Applications of Style Transfer in Augmented Reality

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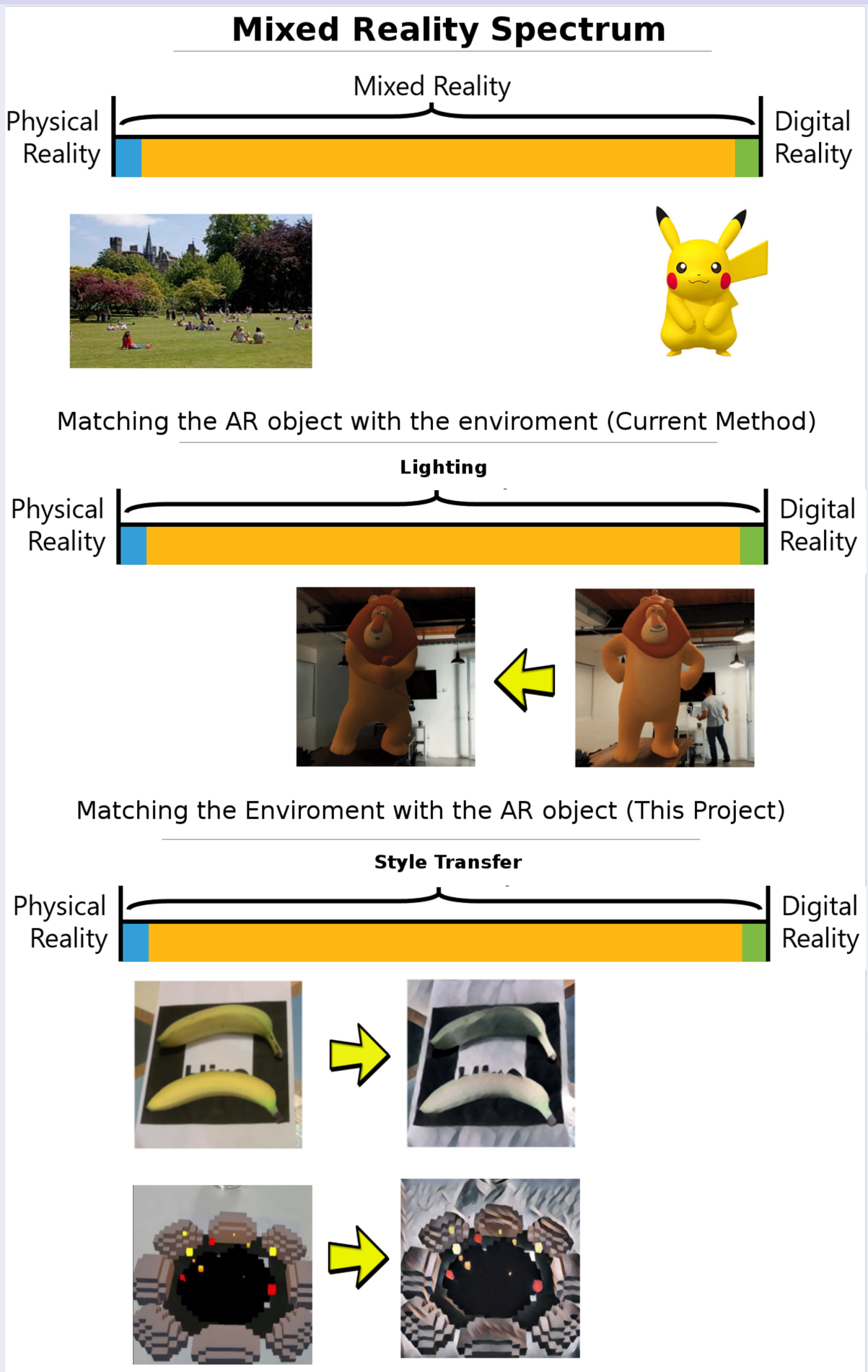
Project Outline

Augmented reality is the process of integrating digital content into the environment in real time. There is a problem in augmented reality that has stumped engineers, it is very obvious that a digital object has been placed in a real world environment. The AR object looks fake.
Current attempts at solving this involve attempting to make the AR object look more like the real world.
I propose the question, **"Can you alter the environment, to make the AR object look more realistic?"**
I make use of a technique called style transfer, which takes the style of one image and maps it to the structure of another image. This technique makes use of convolutional neural networks to process the image.

Analogy - "If I apply a 'cartoon' style to the table(environment), are you less able to distinguish if a projected AR cartoon object is real or not"

Visual Outline



Progress

So far in the project I have achieved a number of goals, these include:

- Custom convolutional neural networks models trained,
- AR - Style Transfer pipeline built,
- Initial results show users "fooled", and unable to distinguish the real object when style is applied,

Key Challenges

- Long tedious image processing pipeline,
- Long time taken to produce each combination of AR/style,
- Existing models not built for this purpose,
- Existing neural network structures designed for transferring artist's style specifically,

Further Project Goals

To complete the project I would like to achieve a number of goals, these include:

- Determine if use cases where "blanket" approach does not work,
- Build pipeline to allow stylizing of just the background,
- Design new CNN model,
- User test to find statistical significance,
- Selectively apply style to region - eg table.

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