Categorizing Classification Errors
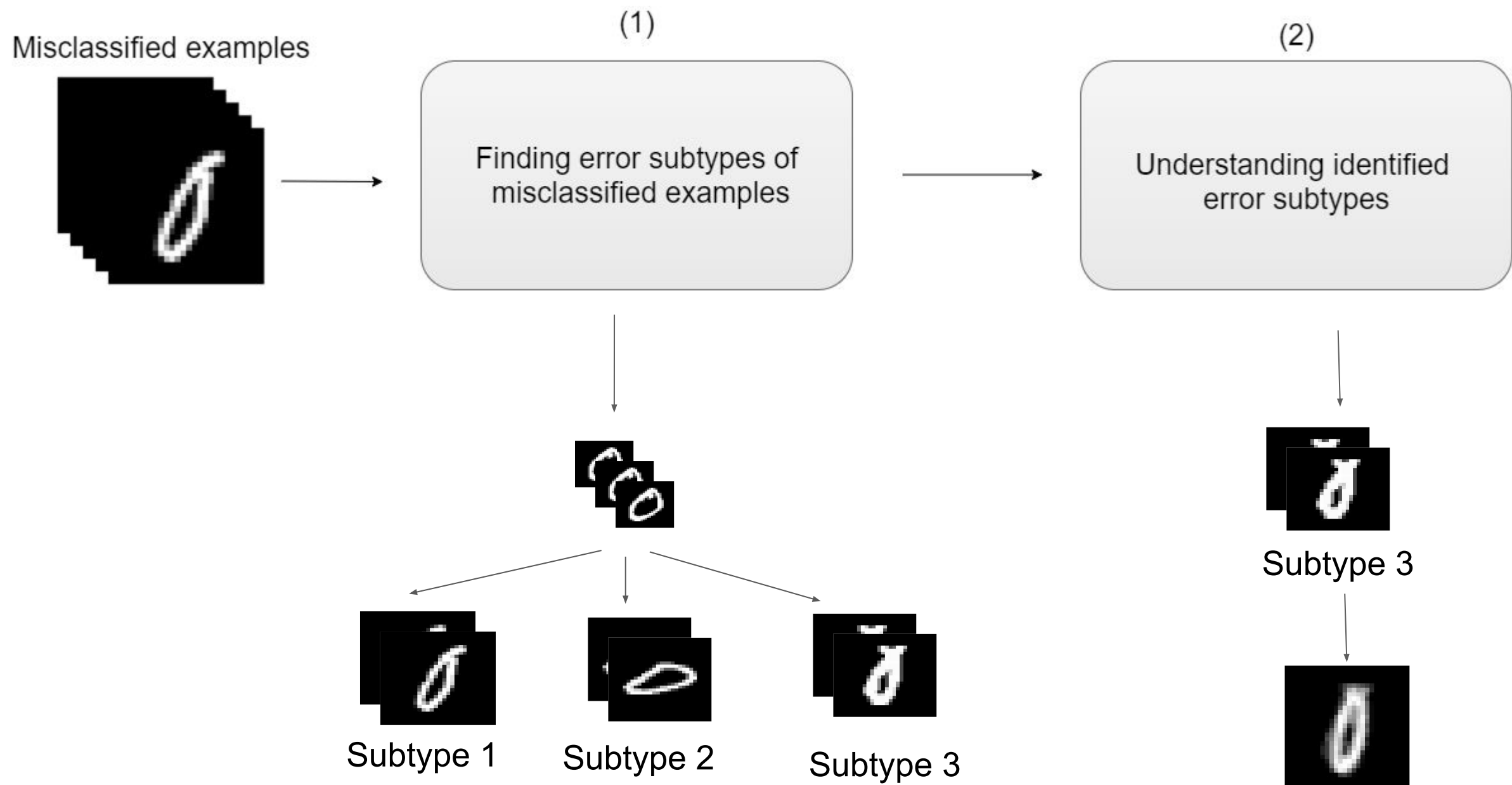
Overview

Misclassified examples of 0

Subtype 1

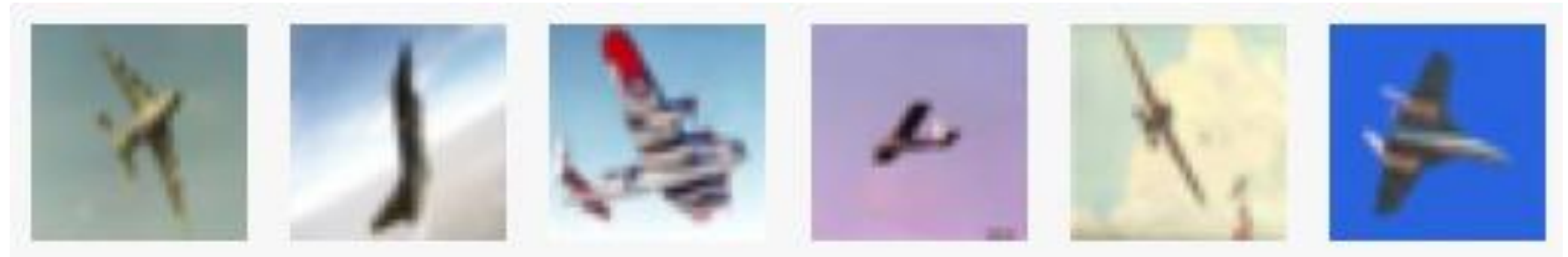Subtype 2

Subtype 3
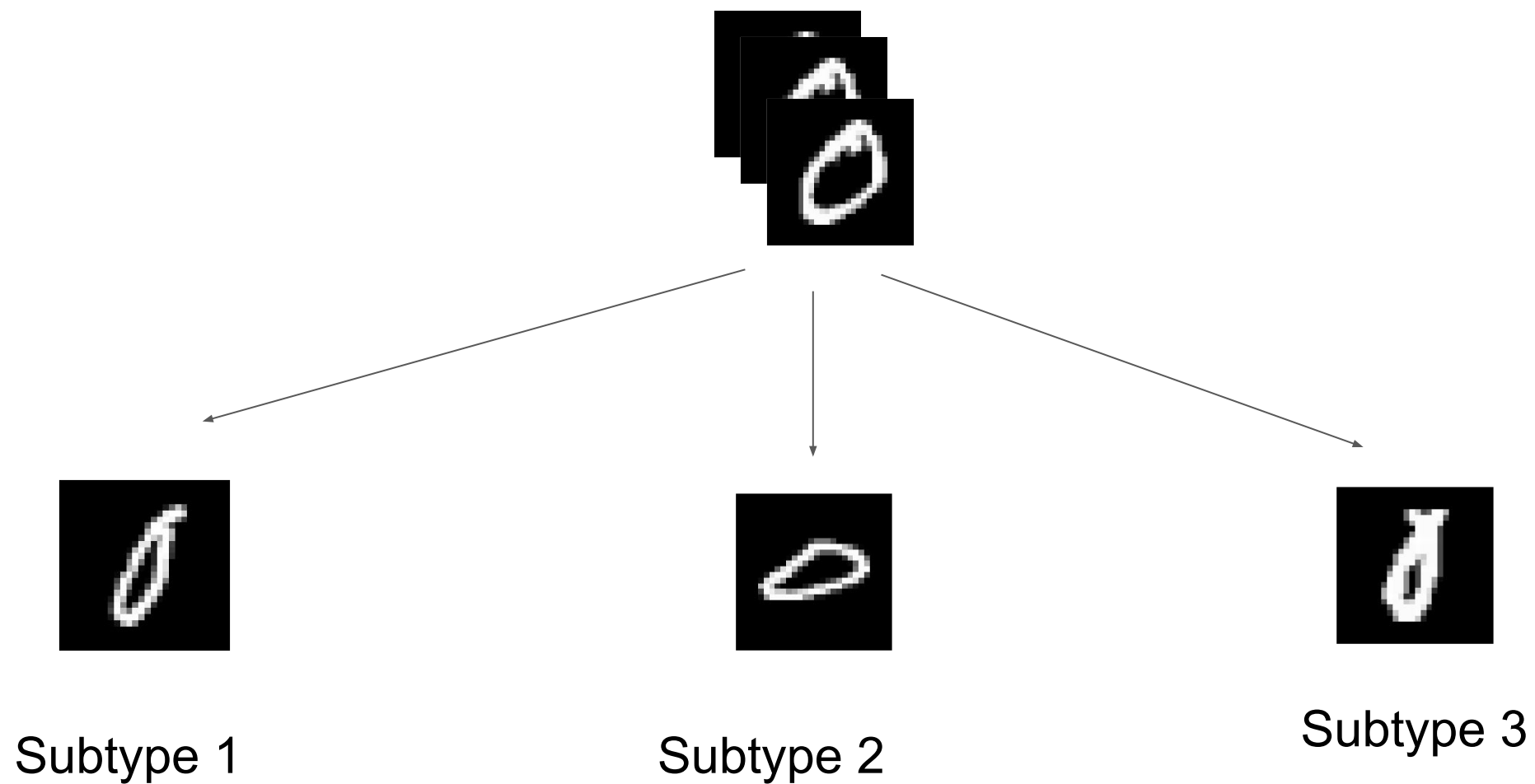
Method: Concept

2 Stages:

Stage 1 overview Approaches

- CNN

- Autoencoders

- Embeddings
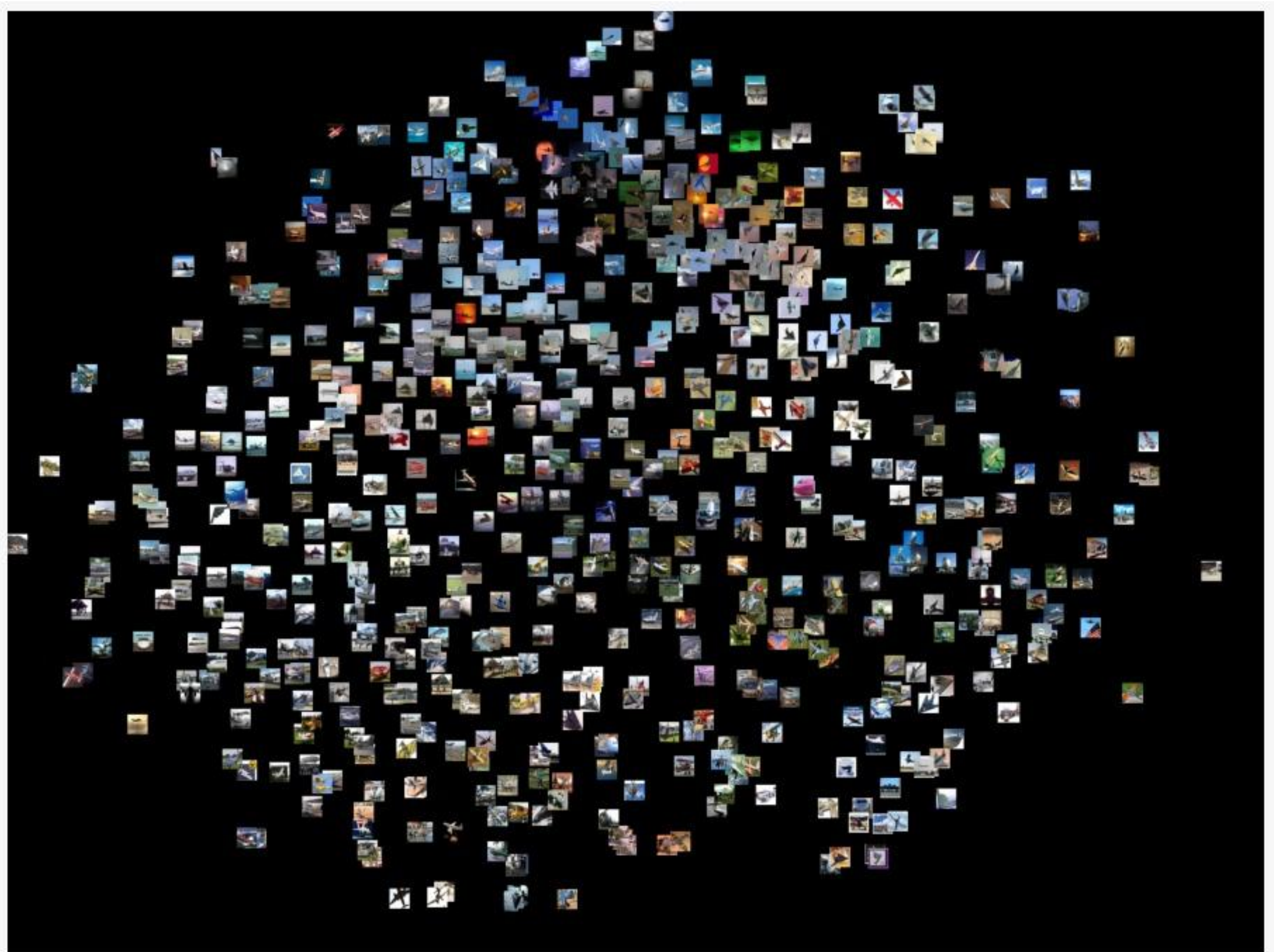
TSNE visualisation (Autoencoder)

TSNE visualisation (Autoencoder)
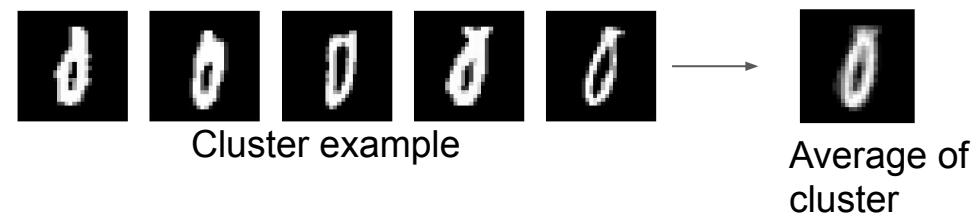
TSNE visualisation (CNN)
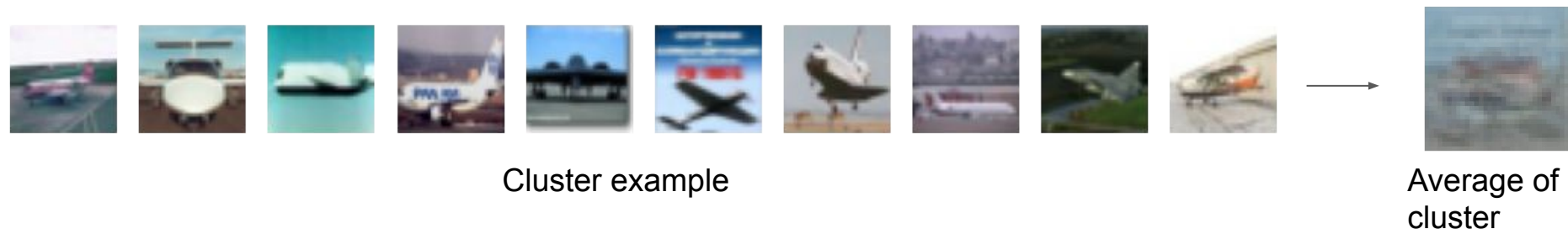
TSNE visualisation (VGG16)

Method: Baseline approach problem

- (1) Simple clustering approaches (e.g. K-means) will not easily group such images
- (2) Averaging over all the examples in the group will result in a noisy image

● Example (MNIST):

Cluster example

Average of cluster

● Example (CIFAR10):

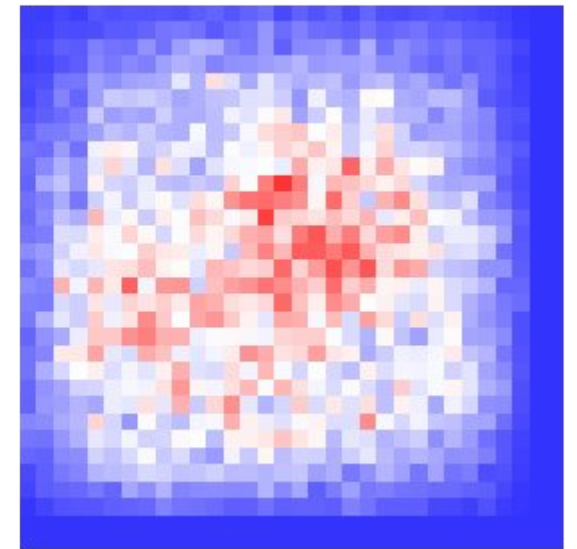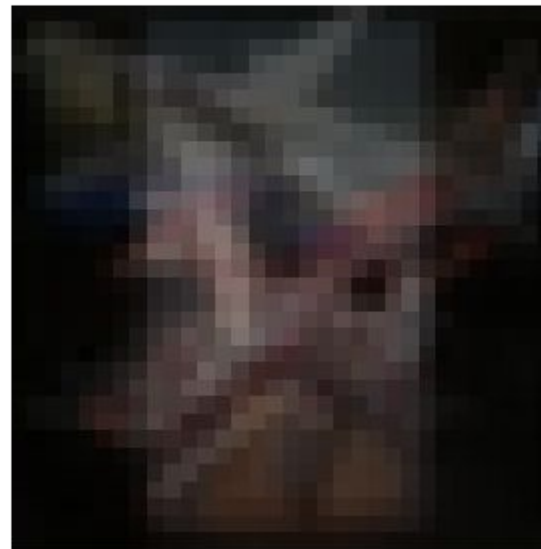Cluster example

Average of cluster
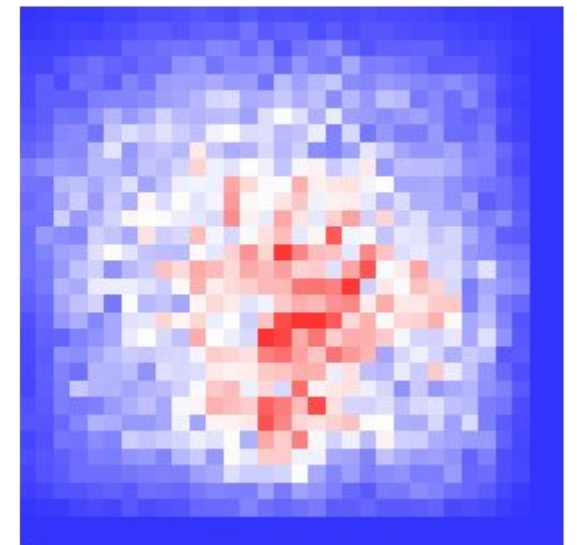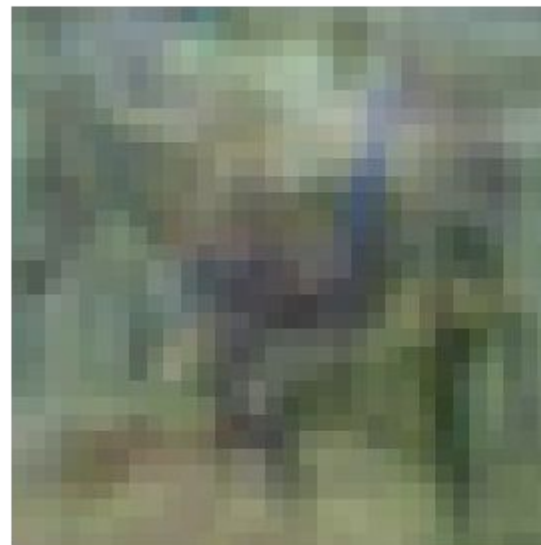
Recap- Method: Approach

- Improve how to represent the error subtype

  - Hierarchical clustering representations

    - Other approaches:

      - Circular clustering

  - Investigating clustering in multiple stages

  - Saliency maps

Saliency map approach
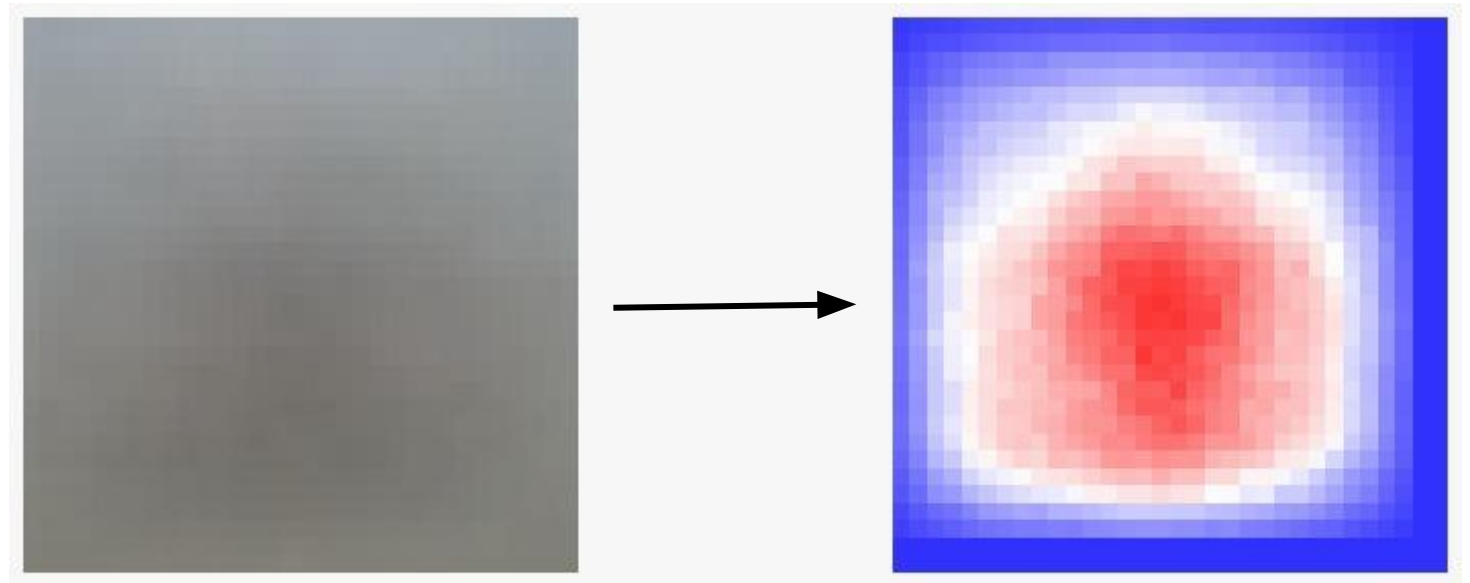
Average Saliency maps
(6 images) **same cluster**

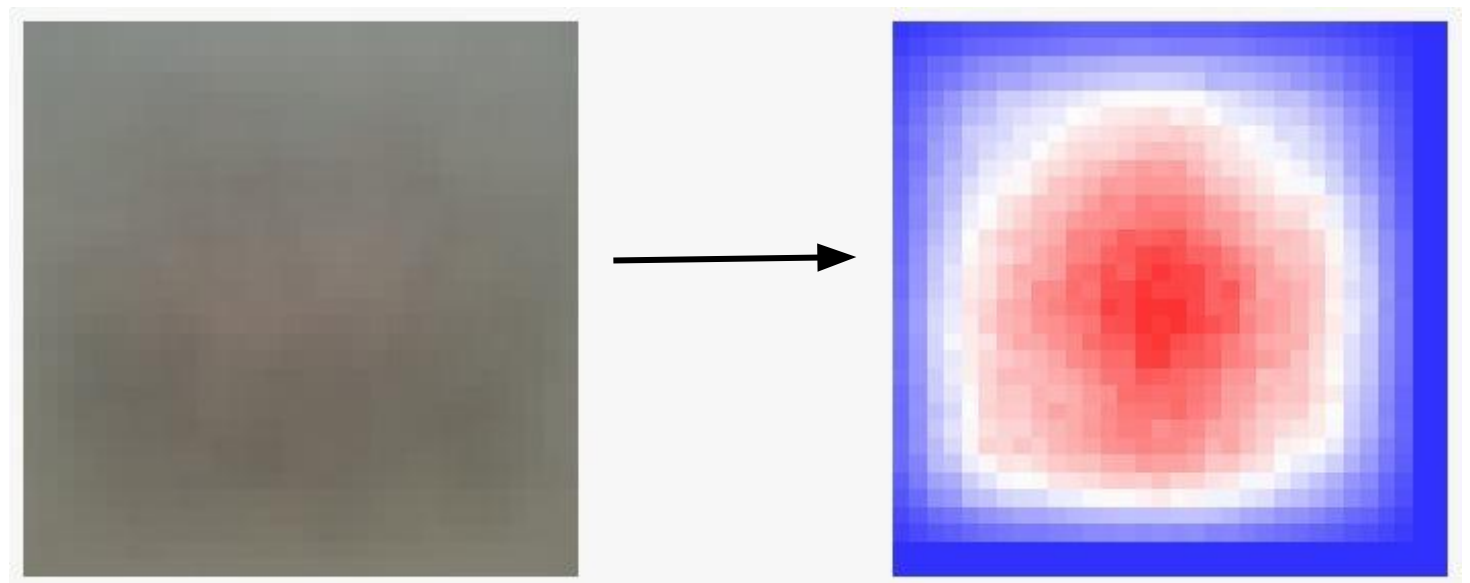Average Saliency maps
(6 images) **randomly chosen**

Saliency map approach

Average Saliency maps
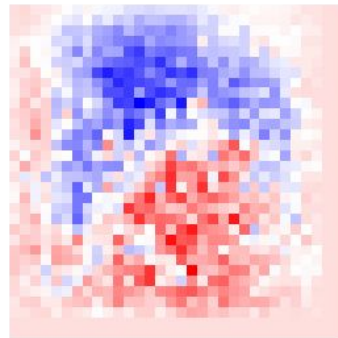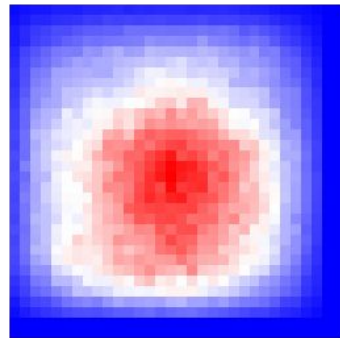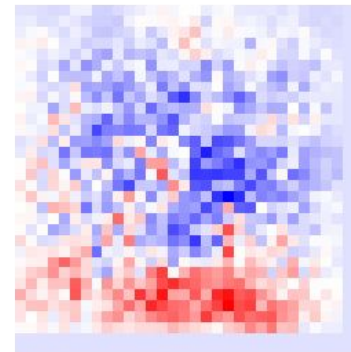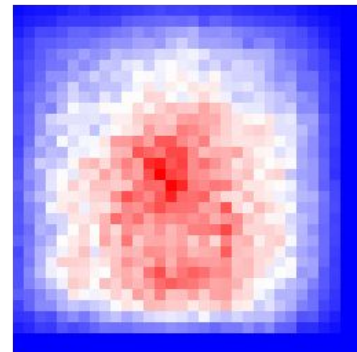(498 images) same
cluster

Average Saliency maps
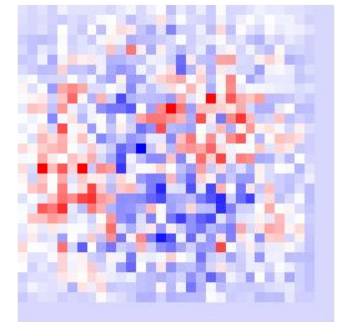(498 images) randomly
chosen

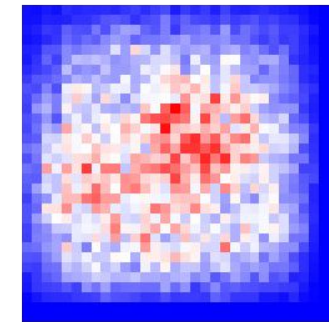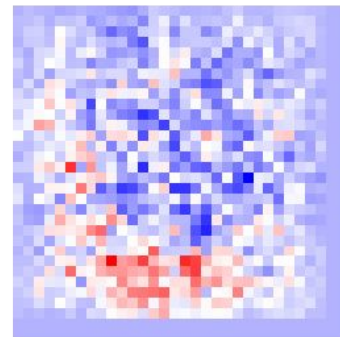# Saliency map approach (Normalization)
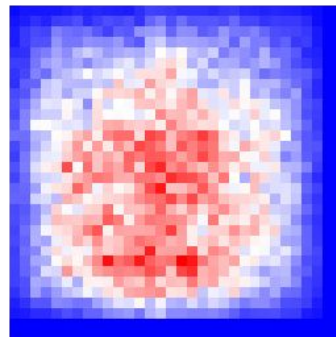
Cluster 1

Cluster 2

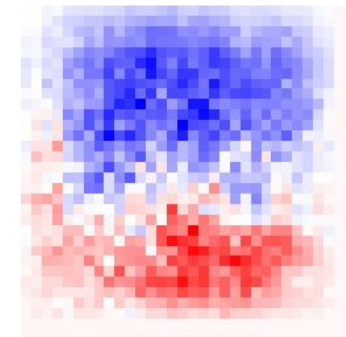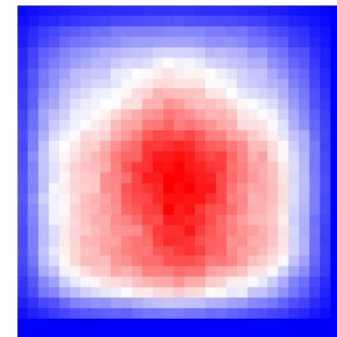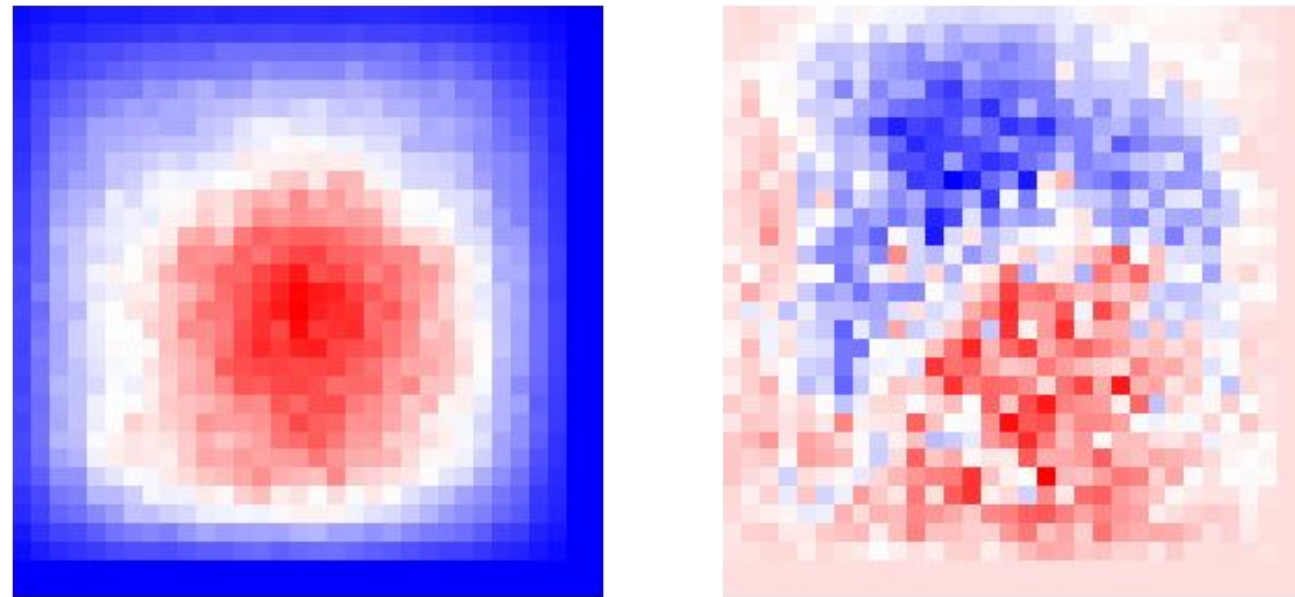

Cluster 3

Cluster 4

Cluster 5
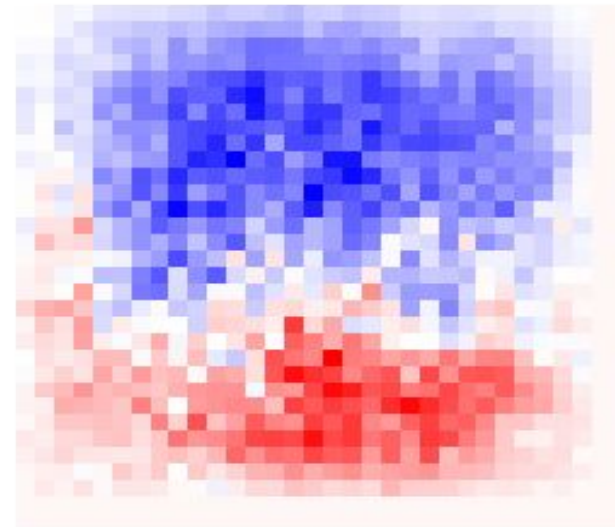
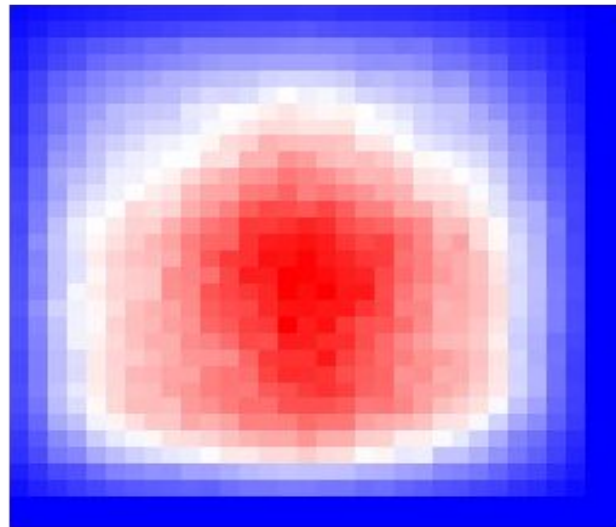# Saliency map approach (Normalization)

Cluster 1

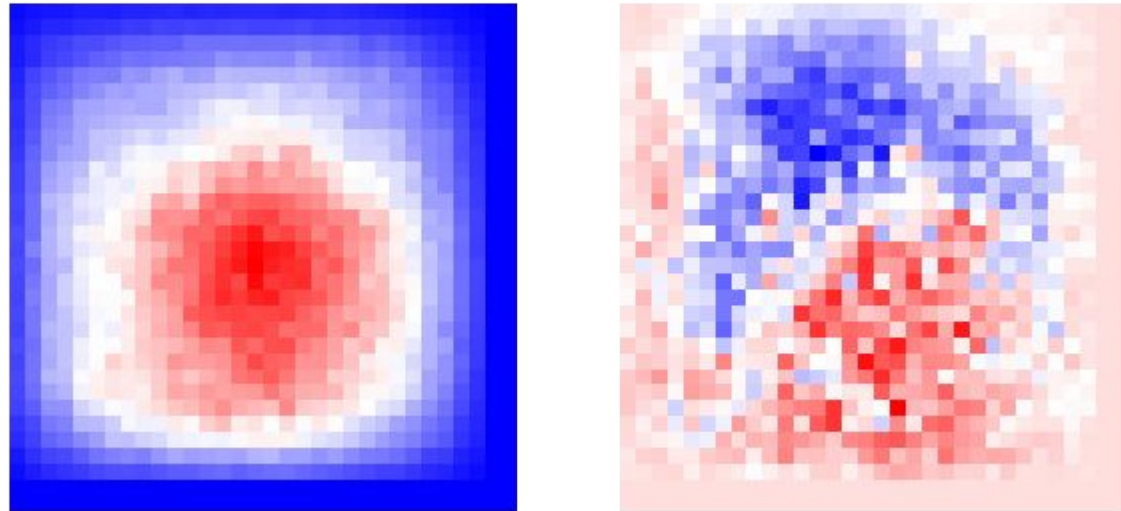Images example

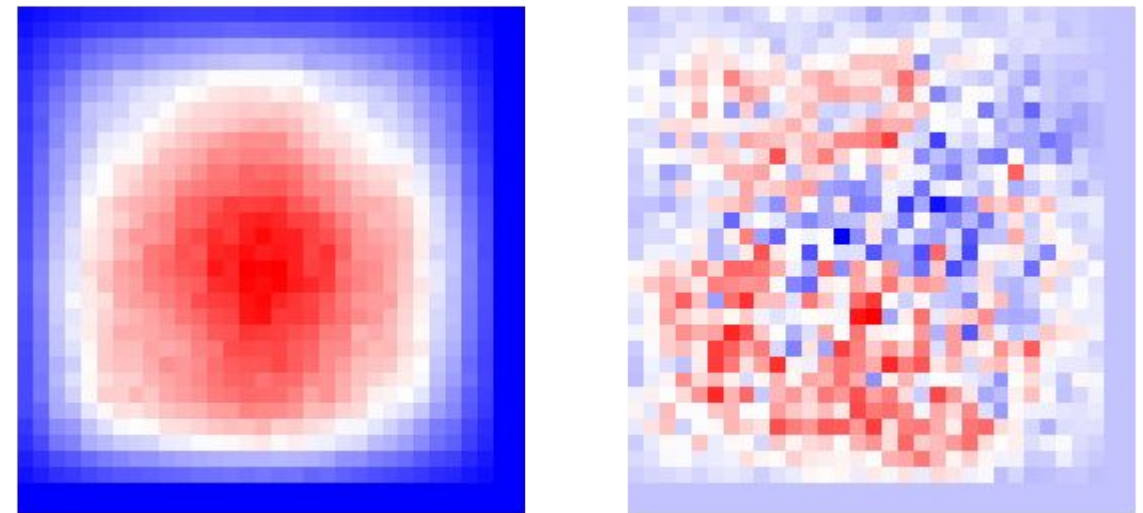# Saliency map approach (Normalization)

Cluster 5

Images example

Saliency map approach (Normalization)
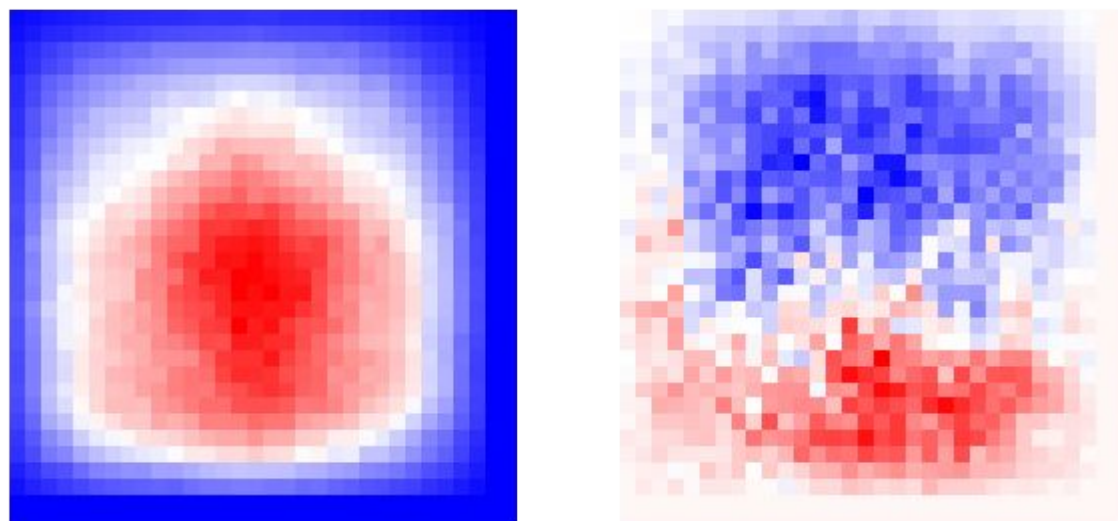
Cluster 1
(157 images)
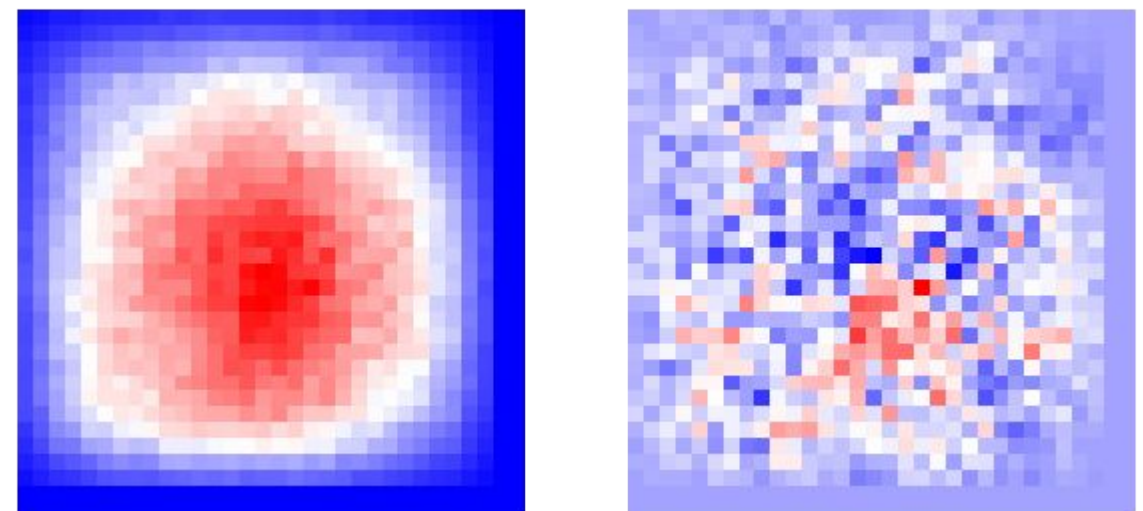
Random set (157 images)

vs.

Cluster 5
(477 images)
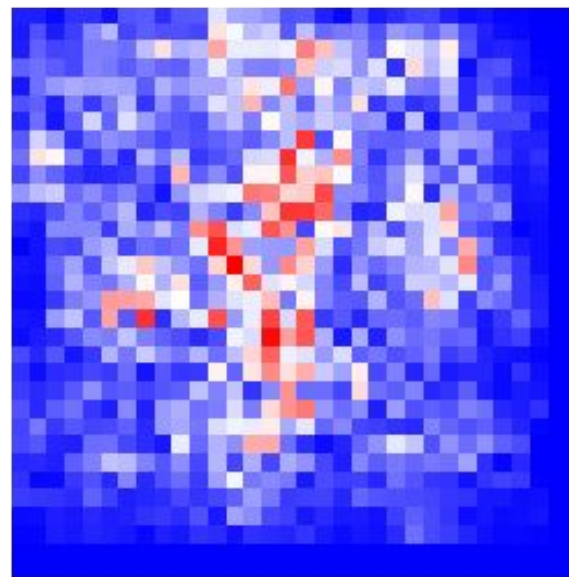
Random set (477 images)

vs.

Saliency map approach

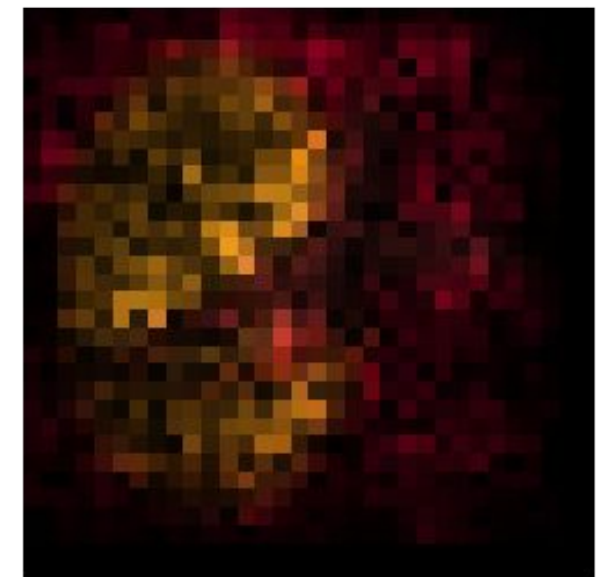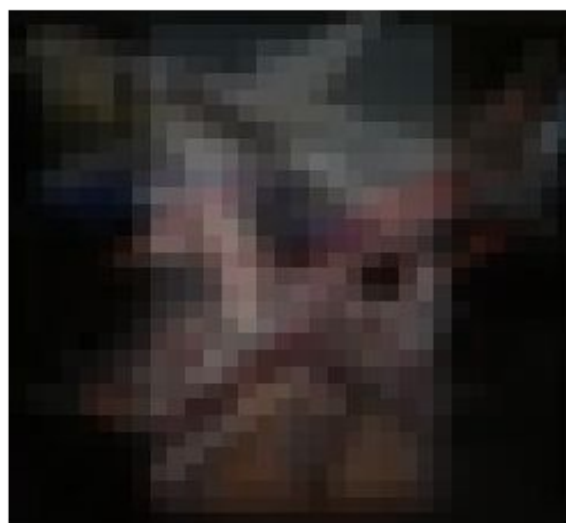Original Image   Saliency map   Superimposed heatmap
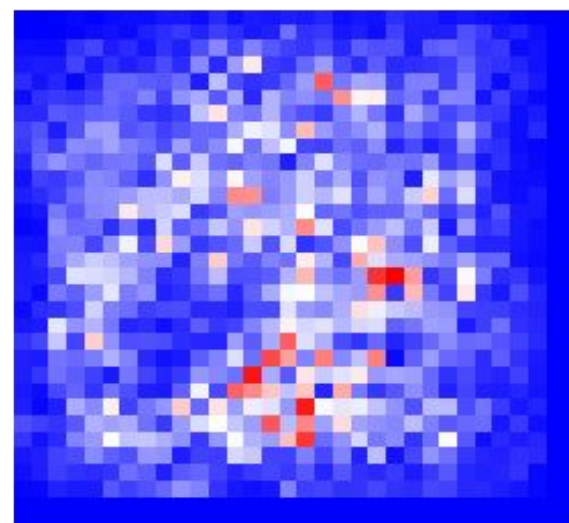

X   =

Average sub-group   Saliency map   Superimposed heatmap
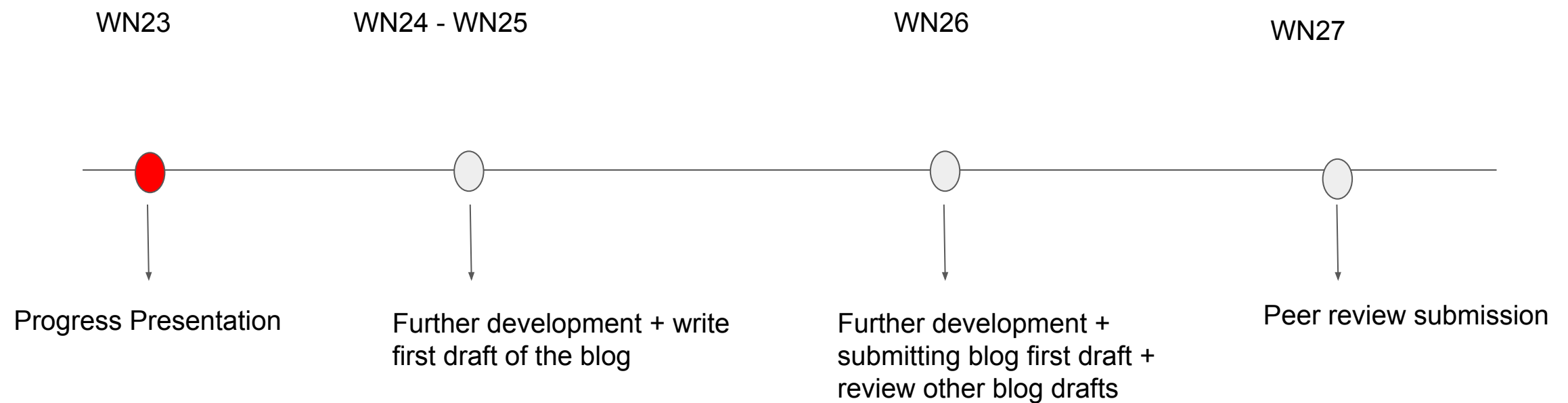

X   =

What's next?

- Applying clustering in multiple approaches (Autoencoders and CNN)

- Grouping according to the misclassified label

Nice to have

- Applying a description approach for each cluster

Plan: Time plan

WN23

WN24 - WN25

WN26

WN27

Progress Presentation

Further development + write
first draft of the blog

Further development +
submitting blog first draft +
review other blog drafts

Peer review submission

Thank you for your attention