# HueChef – Using GAN for color recommendation

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CSCI-8980: Topics in Mobile Computing

# Problem..

So what is the problem we tried to solve?

We are trying to solve the problem of choosing harmonious color combinations and schemes using machine learning

What is novel about our approach?

We use a combination of machine learning and graphical representation  to address the problem for mobile specific use cases.

By theory, we adhere to the principles of color theory and explore psychology of color bias.
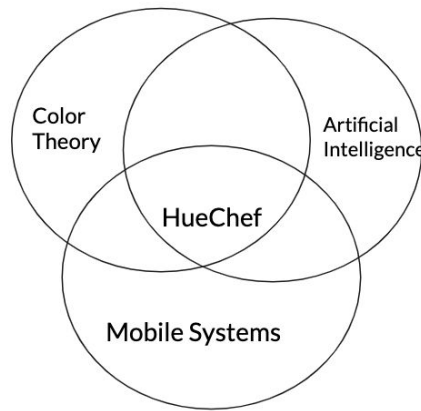
# Generative Adversarial Network (GAN)

- A branch of neural network that pits two neural nets against each other on a zero sum game.
- One neural network, called the generator, generates new data instances, while the other, the discriminator, evaluates them for authenticity.
- We train image data belonging to natural scenery to generate palette data.
- Notable examples of GAN based mobile application are **FaceApp** and **Prisma.**
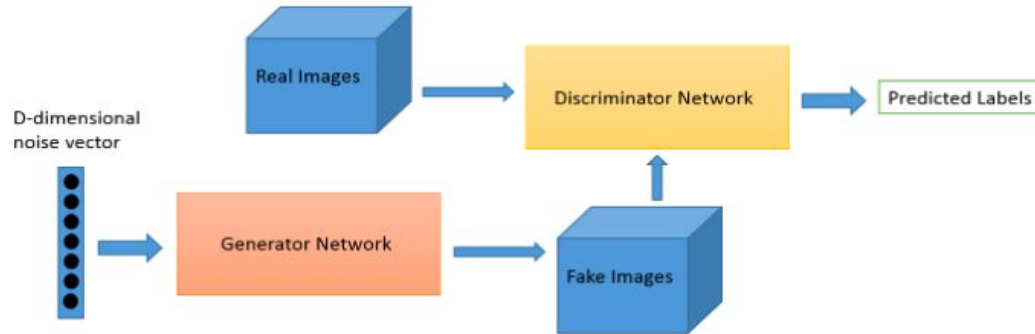
# Generative Adversarial Network vs Quantization

- Traditional palette generating algorithms work with quantization.
- Quantization and neural networks like LSTM provide middling values and doesn't provide the contrast required.
- GAN gives a handle on hyper parameters and based on the training data we can tweak the contrasts.
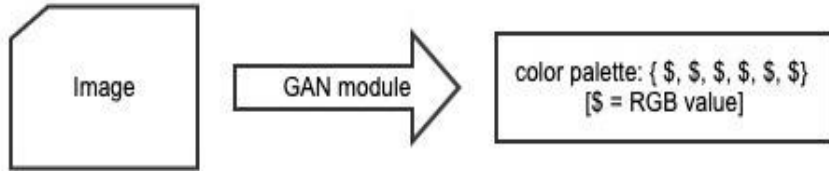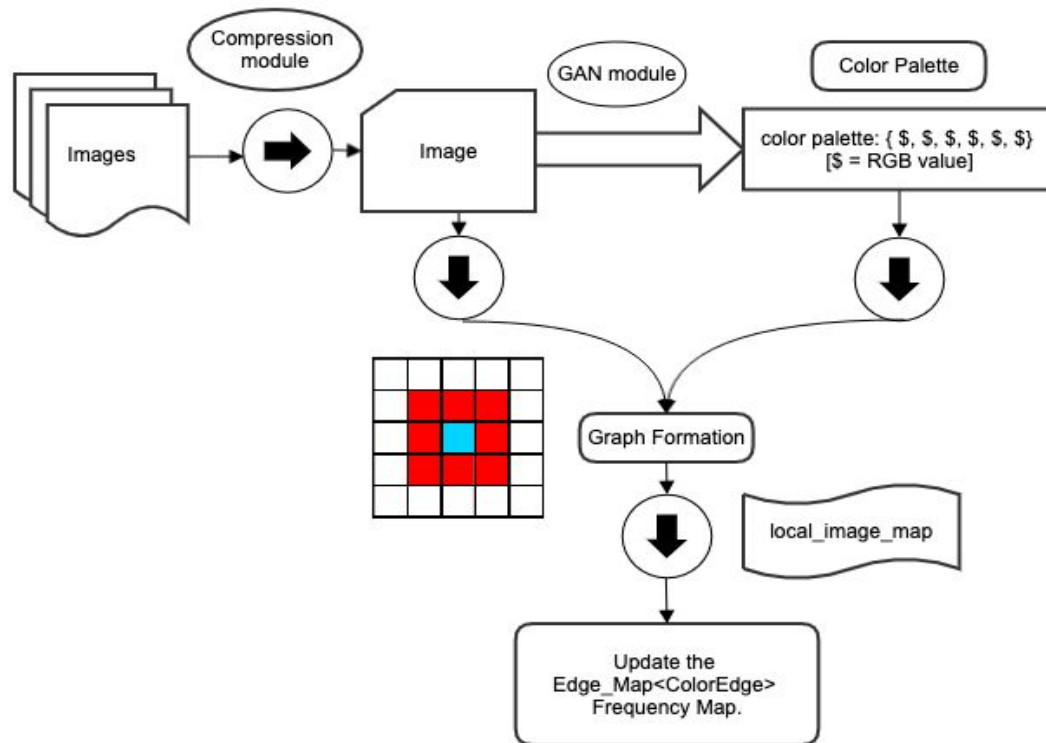
# So what went in..

# Why will this work?  Intuition...

Frequentist inference!

# Using GAN to generate palettes

Image → GAN module → color palette: { $, $, $, $, $, $ } [$ = RGB value]

# Design

# Demo

# Evaluation

- *Control Study*

  Sample Size = 15
  [5 times each]

- *Average Response Time*

  0.0284 s

| Parameter | Experiment | iPhone SE(12 MP, f/2.2aperture) | iPhone 7 (12 MP,f/1.8 aperture) |
|---|---|---|---|
| Accuracy | Relevancy of suggestions finding the confusion matrix | 90% + | 90% + |
| Stability | 10 Random images through camera and computing a "yes%" on the first suggestion | ~90% | ~90% |
| Source Compression | 255 x 255 and 500 x 500 during palette generation | Accuracy increases by 0.2 % | Accuracy increases by 0.2 % |

# Conclusion

- Currently trained close to 10000 image data. However, to see appreciable result we need to train to the order of 1,000,000.

- Use cases

- Can be extended to AR world.

- Other mobile peripherals like color combination to determine vocal harmony through microphone and haptics can be inferred.
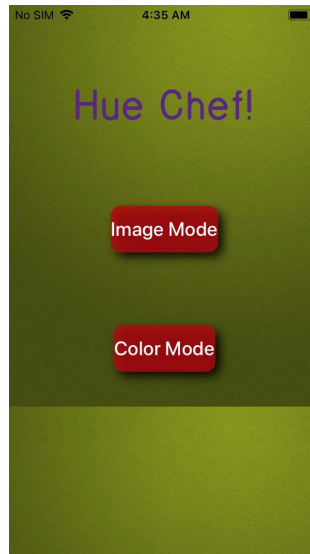
# Thank You!

➢ We believe it is a novel idea that has a lot of use cases in the industries like design, architecture, fashion and art.

➢ We are happy to discuss this project further with interested peers.