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MANGO GENERATIVE ADVERSARIAL NETWORK

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ABSTRACT - This research aims to achieve the objectives of formulating a deep generative adversarial network (GAN) for translating sketches to "Sala" mango images and vice versa, developing a web application for sketch-to-image transformation, and evaluating the quality of the generated images. The methodology involves data collection, preprocessing, and augmentation, followed by the implementation of an image-to-image conditional GAN. The Fréchet Inception Distance (FID) metric is utilized to assess image quality. The findings demonstrate the successful translation of sketches to high- quality "Sala" mango images, with the web application providing a user-friendly interface for convenient transformation. The low FID scores indicate the close resemblance of the generated images to the ground truth, highlighting the effectiveness of the GAN model. This research contributes to the advancement of image generation techniques and provides a valuable tool for transforming sketches into realistic mango images, enhancing the field of generative adversarial networks and mango imagery.

Keywords: Deep generative adversarial network, sketch-to-image translation, "Sala" mango images, image quality evaluation, web application.

1. INTRODUCTION

The objective of this research is to develop a deep generative adversarial network (GAN) for translating sketches to "Mangga Sala" images, focusing on improving color, shape, and details. By achieving this objective, we aim to create realistic and visually appealing mango images from simple sketches. The development of a GAN model specifically designed for "Mangga Sala" mangoes will enable researchers and practitioners to accurately represent the unique characteristics of these mangoes. This will enhance visualization and analysis, benefiting fields such as agriculture, botany, and graphic design. Additionally, we aim to create a user-friendly web application that simplifies the process of transforming sketches into high- quality mango images. This will make the technology more accessible and allow a wider range of users to generate customized mango visuals. By meeting these objectives, this research contributes to the advancement of computer vision and image generation, offering a valuable tool for mango representation. The outcomes of this work hold potential for various applications, bridging the gap between sketches and realistic "Mangga Sala" mango images.

2. METHODOLOGY

The methodology for this project involved several key steps. Firstly, the problem of dataset imbalance in generative adversarial networks was addressed. The focus was on developing a deep generative adversarial network to translate sketches to "Mangga Sala" images. The methodology encompassed data understanding, data preparation, modeling, evaluation metrics, and deployment. Data understanding involved describing and exploring the dataset, while data preparation included collecting the "Mangga Sala" mango image dataset and performing necessary pre-processing steps. The modeling phase implemented an image-to-image conditional GAN model with generator and discriminator networks. Evaluation metrics, such as the Fréchet Inception Distance (FID), were used to assess the quality of generated images. Lastly, a web application was developed for easy deployment and user interaction. The methodology provided a systematic approach to address the research objectives and paved the way for generating high-quality "Mangga Sala" mango images through the use of deep generative adversarial networks

3. RESULTS AND DISCUSSION

The results of this project demonstrated the successful implementation of a deep generative adversarial network (GAN) for translating sketches to "Mangga Sala" images. The GAN model was able to generate realistic mango images based on input sketches, capturing the color, shape, and details of the mangoes. The developed web application provided a user-friendly interface for transforming sketches into high-resolution mango images. The evaluation of the

generated images using the Fréchet Inception Distance (FID) metric showed promising results. The FID scores indicated that the generated images closely resembled the ground truth images, indicating the effectiveness of the GAN model in producing high-quality results. The discussion revolved around the strengths and limitations of the GAN model and the web application. The strengths included the ability to customize mango characteristics such as color, shape, and defects through sketch modifications. The web application provided convenience and accessibility for users to transform sketches into mango images. However, some limitations were identified, such as the need for a diverse and larger dataset to further improve the model's performance and generate a wider range of mango variations.

4. NOVELTY OF RESEARCH / PRODUCT

The novelty of this project lies in leveraging deep neural networks and generative adversarial networks (GANs) to achieve significant advancements in image processing tasks. Deep neural networks have shown promising results in various image processing tasks, including style transfer, restoration, coloring, and more (Gatys et al., 2016). The rapid development of deep learning, especially the emergence of GANs, has led to remarkable progress in image generation (Isola et al., 2016). GANs aim to model the distribution of natural images by generating samples that closely resemble real images (Radford et al., 2015). By incorporating these techniques, this project aims to harness the power of deep learning and GANs to enhance image processing capabilities and generate realistic and high-quality images.

5. CONCLUSION

In conclusion, this project successfully implemented a deep generative adversarial network (GAN) for translating sketches to Sala mango images, resulting in realistic representations of mangoes with customizable features. The low Fréchet Inception Distance (FID) score validates the high quality and similarity of the generated images to the ground truth. The development of a user-friendly web application enhances the convenience and accessibility of the transformation process. For future work can focus on expanding the dataset to include a wider variety of mango variations, exploring advanced GAN architectures to further improve image quality, and incorporating additional features such as texture and ripeness.

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