Universal Solution to Extension and Translation of Fonts Across Languages

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Font design and generation in both western and eastern calligraphy has always been a skilled artwork. In this research, Artificial Intelligence was used to generation new writing fonts across different languages. Recent similar works adopted a convolutional transfer approach using probability vectors, or Generative Adversarial Networks (GANs), which comes with the drawback of a greatly limited character pool. The proposed end-to-end model, a Universal Solution to Extension and Translation of Fonts Across Languages, used in this project is an auto-encoder trained upon pixel-to-pixel comparison of grayscale intensity. This model features two encoders and one decoder. The encoders extract the character's style and content, while the decoder constructs the output character from the encoded content and style. Experiments were conducted to accomplish font extension without language limitations. The Kullback-Leibler divergence is chosen as a loss function to better disentangle content and style information. The model is capable of identifying the stylistic elements of characters such as boldness, tiltedness and serif features. The model does not rely on large amounts of labelled characters and can transform characters across most languages. This project has real-life applications in the design business industry, archaeology and criminology.

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