Baby Face Generator with CycleGAN

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Introduction

In the study, we explored the possibility of generating baby face with parents pictures using CycleGAN[1]. We tried different datasets and applied transfer learning to improve the performance of our models. It takes parents faces or an adult face and generates the baby style face of the morphed parents face or the single adult face.

Datasets and Preprocessing

We use 2 datasets for training our model, UTKFace (low quality images) and IMDB-WIKI (high quality). We use around 2000 images as the training set, 1000 from age 0-5 as group X, 1000 from age 27-35 as group Y. We use OpenCV Face Detection Neural Network[2] to extract faces only from the images to clean up background noisy.

Method and Model

Results

<table>
<thead>
<tr>
<th>Model</th>
<th>Source</th>
<th>Epochs</th>
<th>Cropped</th>
<th>Pretrained</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>UTKFace</td>
<td>155</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>UTKFace</td>
<td>10</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>IMDB-WIKI</td>
<td>100</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>IMDB-WIKI</td>
<td>155</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Conclusion and Future Work

• CycleGAN could work well in baby face generation. The quality of dataset and data preprocessing could influence the performance significantly. Transfer learning from similar model could help with training.
• The generated pictures are not perfect. We could try with large training set.

Reference