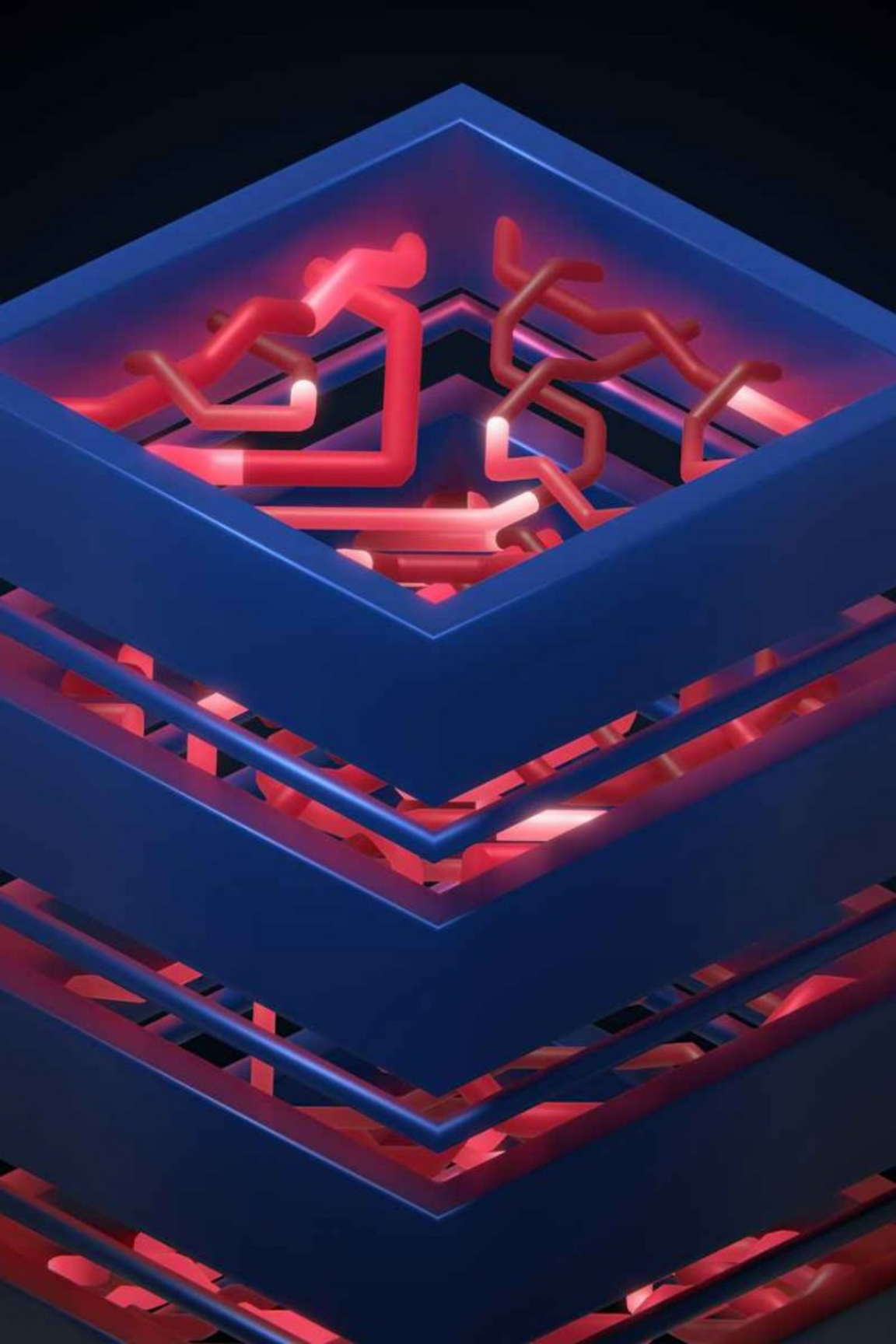


Reinforcement Learning for Recommendation Systems

This presentation explores a novel methodology for integrating reinforcement learning (RL) into recommendation systems, focusing on key challenges and innovative solutions.





Core Idea: Enhanced Recommendations

1

Cross-Platform Behavior

Account for user interactions across multiple platforms.

2

Stable Offline Learning

Ensure reliable model training with limited data.

3

Negative Feedback

Incorporate both positive and negative user signals.

4

Adaptive User Modeling

Leverage transformers for dynamic user preference capture.

Modeling Cross-Platform Behavior

Concept

Users interact with multiple platforms (e.g., social media, e-commerce).

Implementation

Federated learning: share knowledge across platforms while respecting privacy.

Deng Y, Tan X, Qiu X, Jin Y. FedSlate: A Federated Deep Reinforcement Learning Recommender System. arXiv preprint arXiv:2409.14872. 2024 Sep 23.



FedSlate: A Federated Deep Reinforcement Learning Recomm...

Reinforcement learning methods have been used to optimize long-term user engagement in recommendation systems. However, existing reinforcement...

Stable Learning with CQL

Concept

Offline RL models often overestimate rewards for actions not present in the training data.

Implementation

Conservative Q-learning (CQL) addresses overestimation by defining action values conservatively.

Mozifian M, Sylvain T, Evans D, Meng L. Robust Reinforcement Learning Objectives for Sequential Recommender Systems. arXiv preprint arXiv:2305.18820. 2023 May 30.



arXiv.org



Robust Reinforcement Learning Objecti...

Attention-based sequential recommendation methods have shown promise in accurately...



Incorporating Negative Feedback



Skips

Users may ignore or skip recommendations.



Dislikes

Explicit negative feedback signals user disinterest.

Leveraging Transformers

1

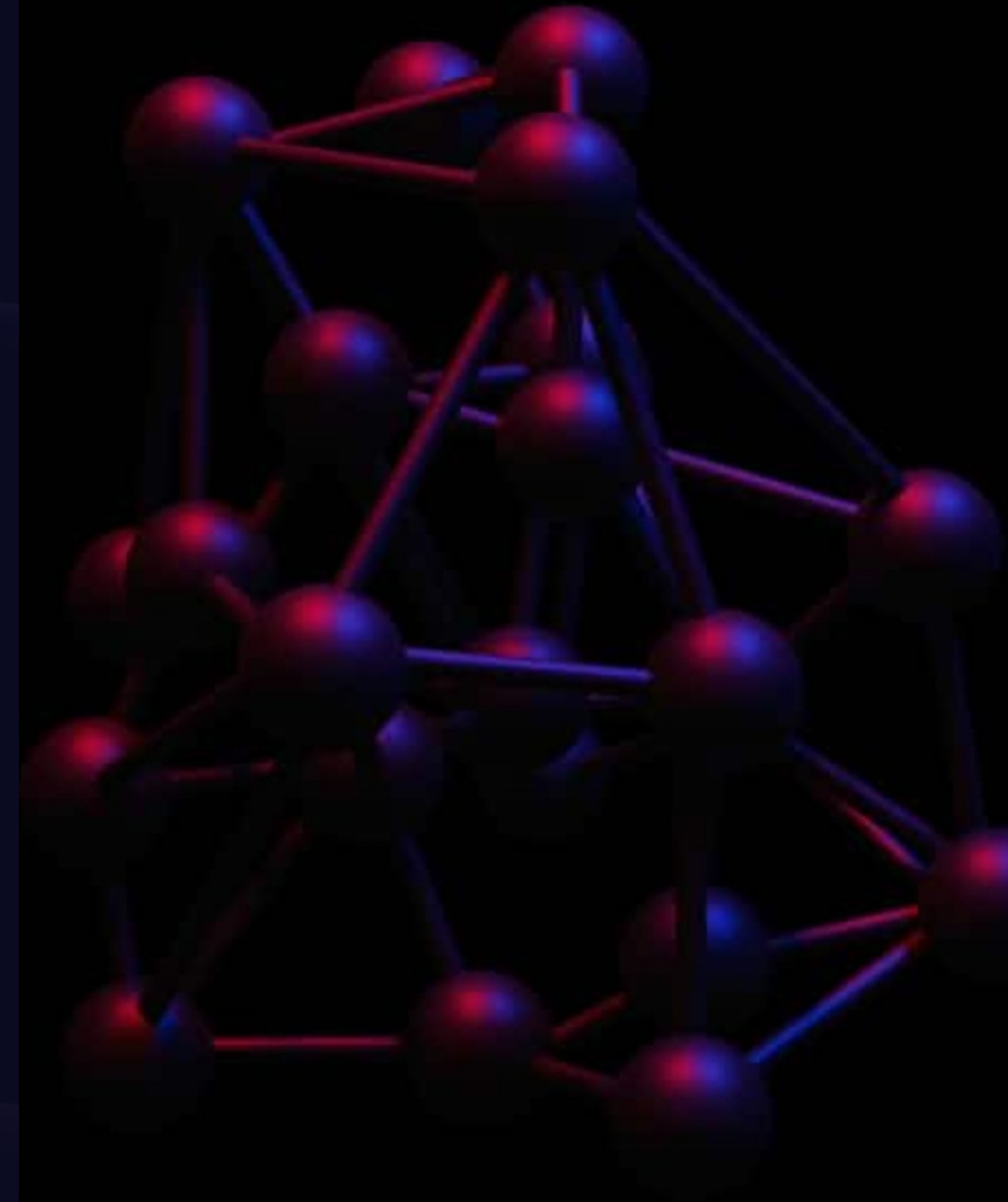
Concept

Transformers capture sequential dependencies for dynamic user modeling.

2

Implementation

Transformer encoder summarizes user behavior over time to inform RL decisions.





Addressing Key Challenges

1

Complex User Interactions

Capture user behavior across platforms.

2

Bias Mitigation

Reduce overreliance on positive feedback.

3

Offline Learning Stability

Ensure reliable model training with limited data.

4

Adaptive Modeling

Adapt to changing user preferences.



Moving Forward

This methodology offers a promising foundation for developing robust and adaptive recommender systems. Future research will focus on:

1

Optimization

Improve model efficiency and reduce computational demands.

2

Real-World Evaluation

Validate the methodology on diverse and large-scale datasets.