

## Integrating AI Visualization Tools to Enhance Student Engagement and Understanding in AI Education

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**Abstract :** Artificial Intelligence (AI), particularly the usage of deep neural networks for hierarchical representations from data, has found numerous complex applications across various domains, including computer vision, robotics, autonomous vehicles, and other scientific fields. However, their inherent “black box” nature can sometimes make it challenging for early researchers or school students of various levels to comprehend and trust the results they produce. Consequently, there has been a growing demand for reliable visualization tools in engineering and science education to help learners understand, trust, and explain a deep learning network. This has led to a notable emphasis on the visualization of AI in the research community in recent years. AI visualization tools are increasingly being adopted to significantly improve the comprehension of complex topics in deep learning. This paper proposes a novel approach to empower students to actively explore the inner workings of deep neural networks by combining the student-centered learning approach of flipped classroom models with the investigative power of AI visualization tools, namely, the TensorFlow Playground, the Local Interpretable Model-agnostic Explanations (LIME), and the SHapley Additive exPlanations (SHAP), for delivering an AI education curriculum. Combining the two factors is vital in fostering ownership, responsibility, and critical thinking skills in the age of AI.

**Keywords :** deep learning, explainable AI, AI visualization, representation learning

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