponaro, Giovanni; Vicente, Pedro; Dehban, Atabak; Jamone, Lorenzo; Bernardino, Alexandre;
  Santos-Victor, José
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure-from-Plenoptic-Imaging</td>
<td>338</td>
</tr>
<tr>
<td>Marto, Simão Pedro; Monteiro, Nuno Barroso; Barreto, João P.; Gaspar, Jose</td>
<td></td>
</tr>
<tr>
<td>A-Deep-Reinforcement-Learning-Based-Model-Supporting-Object-Familiarization</td>
<td>344</td>
</tr>
<tr>
<td>Panzner, Maximilian; Cimiano, Philipp</td>
<td></td>
</tr>
<tr>
<td>Unsupervised-Learning-Based-Semantic-Scene-Recognition-and-Boundary-Visualization-on-Category-Maps</td>
<td>350</td>
</tr>
<tr>
<td>Madokoro, Hirokazu; Kazuhito, Sato; Nakasho, Kazuhisa; Shimo, Nobuhiro</td>
<td></td>
</tr>
<tr>
<td>Experiential-Robot-Learning-with-Deep-Neural-Networks</td>
<td>356</td>
</tr>
<tr>
<td>Aly, Ahmed; Dugan, Joanne</td>
<td></td>
</tr>
<tr>
<td>Gay, Simon L.; Mille, Alain; Cordier, Amélie</td>
<td></td>
</tr>
<tr>
<td>Iterative-Affordance-Learning-with-Adaptive-Action-Generation</td>
<td>368</td>
</tr>
<tr>
<td>Maestre, Carlos; Mukhtar, Ghanim; Gonzales, Christophe; Doncieux, Stéphane</td>
<td></td>
</tr>
<tr>
<td>Aly, Amir; Taniguchi, Akira; Taniguchi, Tadahiro</td>
<td></td>
</tr>
<tr>
<td>Synchronisation-and-Desynchronisation-As-Important-Elements-for-the-Development-of-Interaction-Capabilities</td>
<td>384</td>
</tr>
<tr>
<td>Ansermin, Eva; Gaussier, Philippe; de Rengervé, Antoine; Mostafaoui, Ghiles; marin, Ludovic</td>
<td></td>
</tr>
<tr>
<td>Studying-the-Early-Development-of-Speech-and-Tool-Use-with-a-Robotic-Model</td>
<td>N/A</td>
</tr>
<tr>
<td>Forestier, Sébastien; Oudeyer, Pierre-Yves</td>
<td></td>
</tr>
<tr>
<td>Attention-Allocation-Dynamically-Responds-to-Context</td>
<td>N/A</td>
</tr>
<tr>
<td>Chinn, Lisa; Golob, Edward</td>
<td></td>
</tr>
<tr>
<td>Behavioral-Diversity-through-Homeokinesis-in-a-Compliant-Robot</td>
<td>N/A</td>
</tr>
<tr>
<td>Gerken, Andreas Konrad Richard; Berthold, Oswald; Hafner, Verena Vanessa</td>
<td></td>
</tr>
<tr>
<td>Intrinsic-Motivation-Based-on-Bayesian-Optimization-for-Effective-Exploration-of-Training-Data</td>
<td>N/A</td>
</tr>
<tr>
<td>Ogino, Masaki</td>
<td></td>
</tr>
</tbody>
</table>