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EDITED AND REVIEWED BY  
Alois C. Knoll,  
Technical University of  
Munich, Germany

\*CORRESPONDENCE  
Witali Dunin-Barkowski  
✉ wdbun@gmail.com

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# Editorial: Toward and beyond human-level AI, volume II

Witali Dunin-Barkowski<sup>1\*</sup> and Alexander Gorban<sup>2,3</sup>

<sup>1</sup>Department of Neuroinformatics, Center for Optical Neural Technologies, Scientific Research Institute for System Analysis, Russian Academy of Sciences, Moscow, Russia, <sup>2</sup>Department of Mathematics, University of Leicester, Leicester, United Kingdom, <sup>3</sup>Scientific and Educational Mathematical Center "Mathematics of Future Technology," Lobachevsky State University of Nizhny Novgorod, Nizhny Novgorod, Russia

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## Editorial on the Research Topic Toward and beyond human-level AI, volume II

AI systems have surpassed human-level in a lot of computational competencies, and the number of these competencies is growing almost daily. Still, modern AI systems are specialized gadgets which are aimed at solving specific particular problems or limited sets of problems. The universal human-type intellectuality for these systems still remains unattained. In the opinion of many professionals, obtaining practical solution for that general problem seems to be very hard (Zhang et al., 2022) and it is not clear when it can be achieved (Stein-Perleman et al., 2022). Also, this task seems to be tough for general public (Schmidt, 2022).

In the first paper of this topic (Rivera, Poppek et al.), authors explore a novel framework called PICO to detect presence of novel behaviors and construct a library of behavior primitives from unlabeled demonstrations. A gap in trajectory is defined as a region where actions cannot be predicted with high enough probability in a current behavior model. When such a gap occurs a new behavior primitive is added. The approach is evaluated using a reach-grab-lift task using a robotic arm, showing better label and reconstruction accuracies when compared to similar approaches.

The paper Rivera, Staley et al. is devoted to multi-agent reinforcement learning in complex environments such as dense urban defense-related scenarios. The authors introduce the AI Aerna framework. There, different agents control tanks and fight with each other in a 5 vs. 5 tank combat game. It is shown that agents of the same team converge to a cooperative set of behaviors. Thus emergence of cooperative behavior has been demonstrated in the work.

In the third paper (Limbacher and Legenstein), authors demonstrated the emergence of clustering of temporally correlated inputs on dendritic branches in a setting with a generic stochastic rewiring principle with a simple synaptic plasticity rule. The mechanism is demonstrated in a computational model and is backed up with a heavy theoretical analysis. The hypothesis is proposed that such clustering might serve to protect memories from catastrophic forgetting on a medium time scale.

# Toward Modern Science Volume 1

**Padhraic Smyth**



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## **Table of Contents Toward Modern Science Volume 1**

1. Understanding the eBook Toward Modern Science Volume 1
  - The Rise of Digital Reading Toward Modern Science Volume 1
  - Advantages of eBooks Over Traditional Books
2. Identifying Toward Modern Science Volume 1
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Toward Modern Science Volume 1
  - User-Friendly Interface
4. Exploring eBook Recommendations from Toward Modern Science Volume 1
  - Personalized Recommendations
  - Toward Modern Science Volume 1 User Reviews and Ratings
  - Toward Modern Science Volume 1 and Bestseller Lists
5. Accessing Toward Modern Science Volume 1 Free and Paid eBooks
  - Toward Modern Science Volume 1 Public Domain eBooks

- Toward Modern Science Volume 1 eBook Subscription Services
- Toward Modern Science Volume 1 Budget-Friendly Options
- 6. Navigating Toward Modern Science Volume 1 eBook Formats
  - ePub, PDF, MOBI, and More
  - Toward Modern Science Volume 1 Compatibility with Devices
  - Toward Modern Science Volume 1 Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Toward Modern Science Volume 1
  - Highlighting and Note-Taking Toward Modern Science Volume 1
  - Interactive Elements Toward Modern Science Volume 1
- 8. Staying Engaged with Toward Modern Science Volume 1
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Toward Modern Science Volume 1
- 9. Balancing eBooks and Physical Books Toward Modern Science Volume 1
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Toward Modern Science Volume 1
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Toward Modern Science Volume 1
  - Setting Reading Goals Toward Modern Science Volume 1
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Toward Modern Science Volume 1
  - Fact-Checking eBook Content of Toward Modern Science Volume 1
  - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks

#### 14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

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