This project is partially funded by the [Schmidt Family Foundation](https://tsffoundation.org/). Advancements in algorithms and computing infrastructure have pushed the limits of AI. The open-source ethos in the AI research community has further expedited the progress of AI not only due to effective communications among researchers but also as a result of its ability to search for more robust solutions based on prior findings. The recent breakthrough of deep learning, particularly the transformer architecture, has continuously revolutionized AI. The transformer architecture suggests the possibility of using pre-trained deep learning models to democratize human intellect and computing power. Numerous research and studies have suggested that models, even those with limited training data, can benefit from pretrained models. However, the existing gigantic transformers focus on contexts such as business (e.g., Self-driving cars) and medicine (e.g., AlphaFold). Few researchers in education have provided such infrastructure for the learning engineering community. To our knowledge, no one has yet spent the money and time to train a new transformer-based NLP model that tries to customize these models to be more applicable to K12 use. Therefore, this project aims to create AI cyberinfrastructure with deep learning to support learning engineering research and development. That is, it plans to provide open-sourced software packages powered by gigantic pre-trained deep learning language models (with billions of parameters) for learning engineering. You can find some of our [open-sourced models](https://huggingface.co/uf-aice-lab/math-roberta) and [algorithms](https://github.com/uf-aice-lab/fair-peer-recommender) here.

Graphical user interface, application, Teams

Description automatically generated

Illustration of Math-RoBERTa, a language model with 355 million parameters trained with over 3 million text data in math learning.

Graphical user interface, application, Teams

Description automatically generated

Illustration of SafeMathBot, a safety-aware model with 1.5 billion parameters specialized in math learning conversation generations.