

# Project Proposal

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## I. Problem Definition

Traditional QR codes are functional but visually plain and often unappealing, which limits their ability to attract or engage viewers in visually rich contexts. Thus, recent studies have been started to apply techniques such as style transfer to QR codes, adding artistic elements that blend the code with specific visual themes. As the demand for interactive, aesthetical digital tools grows, there is an increasing need to enhance QR codes beyond their basic form, transforming them into dynamic to better capture users' attention and enhance their experience.

## II. Motivation

The goal is to transform static QR codes into dynamic, visually captivating codes that can catch viewers' attention and enhance user engagement. By integrating elements such as animation, color, and customization, dynamic QR codes can be made more attractive and memorable, making them suitable for applications in advertising, branding, and personalized user experiences. This approach could elevate the QR code from a mere tool to an integral part of a brand's visual identity, enhancing its appeal and effectiveness in connecting with audiences.

## III. Related Work

### QRcode Generation

Numerous studies have been conducted on the stylization of QR code generation. [1] introduced a technique to transform standard QR codes into halftone-style black-and-white images, enhancing their visual presentation. [2] expanded on this by using reference images and style guidance to generate more artistically stylized QR codes. Subsequently, [3] employed diffusion models to leverage their robust generative capabilities, producing highly detailed QR codes that can incorporate text-guided customization. Building on these advancements, [4,5] refined these methods, focusing on improving the quality and stability of the generated QR codes to ensure reliable scanability.

## Animate Diffusion [6]

AnimateDiff is a framework that transforms text-to-image (T2I) diffusion models into animation generators without the need for model-specific fine-tuning. It accomplishes this using a pre-trained motion module based on real-world video data, capturing general motion priors to create temporally coherent animations. Additionally, AnimateDiff's ability to directly leverage 2D diffusion priors allows seamless integration with plug-and-play modules like ControlNet and LoRA, making it particularly effective for applications such as animated QR codes.

## IV. Reference

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