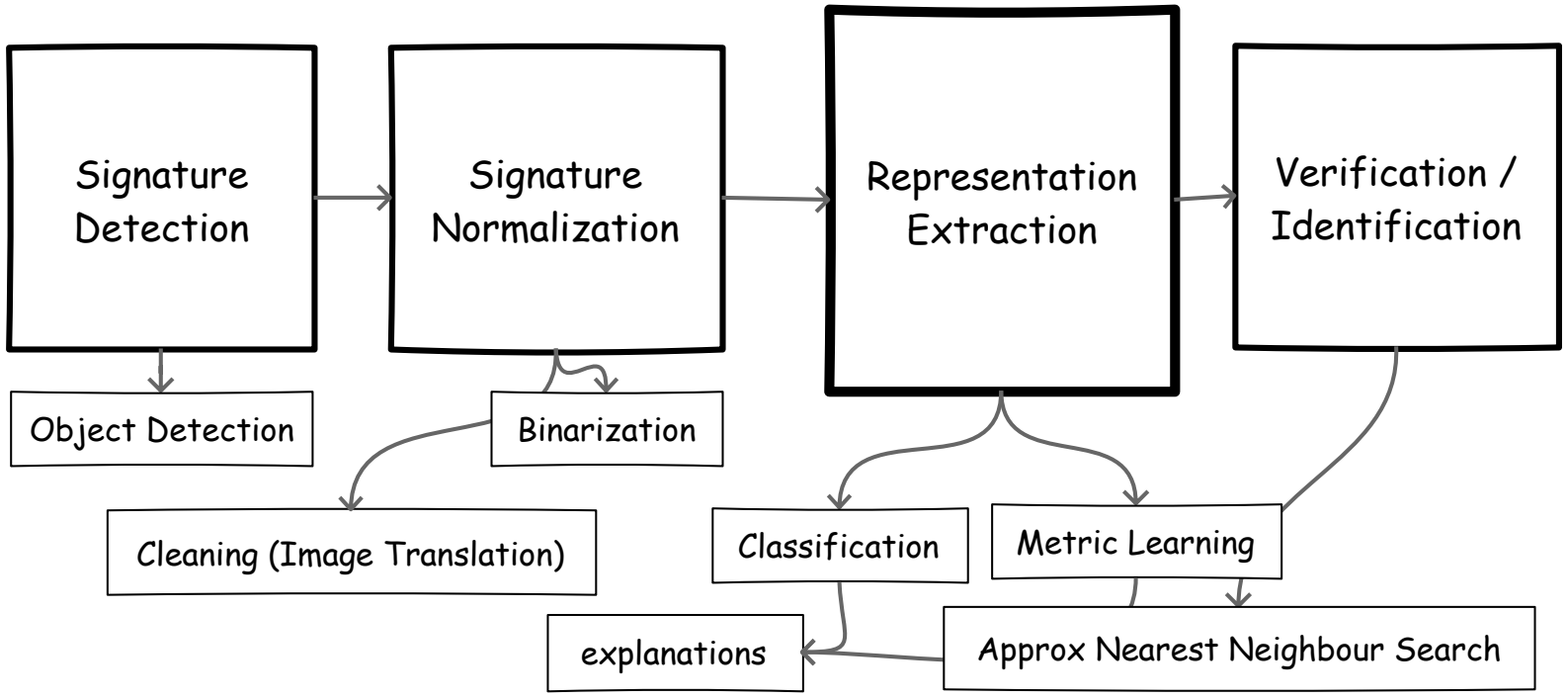
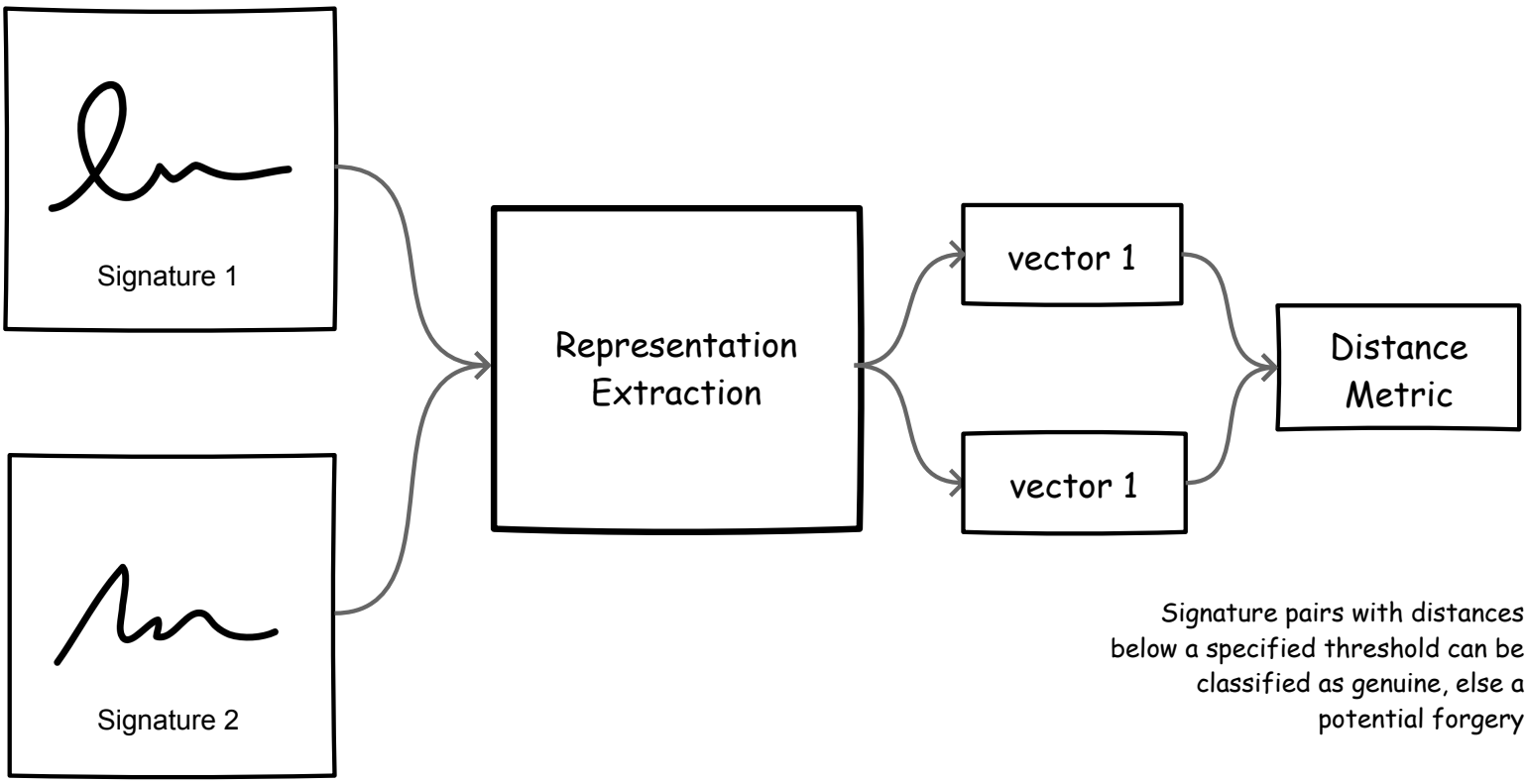
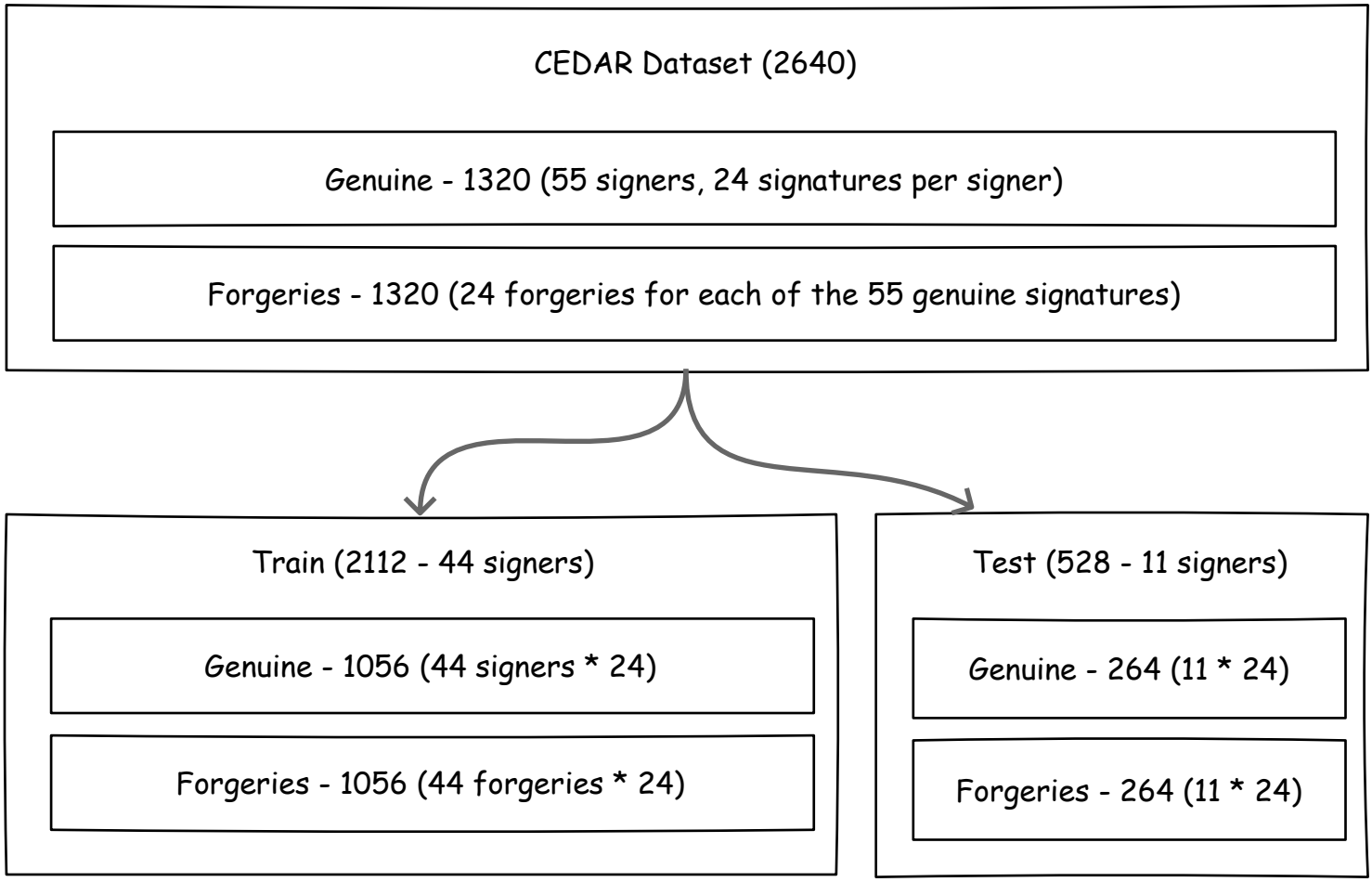
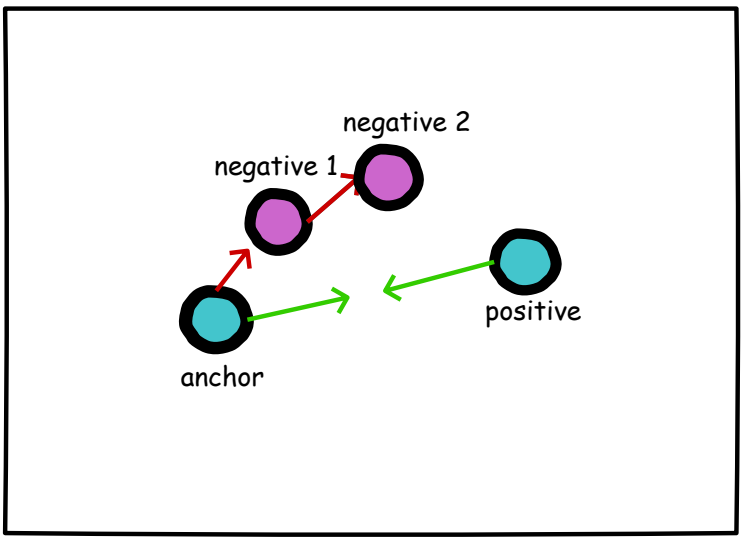

Signature Detection
Signature Normalization
Representation Extraction
Verification / Identification
Object Detection
Binarization
Cleaning (Image Translation)
Classification
Metric Learning
explanations
Approx Nearest Neighbour Search

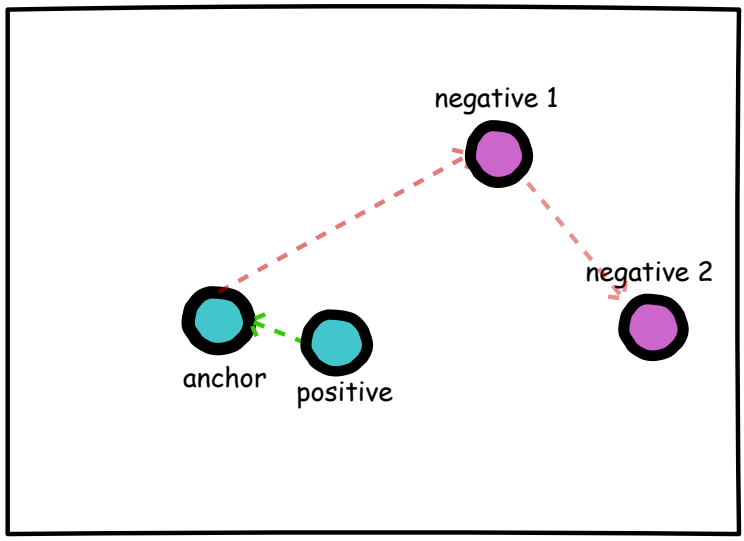

Signature 1
Signature 2
Representation Extraction
vector 1
vector 1
Distance Metric
Signature pairs with distances below a specified threshold can be classified as genuine, else a potential forgery



Note: Train/test is split based on authors.
i.e. irrespectively of loss function and training data generation strategy, we hold out a random subset of authors (20%) and their corresponding forgeries as the test set.

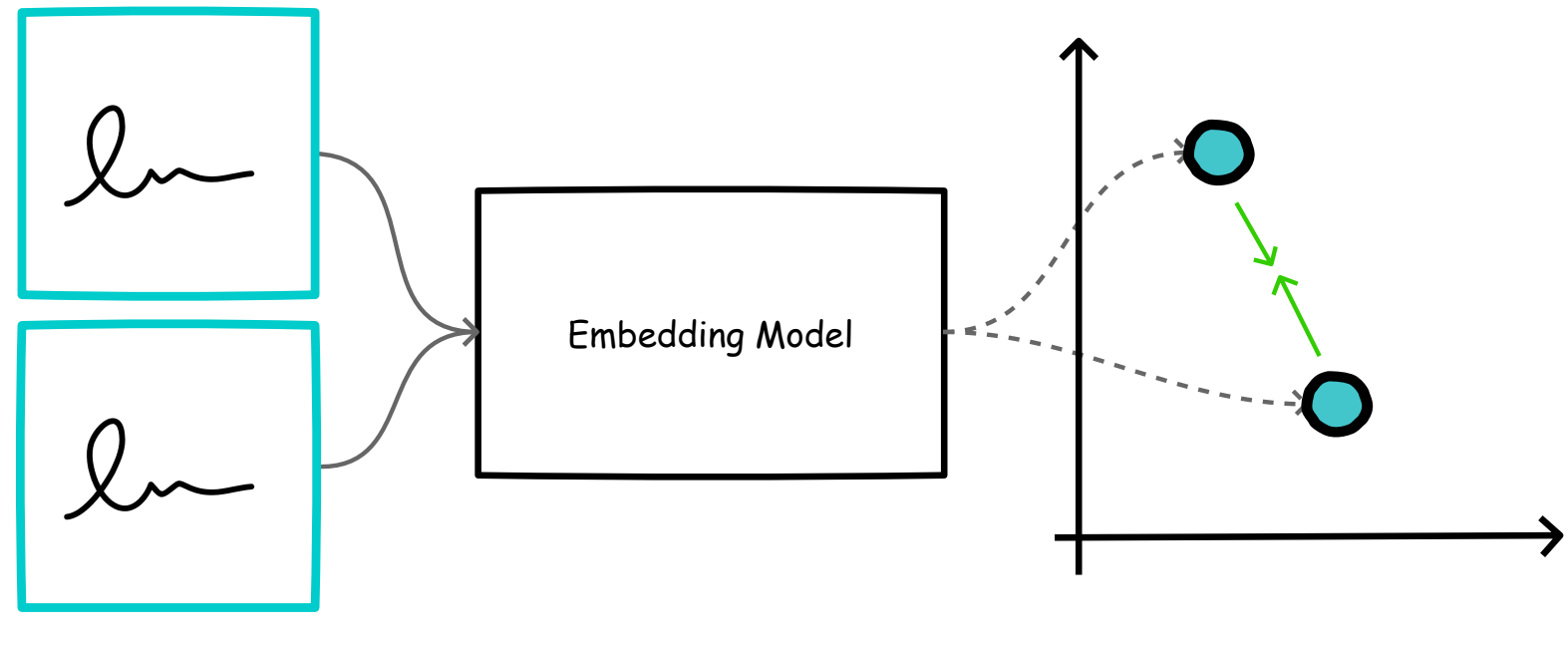


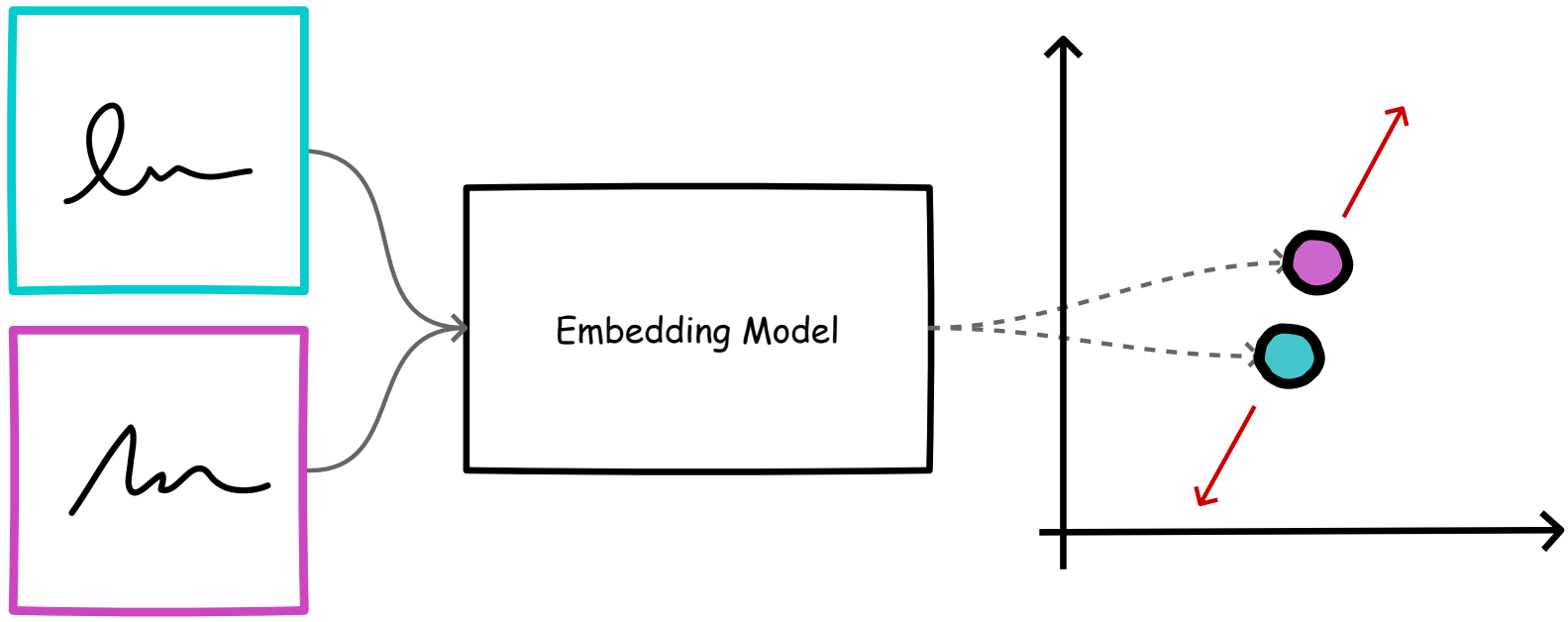
Embeddings before loss update

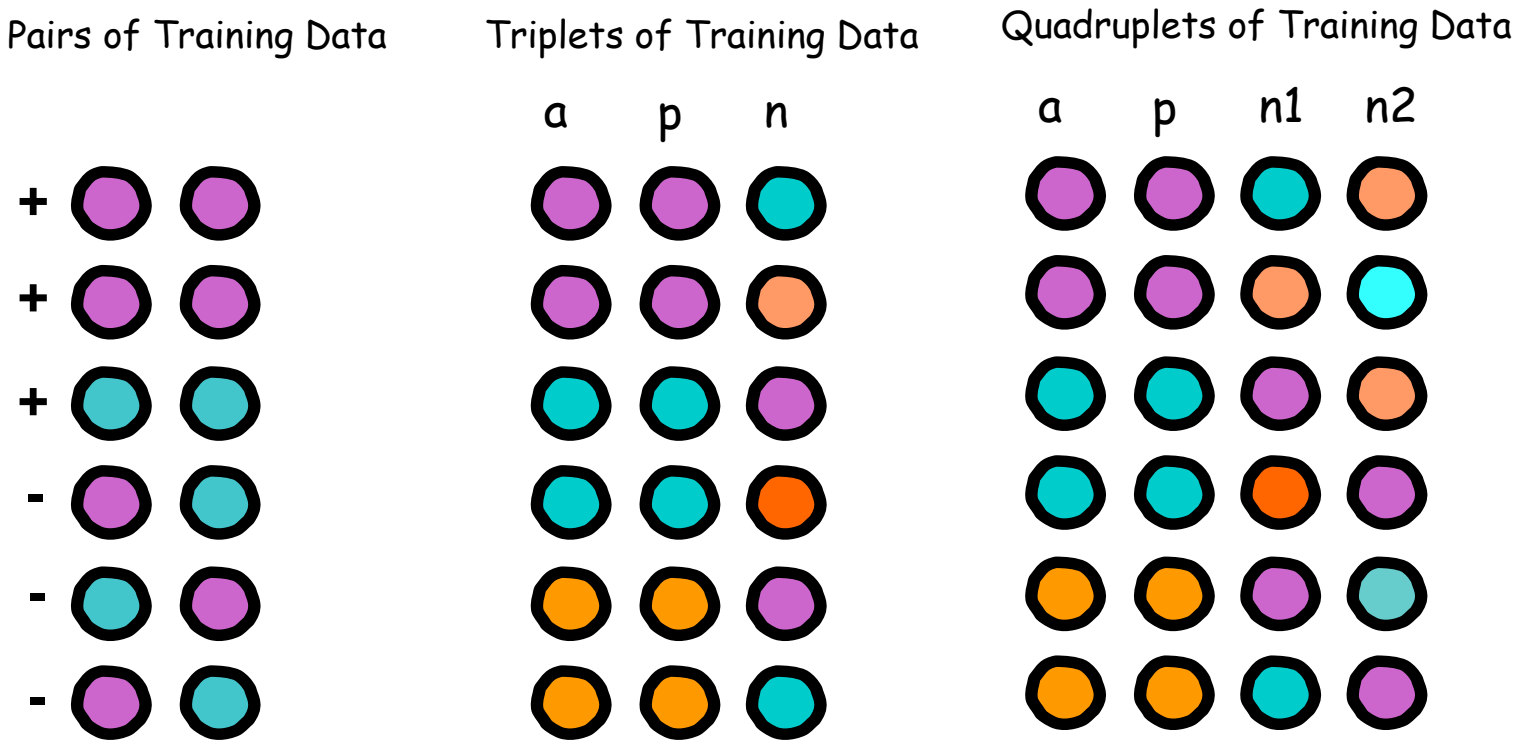


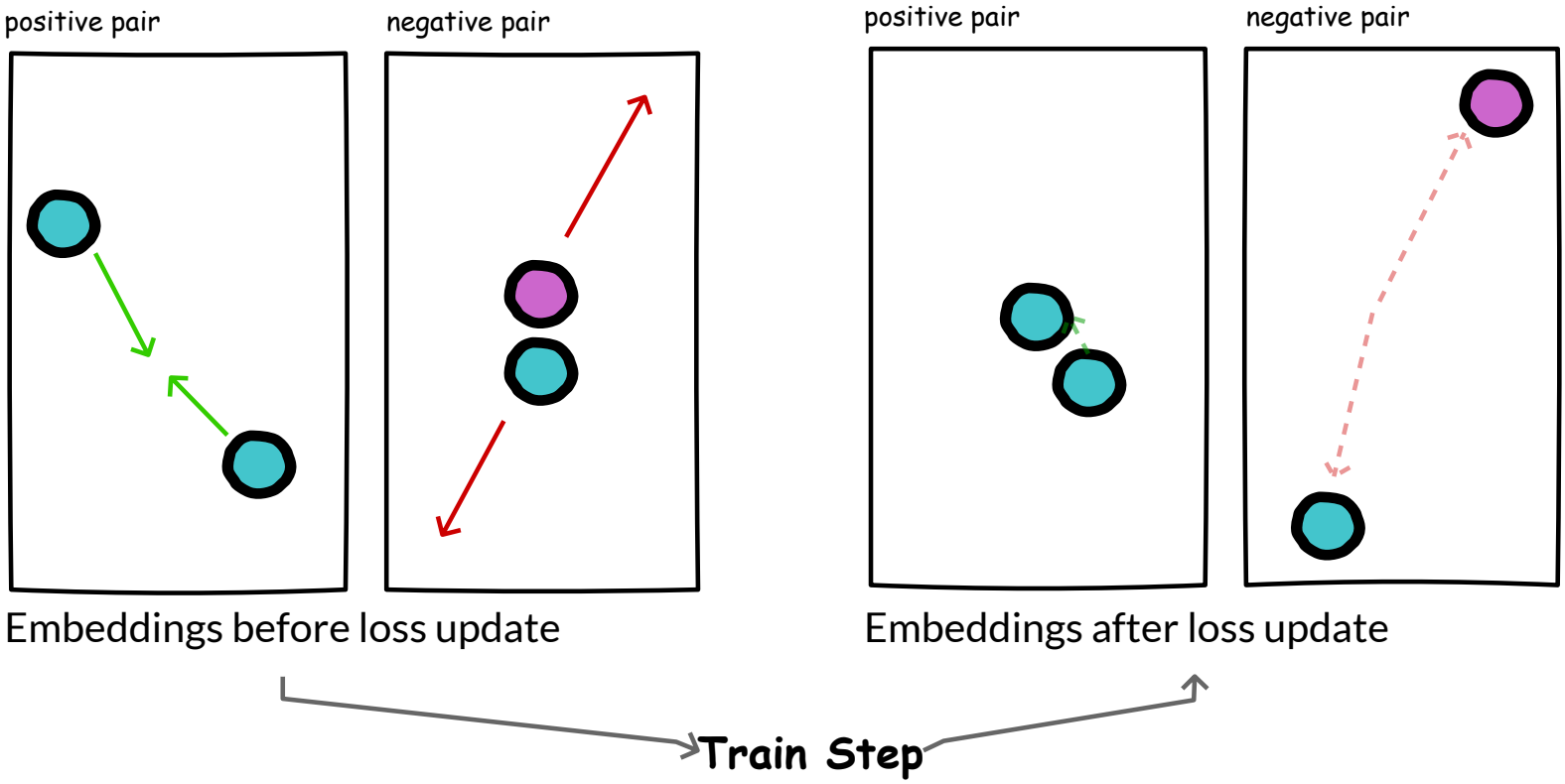
Embeddings after loss update

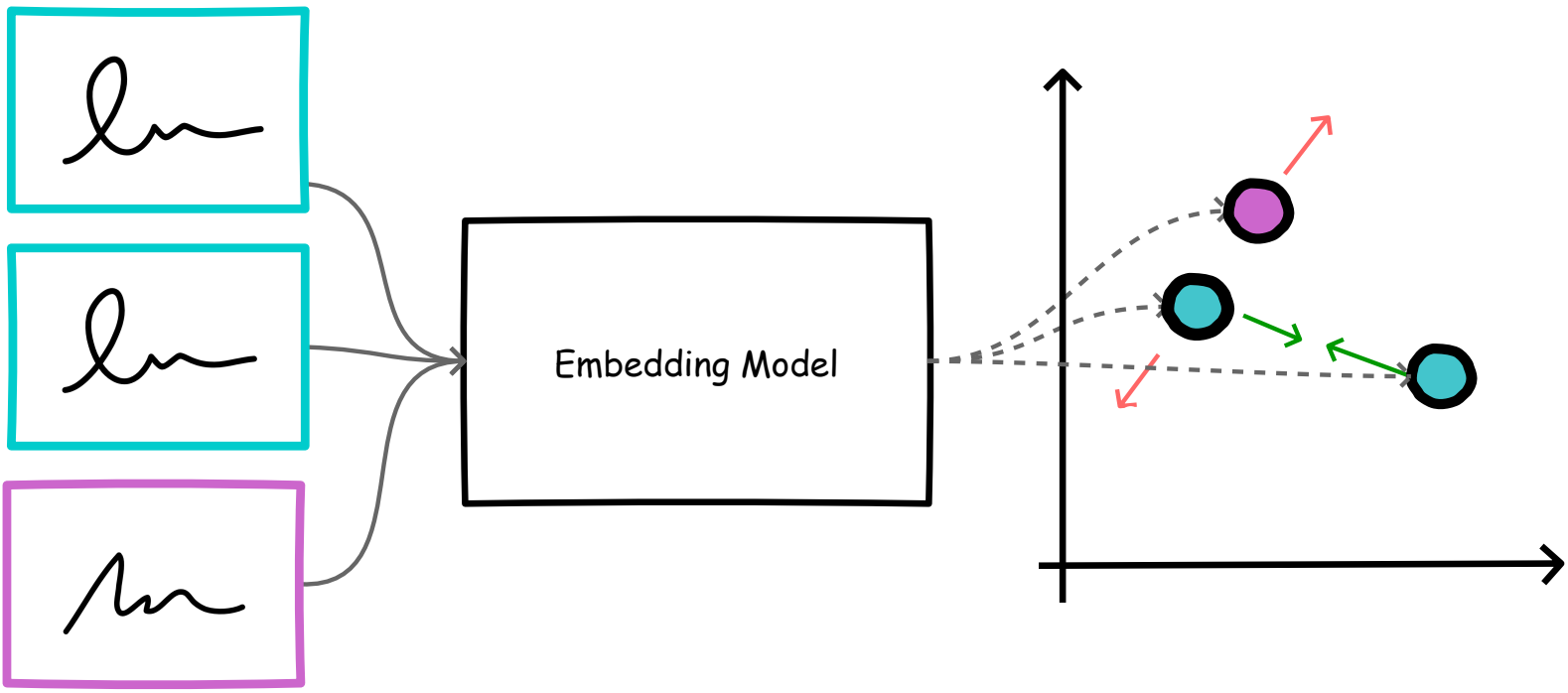
Train Step

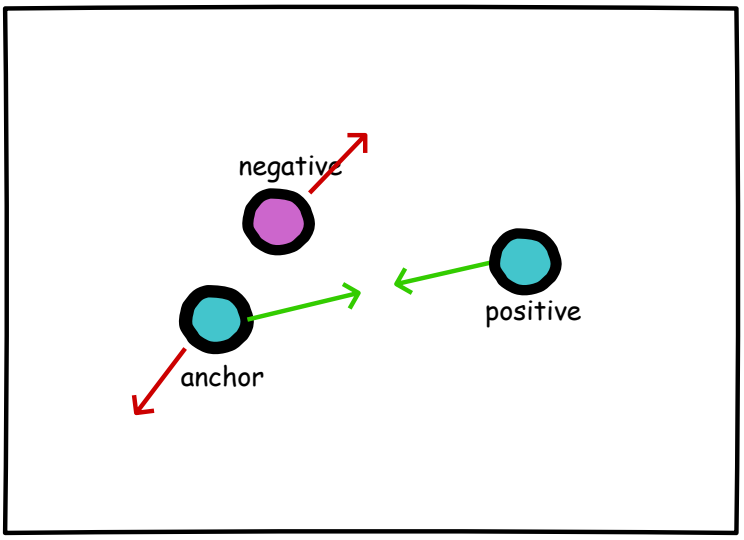

Embedding Model


Embedding Model

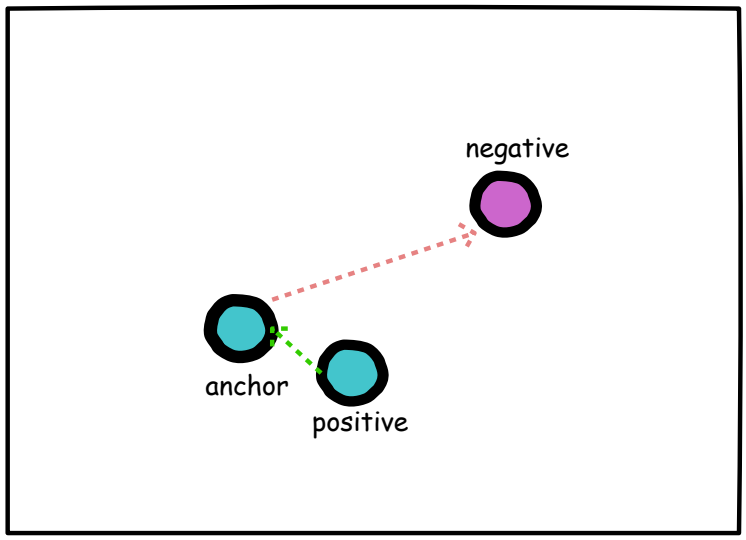

Pairs of Training Data
Triplets of Training Data
Quadruplets of Training Data
a
p
n
a
p
n1
n2
+
+
+
-
-
-


positive pair
negative pair
positive pair
negative pair
Embeddings before loss update
Embeddings after loss update
Train Step


Embedding Model

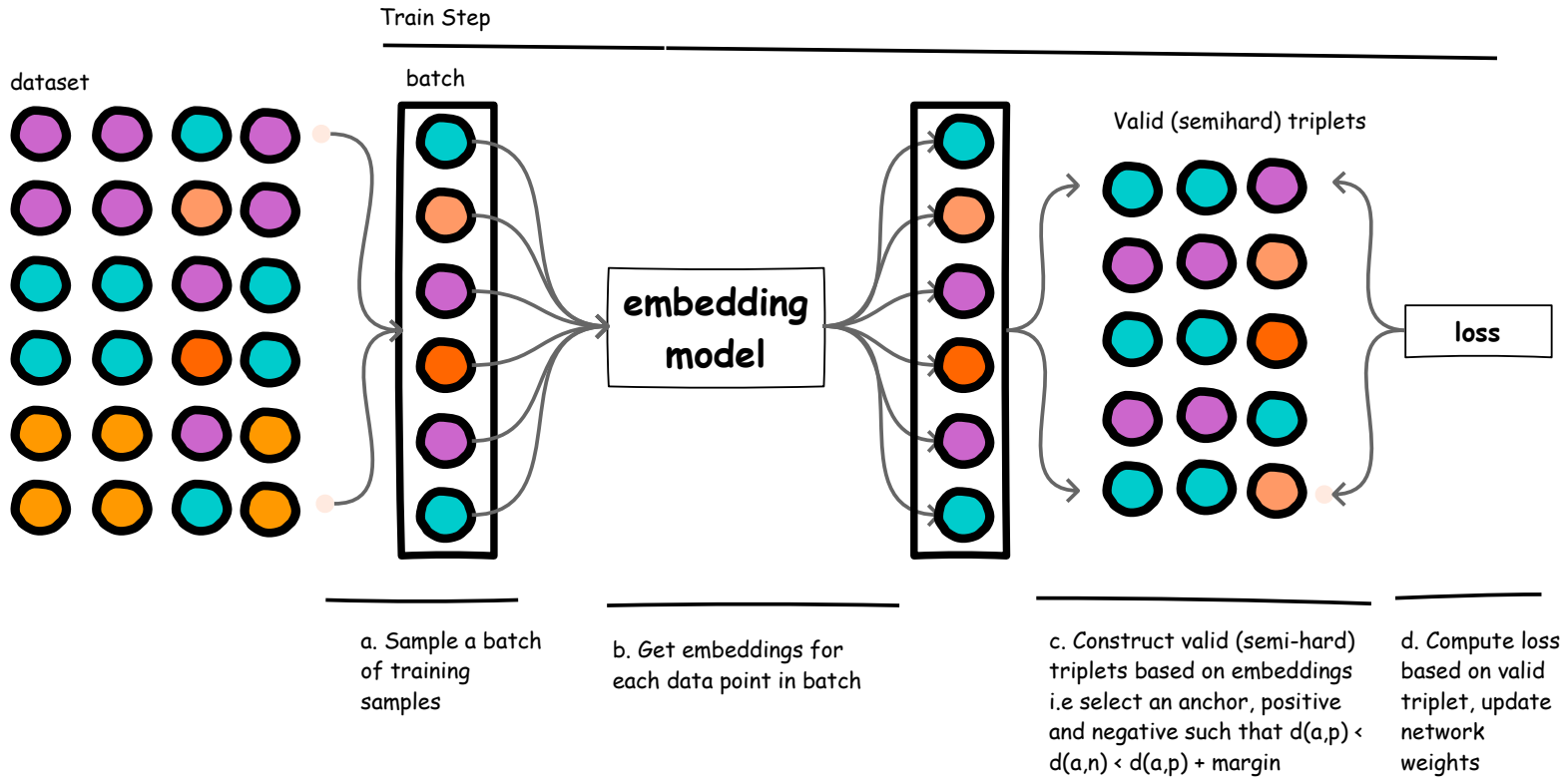


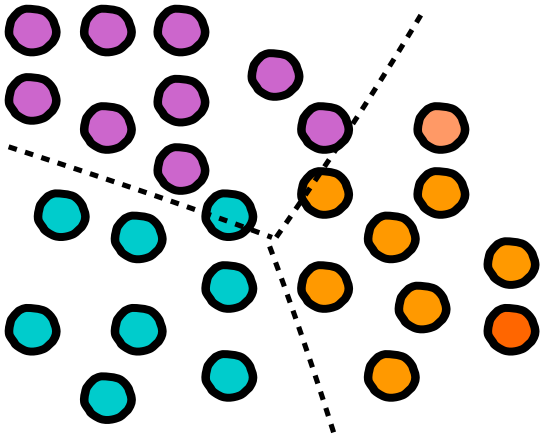
Embeddings before triplet loss update



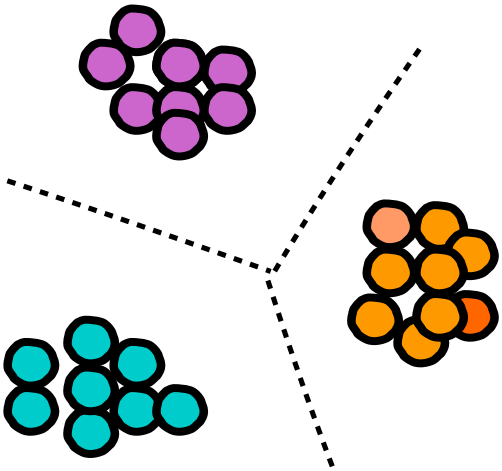
Embeddings after triplet loss update

Train Step

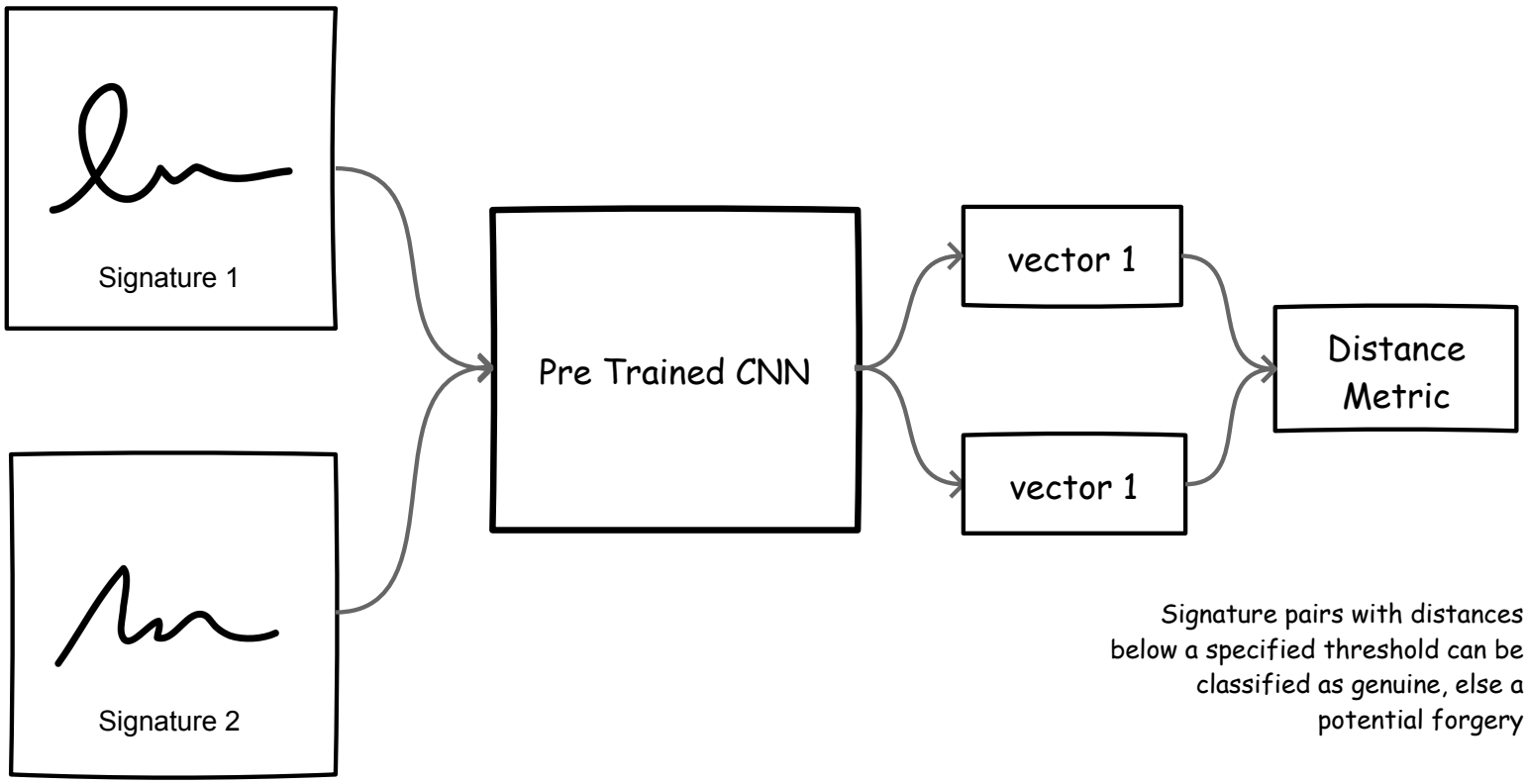

Train Step
dataset
batch
embedding model
Valid (semihard) triplets
loss
a. Sample a batch of training samples
b. Get embeddings for each data point in batch
c. Construct valid (semi-hard) triplets based on embeddings i.e select an anchor, positive and negative such that d(a,p) < d(a,n) < d(a,p) + margin
d. Compute loss based on valid triplet, update network weights



Separable Features (e.g. classification)



Discriminative Features (e.g. metric learning)



Signature pairs with distances below a specified threshold can be classified as genuine, else a potential forgery