QBurst

Enhancing Architectural Floor Plans with CycleGAN

CycleGAN accelerated and streamlined the process of transforming black and white floor plans into vibrant, modern designs. It not only ensured efficient modernization of floor plans but also delivered visually captivating outputs to meet aesthetic expectations.

Overview

This case study highlights the application of CycleGAN to transform conventional black and white floor plans into colorful, contemporary designs. By leveraging CycleGAN's capabilities, we streamlined the process of floor plan modernization, providing clients with visually engaging representations of their spaces. This innovative approach exemplifies the potential of machine learning for enhancing architectural visualization.

Client Profile

The client offers queue management and online appointment scheduling solutions with intuitive tools and convenient scheduling capabilities.

Business Requirements

The client wanted to revolutionize architectural visualization by developing a generative adversarial network (GAN) solution to transform hand-drawn or black-and-white floor plans into visually appealing, modern designs. The primary objective was to enhance the presentation quality of floor plans and provide a seamless user experience.

The client envisioned a user-friendly platform accessible to architects, designers, and clients alike. The platform would enable them to effortlessly upload floor plans and witness their transformation into captivating visual representations.

Additionally, the platform would integrate with the existing architectural workflows for seamless adoption. By aligning with industry standards and common design tools, the solution would facilitate a smooth transition from traditional to modernized floor plans, enhancing workflow efficiency.

QBurst Solution

We developed an intuitive platform leveraging CycleGAN, a deep-learning architecture that facilitates unsupervised image translation. It helped us develop a solution that meets the client's requirements—the seamless transformation of floor plans into modern, appealing designs.

After careful consideration and evaluation, we chose CycleGAN for its capabilities to produce remarkable results without the need for a paired dataset. An added bonus is its powerful unpaired training capabilities and ability to work well with texture and color changes.

Key Features

Unpaired Image Translation:

CycleGAN performs image translation without requiring paired examples of corresponding images. This flexibility is crucial for tasks where obtaining paired datasets is challenging or impractical, such as transforming floor plans where corresponding colorful versions may not exist.

Cycle-Consistency Loss:

CycleGAN incorporates cycle-consistency loss, which ensures that the reconstructed image from the translated image is close to the original input. This helps maintain the identity of the input image during translation, leading to more realistic and coherent outputs.

Scalability and Performance:

CycleGAN is capable of handling large datasets efficiently and can be trained on modern GPU hardware, making it scalable for diverse applications, including architectural visualization.

Bidirectional Image Translation:

CycleGAN supports bidirectional image translation, meaning it can learn to transform images from domain A to domain B as well as from domain B to domain A simultaneously. This bidirectional mapping ensures that the model can handle transformations in both directions.

Open-Source Implementation:

CycleGAN is available as an open-source implementation, making it accessible to researchers and developers for experimentation, customization, and integration into various projects.

Technologies

PyTorch CycleGAN

Business Benefits

- **Enhanced Visual Appeal:** With modern and aesthetically pleasing designs, the client improved presentation quality and enhanced client engagement and satisfaction.
- **Cost Efficiency:** CycleGAN minimized the need for manual design interventions, reducing labor costs associated with manual colorization or redesign.
- **Improved Performance:** Leveraging cutting-edge technology like CycleGAN demonstrates innovation and quick delivery of architectural visualization services.
- **Reduced Time and Resources:** CycleGAN's unpaired training approach reduces the need for large paired datasets, saving time and resources typically required for dataset preparation. It accelerates the floor plan transformation process and expedites project timelines.
- **Consistency in Design:** CycleGAN ensures consistency in design transformations by applying learned style patterns across different floor plans. This consistency enhances the overall coherence and professionalism of the visual output, aligning with project objectives and maintaining design integrity.