Strengths

Semantic-Invariant Feature Learning- Paired Adversarial learning is used to train the model on handwritten and printed LaTeX expressions.This process wherein a discriminator and a attentional recognizer compete with each other encourages the model to learn representations that are consistent across different writing styles while learning to ignore the differences that exist in the way different people write different symbols such as drawing a "t" with a curve at the bottom compared to just a straight line without a curve amongst numerous other such differences.

Pre-aware Coverage Attention (PCA)- Convolutional decoders predict all of the symbols at the same time without placing inherent value on left to right reading as humans would. This creates a problem wherein such systems may focus on particular areas of symbols many times and on other areas rarely resulting in attentional errors in the system. The Pal-v2 framework helps solve this problem by using PCA to give the system memory of what has already been done.

Limitations

Accuracy- While PAL-v2 is an improvement over other systems the state of the art is still very inaccurate only being able to correctly identify expressions roughly 50% of the time depending on various factors. This is obviously not yet at the stage where it could be useful as a consumer level tool.

Sensitivity to Adversarial Loss Hyperparameter (λ)- The performance of PAL-v2 is highly sensitive to the hyperparameter λ, which balances semantic invariant learning and discriminative learning. Too low a value results in poor generalization to different writing styles and too high a value degrades classification accuracy by suppressing discriminative features between symbols.

Failure Modes

When symbols overlap or are visually similar such as is the case with "9", "q", and "g" or uppercase "C" versus lowercase "c" the system will often fail outright to correctly classify the characters. Additionally when symbols are slanted or roasted that will also negatively impact the ability to correctly classify them.