**AttentionHTR: Handwritten Text Recognition based on Attention Encoder-Decoder Networks**

**Introduction:**
Handwritten text possesses high variability due to different writing styles, languages, and scripts. Training an accurate and robust system calls for data-efficient approaches due to the unavailability of enough annotated multi-writer text.

**Methods:**
1. **Four-stage framework:**
   - Transformation: TPS
   - Feature extraction: ResNet
   - Sequence modeling: BiLSTM
   - Prediction: LSTM with attention
2. **Transfer learning** from Scene Text Recognition (STR) to Handwritten Text Recognition (HTR).
3. **Novel multi-writer dataset ImgurSK** previously not used for HTR.
4. **Error analysis.**

**Design a prioritized test error reduction strategy** through error analysis

**Error analysis**
1. **Test error decomposition** = focus on variance

**Prioritized strategy:**
1. **Variance reduction:**
   - Replace early stopping with norm penalty or dropout regularization.
   - Data augmentation tailored to the level of visual effects and characters.
   - Other annotated multi-writer datasets.
   - Language modeling.
2. **Bias reduction:**
   - Run training longer.
3. **Validation/testing set mismatch:**

**Results**
1. Error rates are comparable with the state-of-the-art.
2. The final model is trained on handwriting from thousands of authors, with varying image conditions, in order to aid generalisation in the real-world.
3. Model accuracy can be further strengthened by adding more datasets to the pipeline.

**Transfer learning**
- 14.4M of synthetic training data.
- 230K of real handwritten training data for fine-tuning.

**Methods:**
1. **Prioritized strategy:**
   - Error analysis

**Visual analysis of errors**

**Character-level confusion matrix**

**Character-level F1 scores**

**Ablation study on the IAM dataset**

**Model architecture**
- Encoder
- Decoder
- Attention
- Prediction stage

**Code and pretrained models:**

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