

AI News Digest

12/01/2025 - 12/07/2025

WEEKLY DIGEST: BIOLOGICAL & BIOMEDICAL SCIENCES

Advancements in AI for Crop Resilience and Object Recognition

Recent research highlights the application of AI in enhancing agricultural resilience and understanding visual perception. At Michigan State University, researchers utilized AlphaFold to predict the 3D structure of the glycerate kinase enzyme, aiming to improve heat tolerance in crops amidst climate change. Meanwhile, a study from Konrad Kording's Lab explored the capabilities of Vision Transformers in self-supervised learning, revealing their potential to bind visual elements into coherent objects. These findings underscore the transformative role of AI in both biological sciences and computer vision.

KEY FINDINGS

- ✓ AlphaFold was used to predict the 3D structure of the glycerate kinase enzyme, crucial for photosynthesis.
- ✓ Self-supervised learning enables Vision Transformers to effectively bind visual elements into coherent objects.
- ✓ The research indicates that enhancing crop resilience is critical for adapting to climate change.

IMPLICATIONS

- Improved crop resilience could lead to better food security in a warming climate.
- Advancements in self-supervised learning may enhance AI's ability to interpret complex visual data.
- The integration of AI in biological research can accelerate discoveries in enzyme functionality and agricultural practices.

Key Metrics: 3D structure prediction accuracy; Heat tolerance improvement percentage in crops; Object binding accuracy in Vision Transformers

1. Engineering more resilient crops for a warming climate

Category: Research

Departments: Biological Sciences, Computer Science

Topics: Healthcare AI, Protein Structure Prediction, Enzyme Stability Engineering, Climate Resilient Crops

Impact Score: 26.0

Rubric Scores

Research Relevance: 5

Educational Value: 4

Innovation / Novelty: 5

Practical Impact: 5

Interdisciplinary Potential: 4

Ethical / Policy Implications: 3

Researchers at Michigan State University, led by Berkley Walker, utilized AlphaFold to predict the 3D structure of the glycerate kinase (GLYK) enzyme, crucial for photosynthesis, to enhance its heat tolerance. Their findings revealed that three flexible loops in the plant version of GLYK destabilized at elevated temperatures, compromising its function. By creating hybrid enzymes that incorporated more rigid loops from a heat-tolerant algal version of GLYK, the team developed a variant that maintained stability at temperatures up to 65 °C. This work aims to inform the development of crops better suited to withstand the challenges posed by global warming.

<https://deepmind.google/blog/engineering-more-resilient-crops-for-a-warming-climate/>

2. Do Labels Make AI Blind? Self-Supervision Solves the Age-Old Binding Problem

Category: Research

Departments: Computer Science, Biological Sciences

Topics: Computer Vision, Self-Supervised Learning, Object Binding, Vision Transformers

Impact Score: 23.0

Rubric Scores

Research Relevance: 5

Educational Value: 4

Innovation / Novelty: 5

Practical Impact: 3

Interdisciplinary Potential: 4

Ethical / Policy Implications: 2

The paper from Konrad Körding's Lab investigates whether large pretrained Vision Transformers (ViTs) can naturally learn to bind visual elements into coherent objects. The study finds that ViTs trained using self-supervised learning effectively exhibit object binding capabilities, while those trained through supervised classification do not, indicating limitations in the latter approach. This suggests that the training paradigm significantly influences the model's ability to learn object representations, with self-supervised methods proving more effective in capturing the necessary visual hierarchies. The findings contribute to understanding both artificial neural networks and biological visual processing systems.

<https://towardsdatascience.com/emergent-object-binding-from-self-supervised-not-supervised-learning/>