GANs (Generative Adversarial Networks)

1. **Architecture**:
    - **Generator**: Creates data (e.g., images) from random noise.
    - **Discriminator**: Distinguishes between real and generated data.
2. **Training**:
    - **Adversarial Process**: Generator and Discriminator train simultaneously, competing against each other.
    - **Goal**: Generator learns to create realistic data to fool the Discriminator.
3. **Applications**:
    - Image generation, data augmentation, super-resolution, and image-to-image translation.

DCGANs (Deep Convolutional GANs)

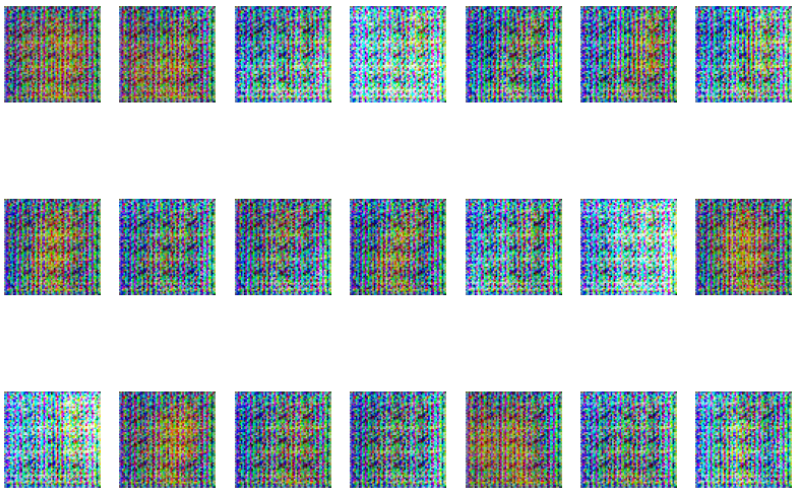
1. **Improvements**:
    - Uses convolutional layers for better image processing.
2. **Generator Enhancements**:
    - **Transposed Convolutions**: Upsample noise to high-res images.
    - **Batch Normalization**: Stabilizes training.
    - **ReLU/Tanh Activations**: Used for better performance.
3. **Discriminator Enhancements**:
    - **Convolutional Layers**: Downsample images.
    - **Leaky ReLU**: Helps with training stability.
    - **Batch Normalization**: Stabilizes training.
4. **Benefits**:
    - Produces more realistic images.
    - Improved training stability.

Summary

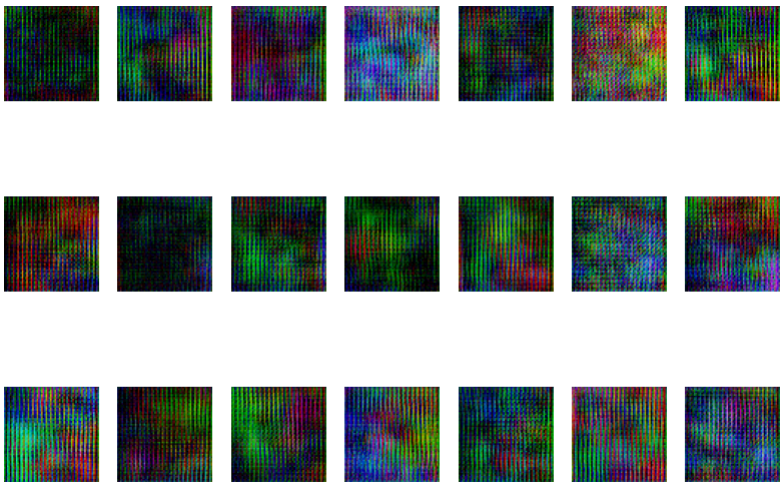
- **GANs**: Two networks (Generator and Discriminator) with adversarial training.
- **DCGANs**: Enhanced GANs using convolutional layers for higher quality and stability in image generation.

Results:

1) Epoch 1



2)Epoch 4



3)Epoch 7