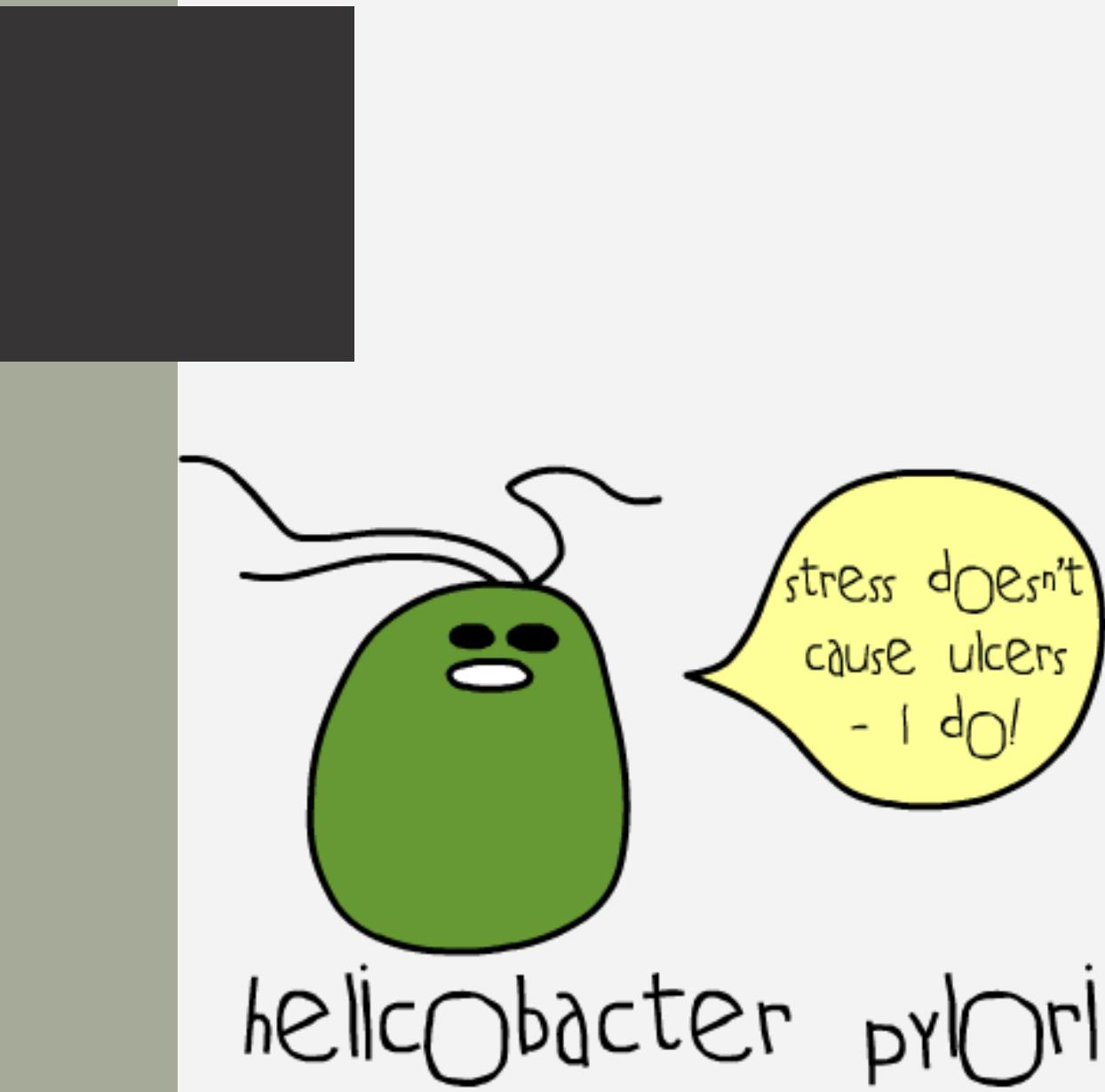


# Helicobacter Pylory diagnosis

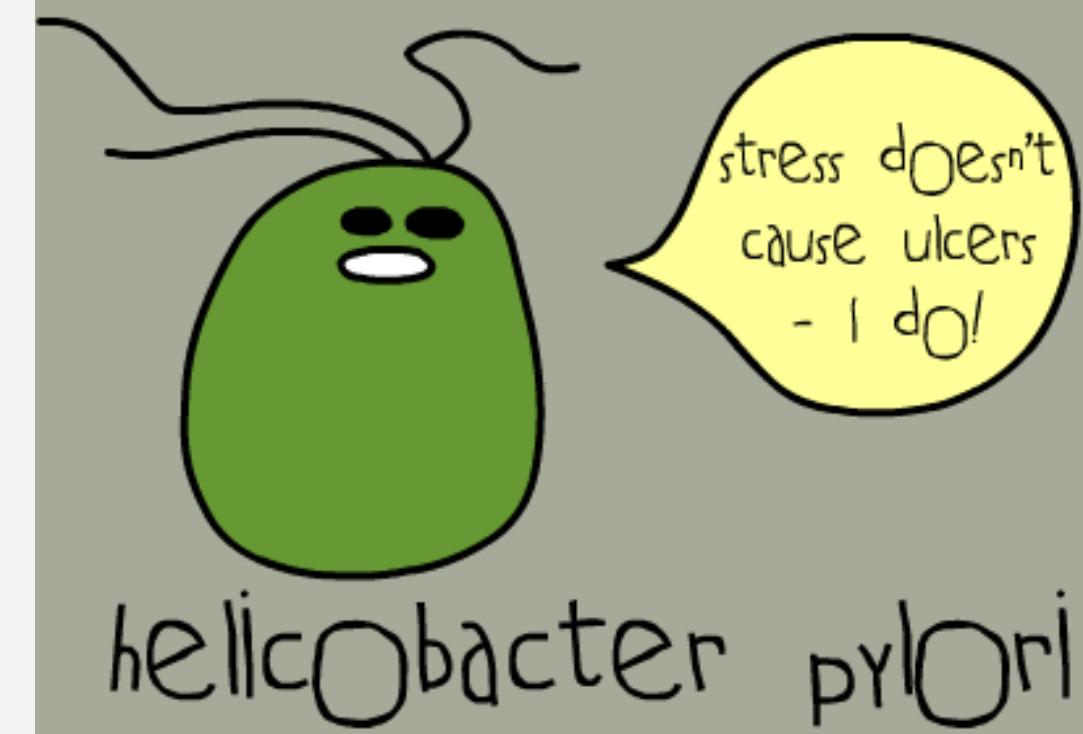
Arnau, Jordi, Josep, Mustapha

AI Degree, Vision & Learning



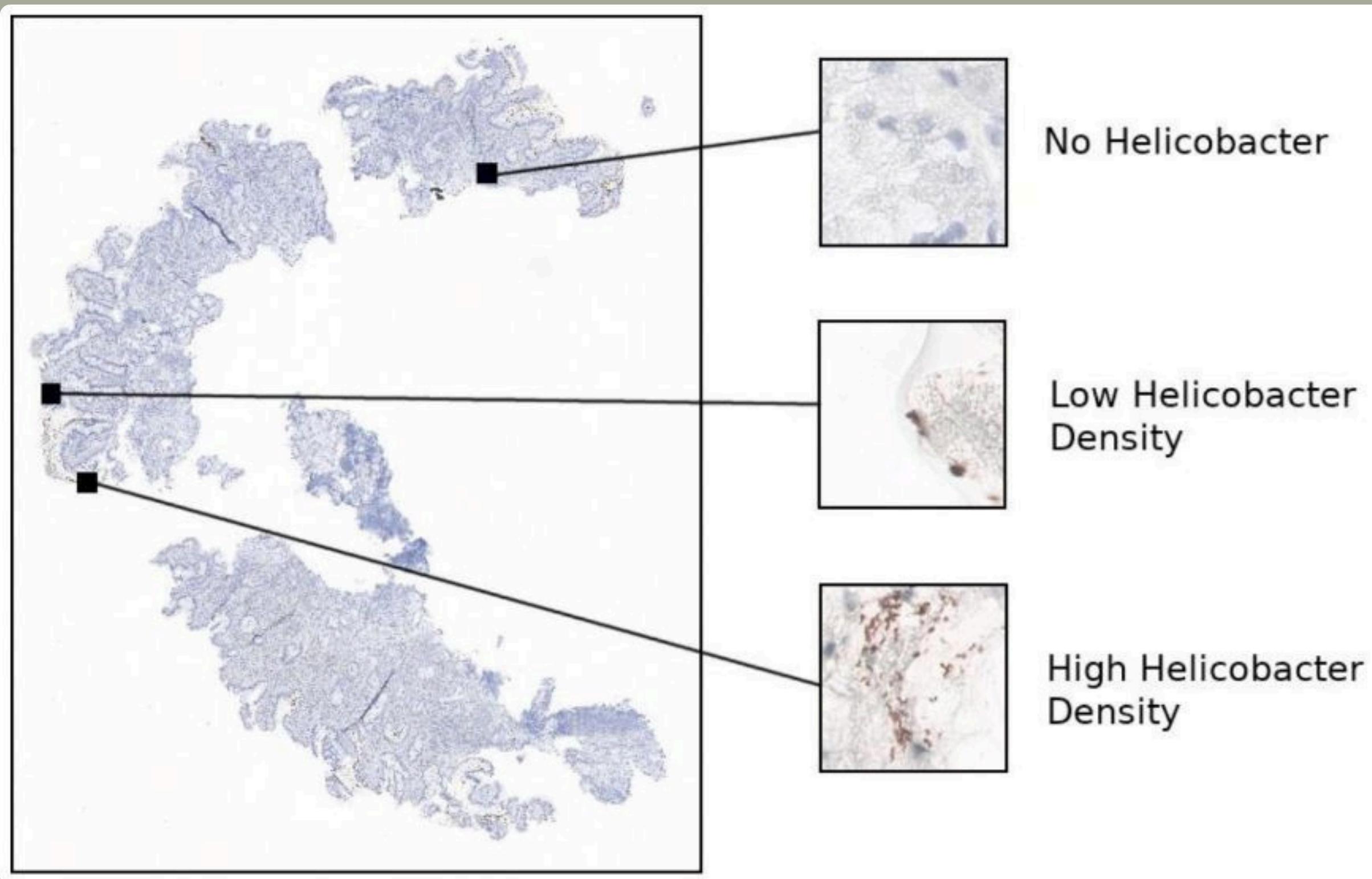
# Contents

- 1** Data
- 2** Patch Classification
- 3** Patient Diagnosis
- 4** Results



# Data

# Data



## Cropped Set

- 133747 Patches from 155 patients, 77 sane and 78 infected

## Annotated Set

- 2676 Patches from 155 patients, 77 sane and 78 infected

## HoldOut Set

- 88794 Patches from 116 patients, 58 sane and 58 infected

# Split

## Patch Classification

### AutoEncoder Set

- 20 Patients
- 18319 sane patches

## Patient Classification

### Train Set

- 135 Patients, 57 sane and 78 infected

### Annotated Set

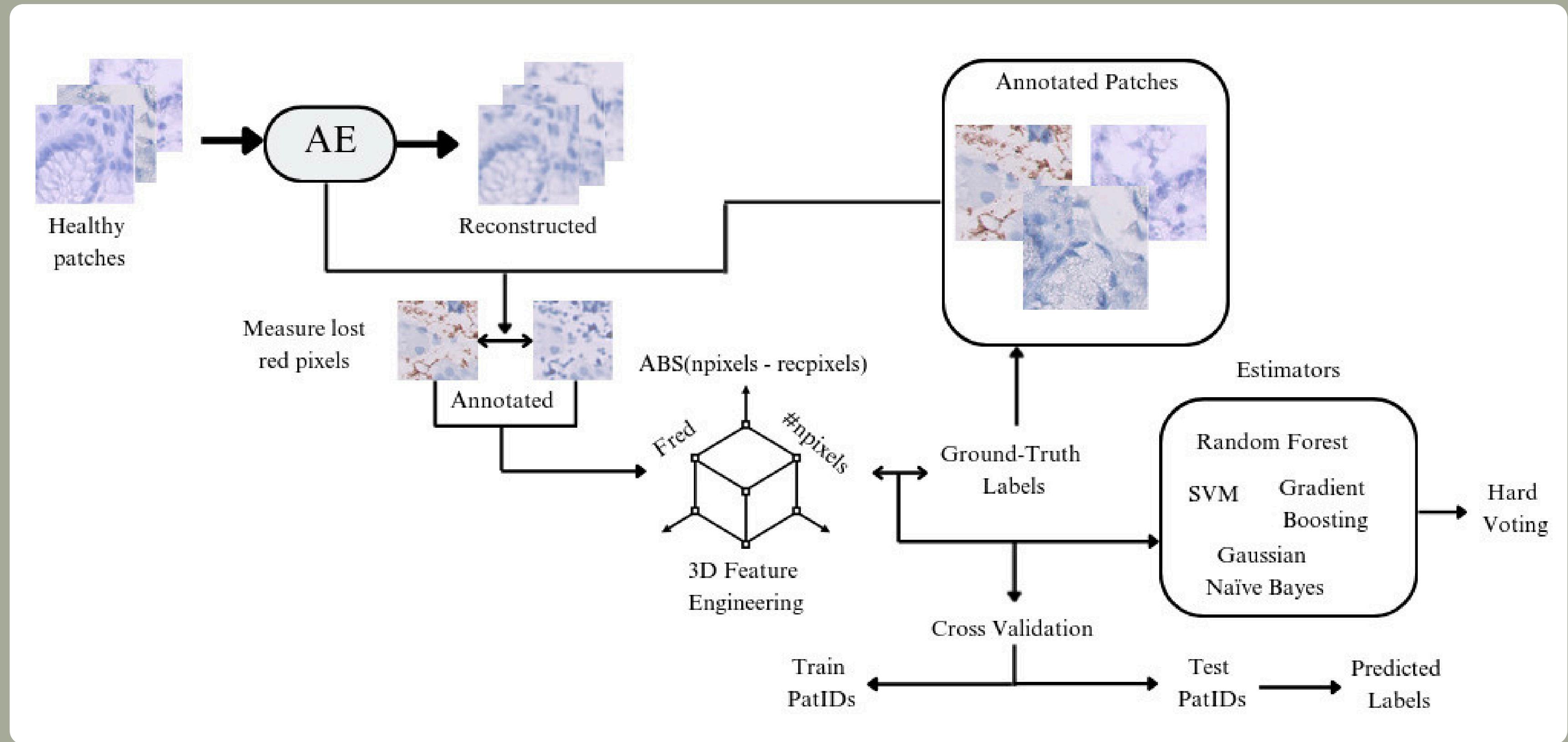
- 135 Patients
- 1096 sane patches and 1460 infected patches

### Test Set

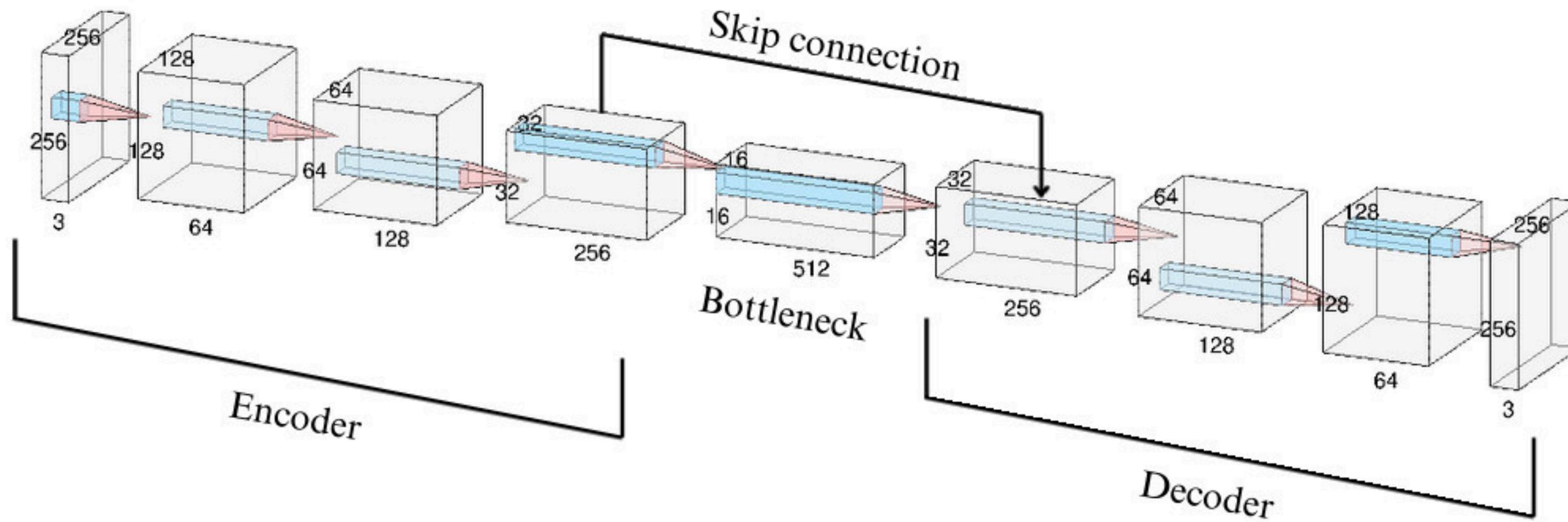
- 116 Patients, 58 sane and 58 infected

# Patch Classification

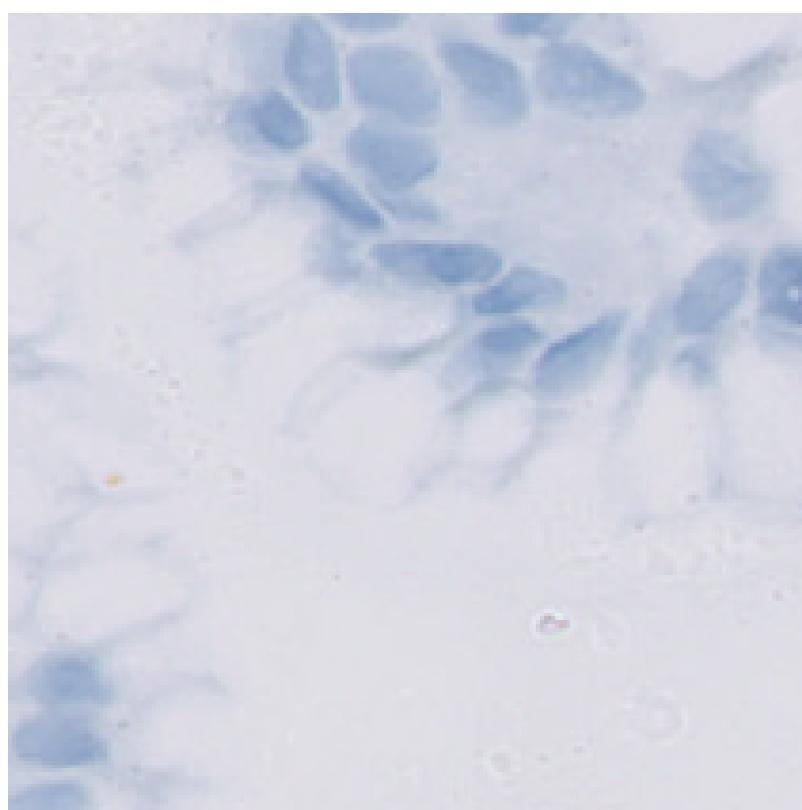
# Pipeline



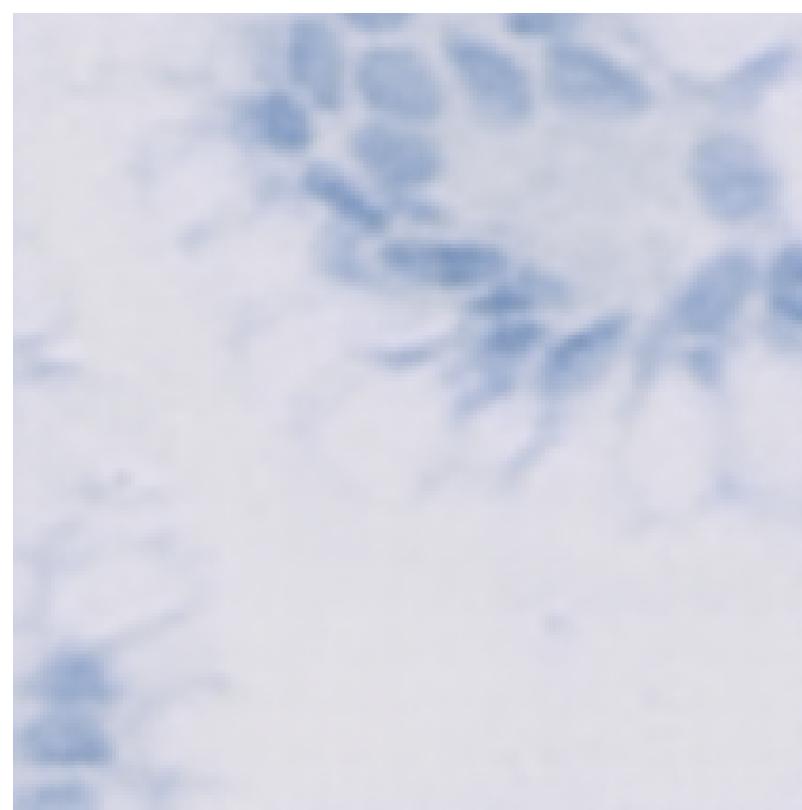
# Autoencoder



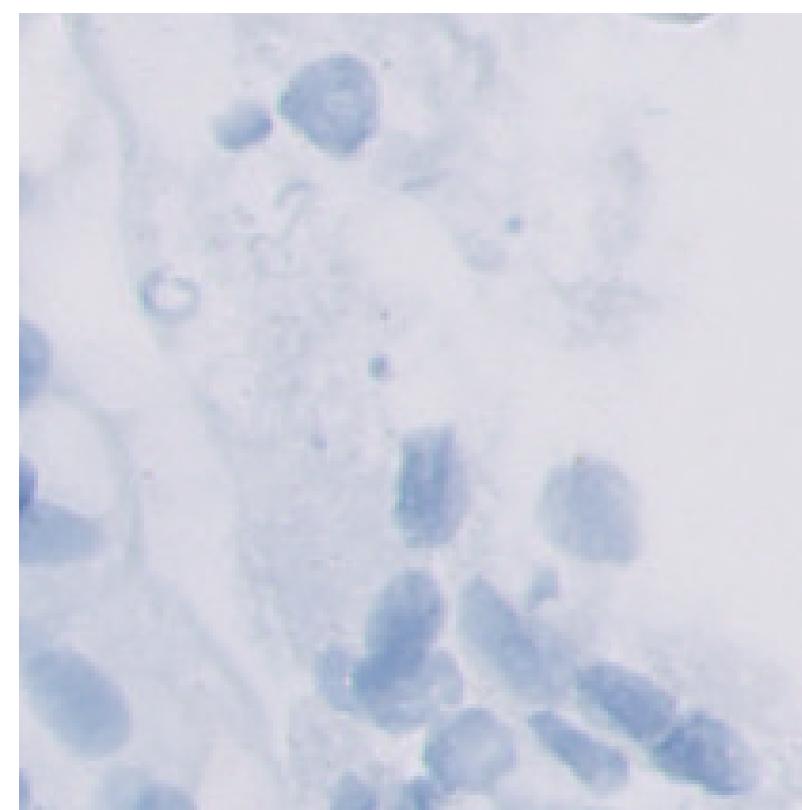
Original



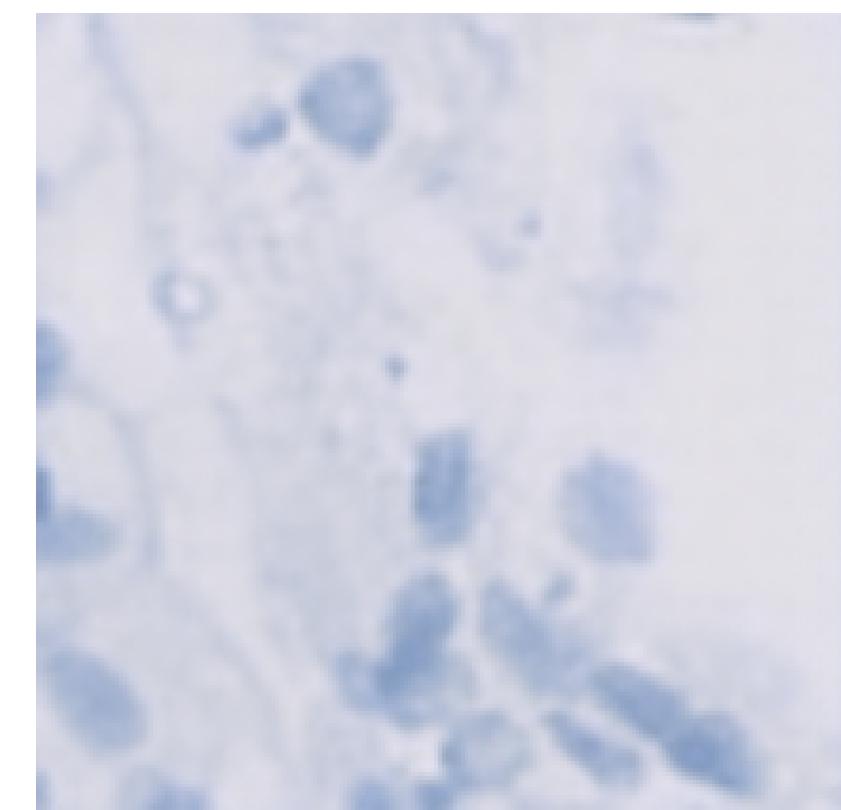
Reconstructed



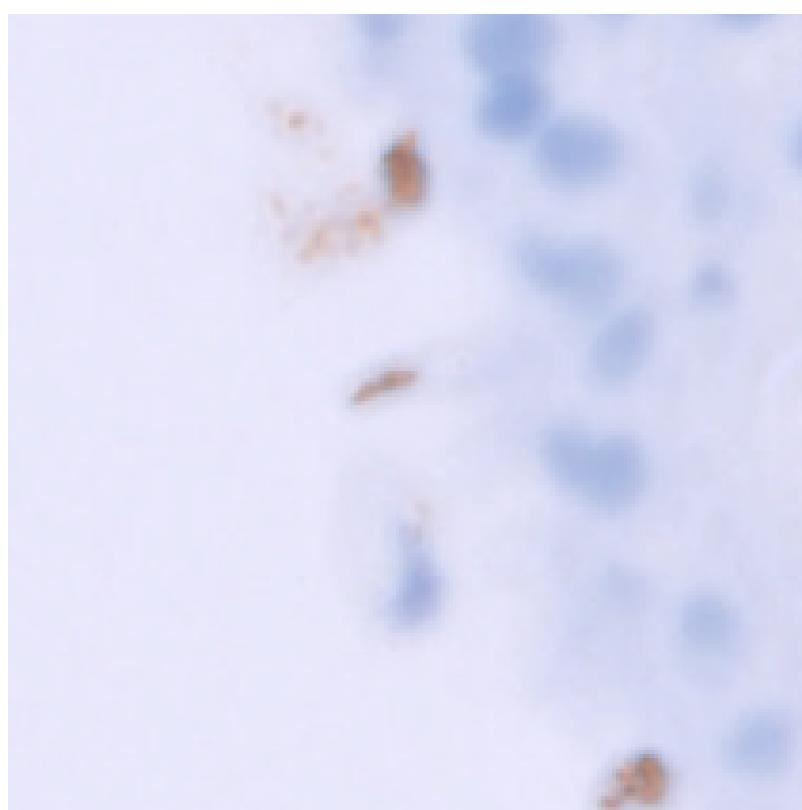
Original



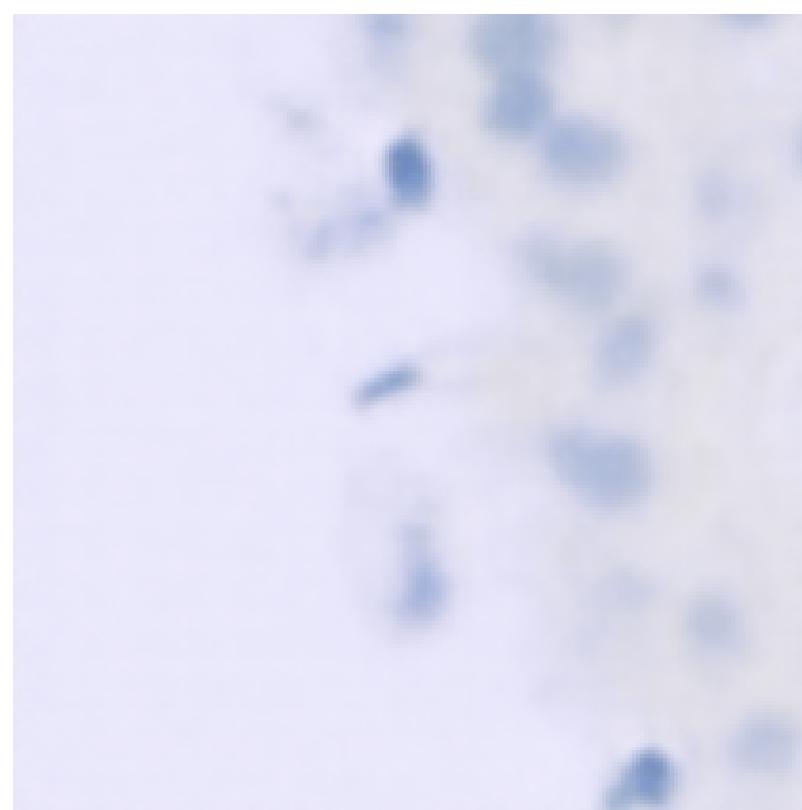
Reconstructed



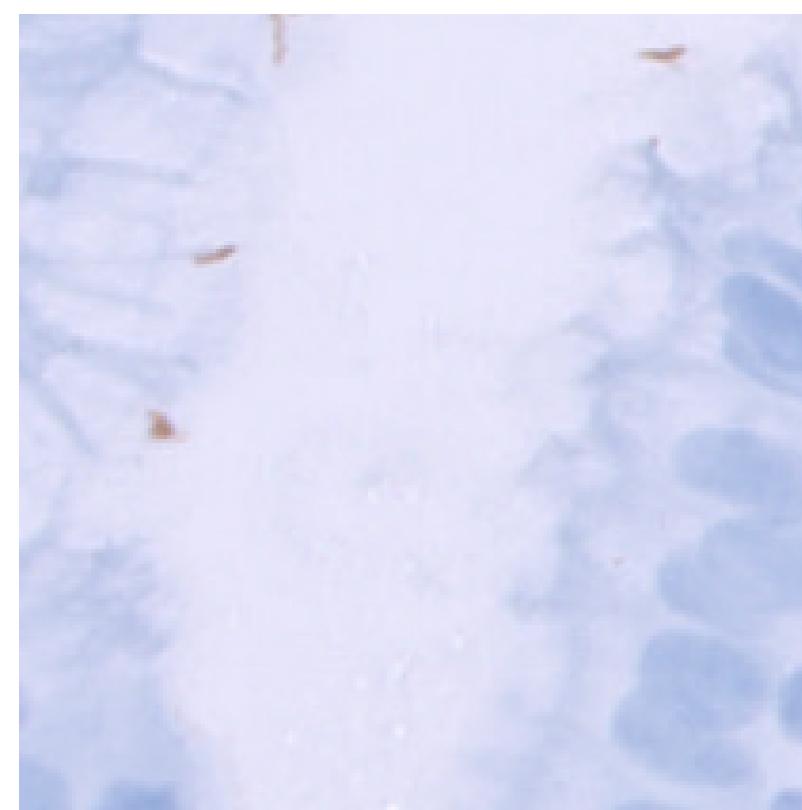
Original



Reconstructed



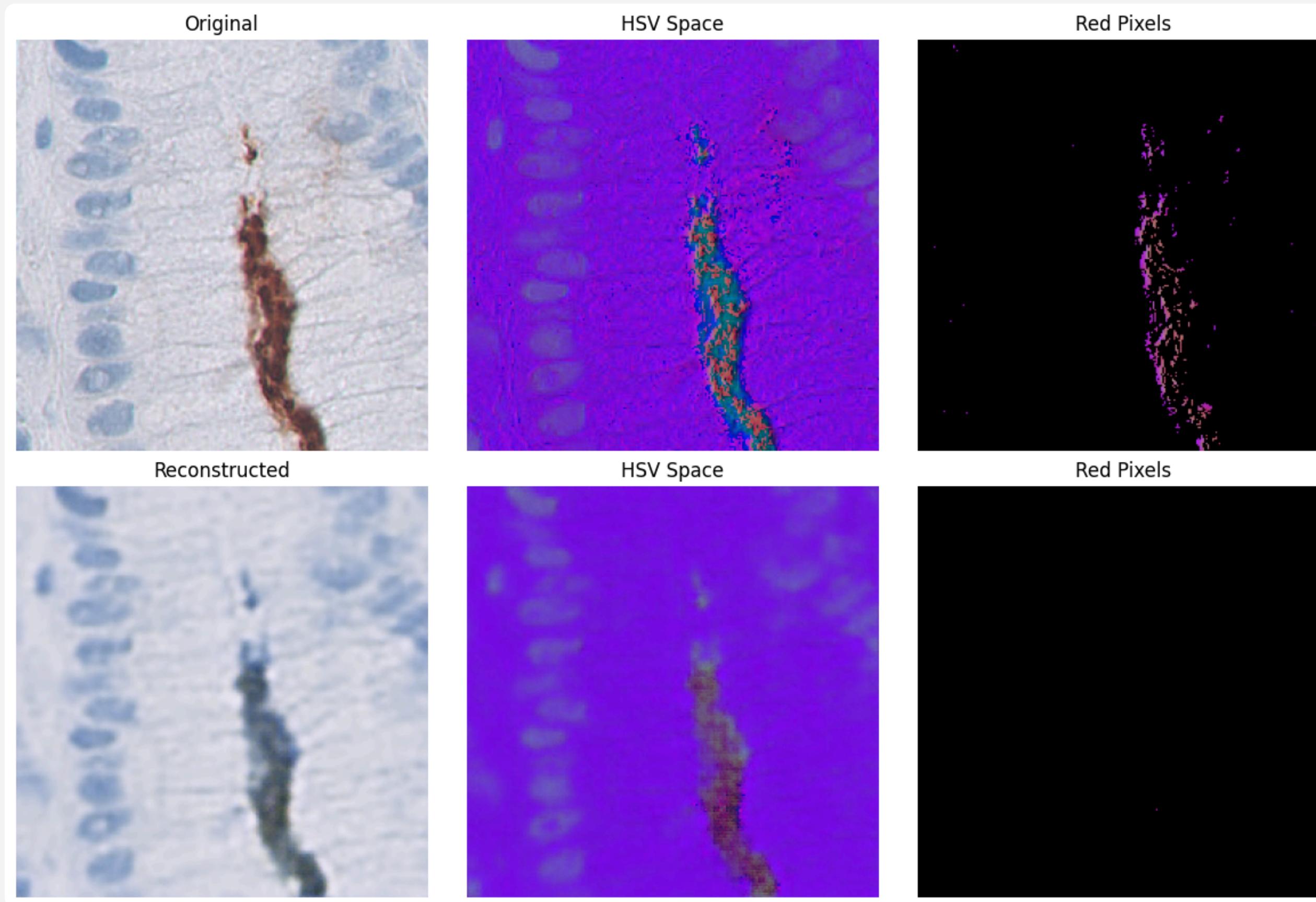
Original



Reconstructed



# Features

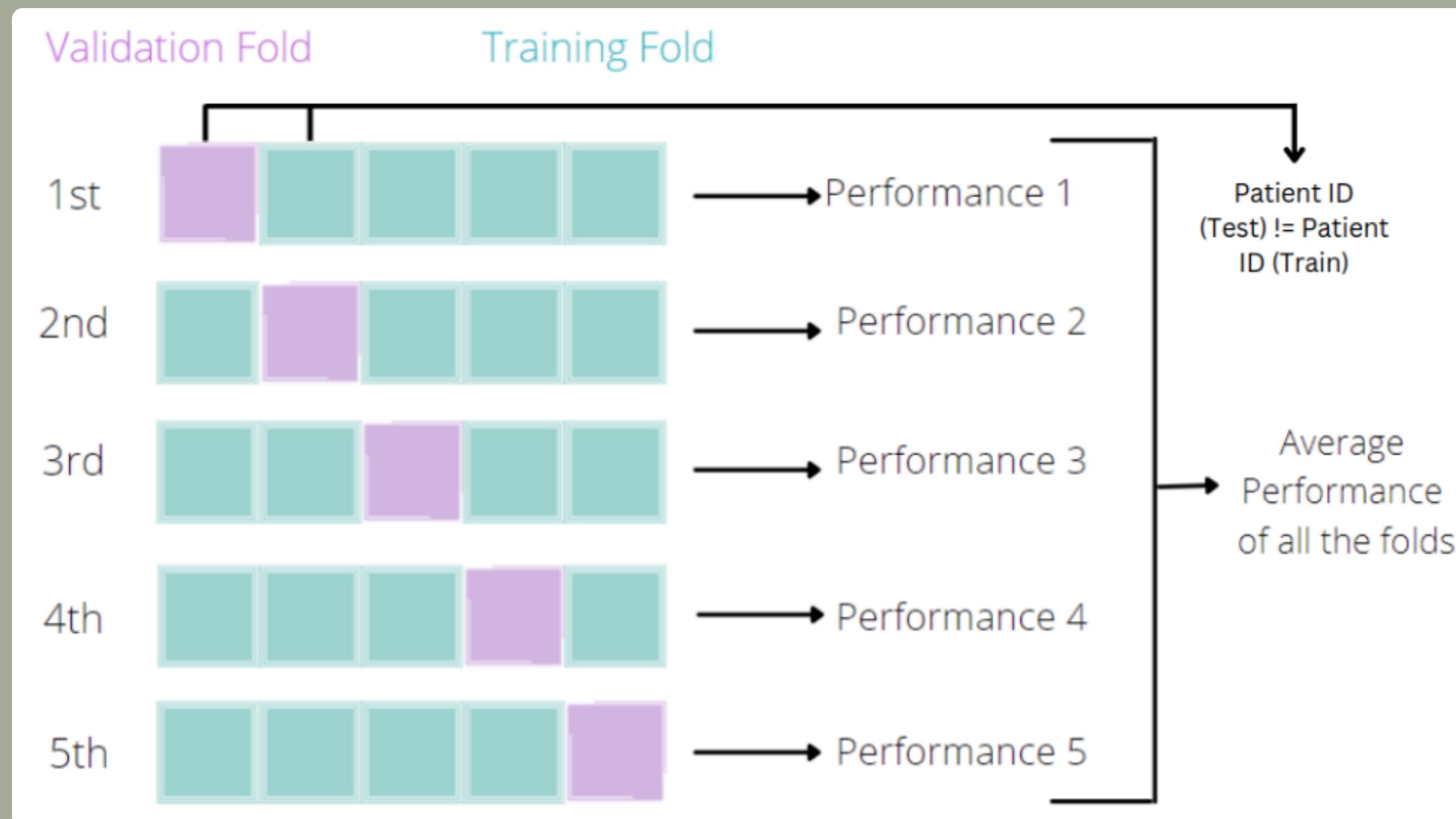


1) NUMBER OF  
RED PIXELS

2) ABSOLUTE  
DIFFERENCE OF  
RED PIXELS WITH  
RECONSTRUCTED

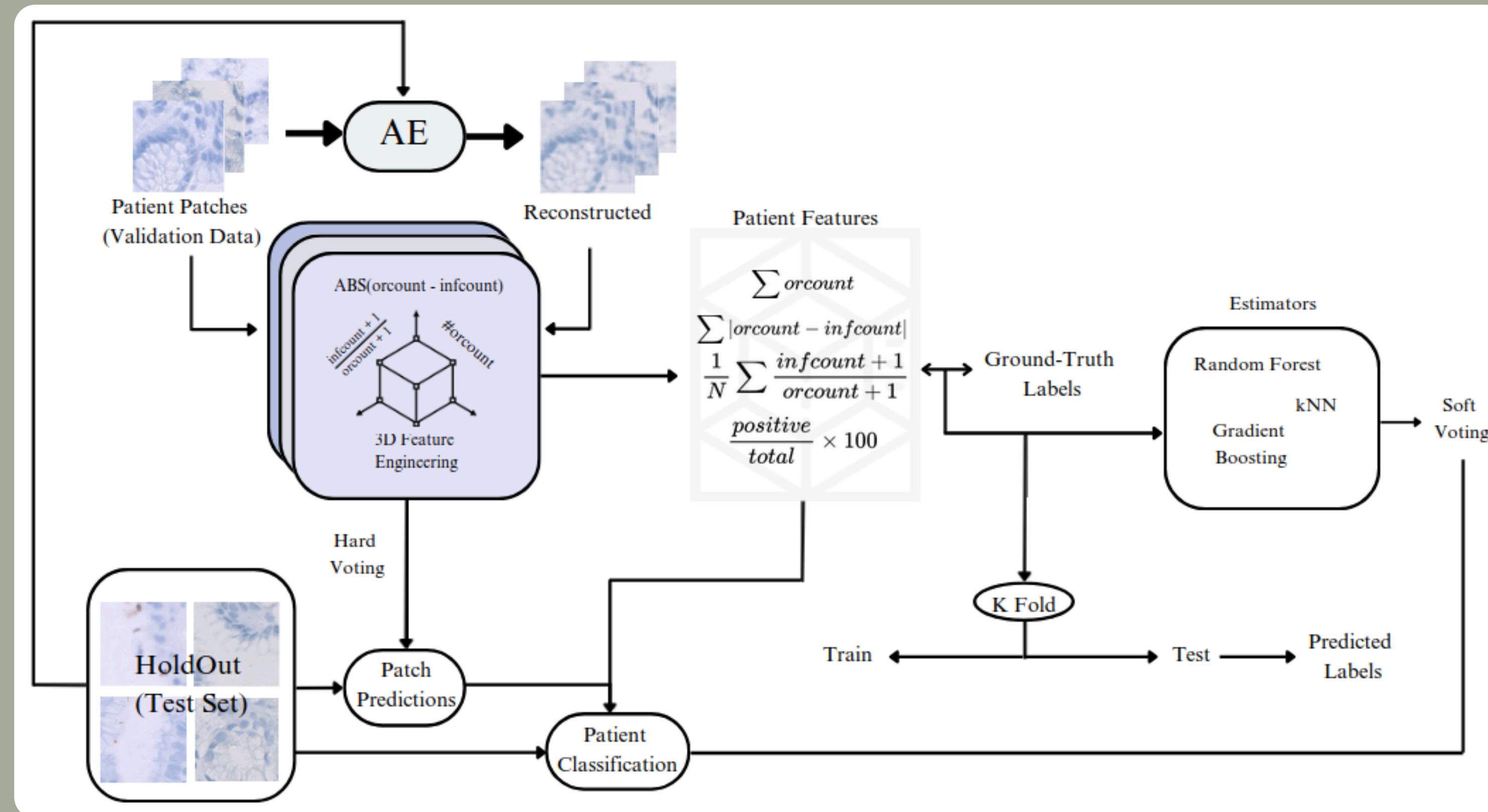
3) RELATIVE  
DIFFERENCE OF  
RED PIXELS WITH  
RECONSTRUCTED

# Cross-Validation

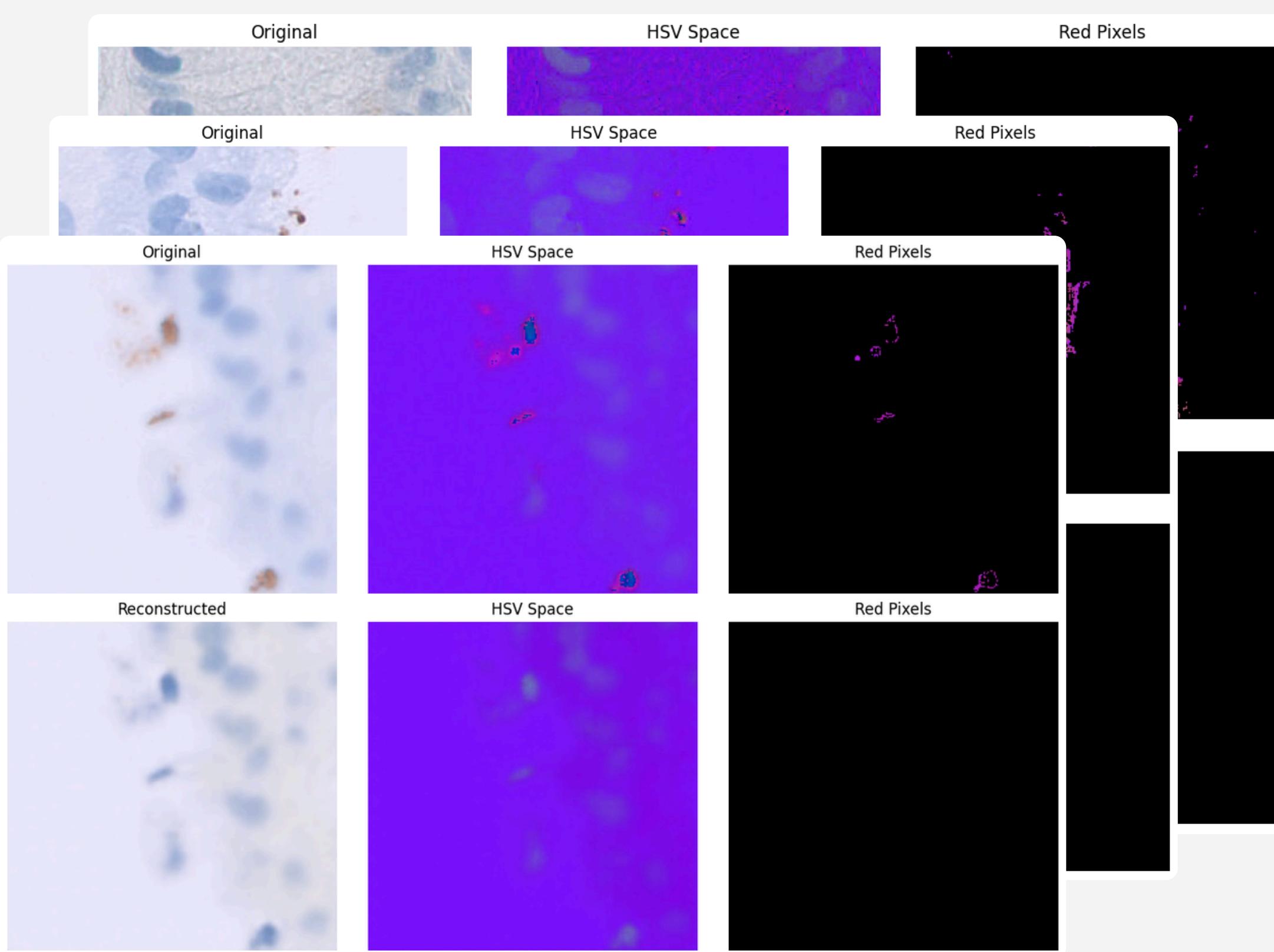


# Patient Diagnosis

# Pipeline



# Features



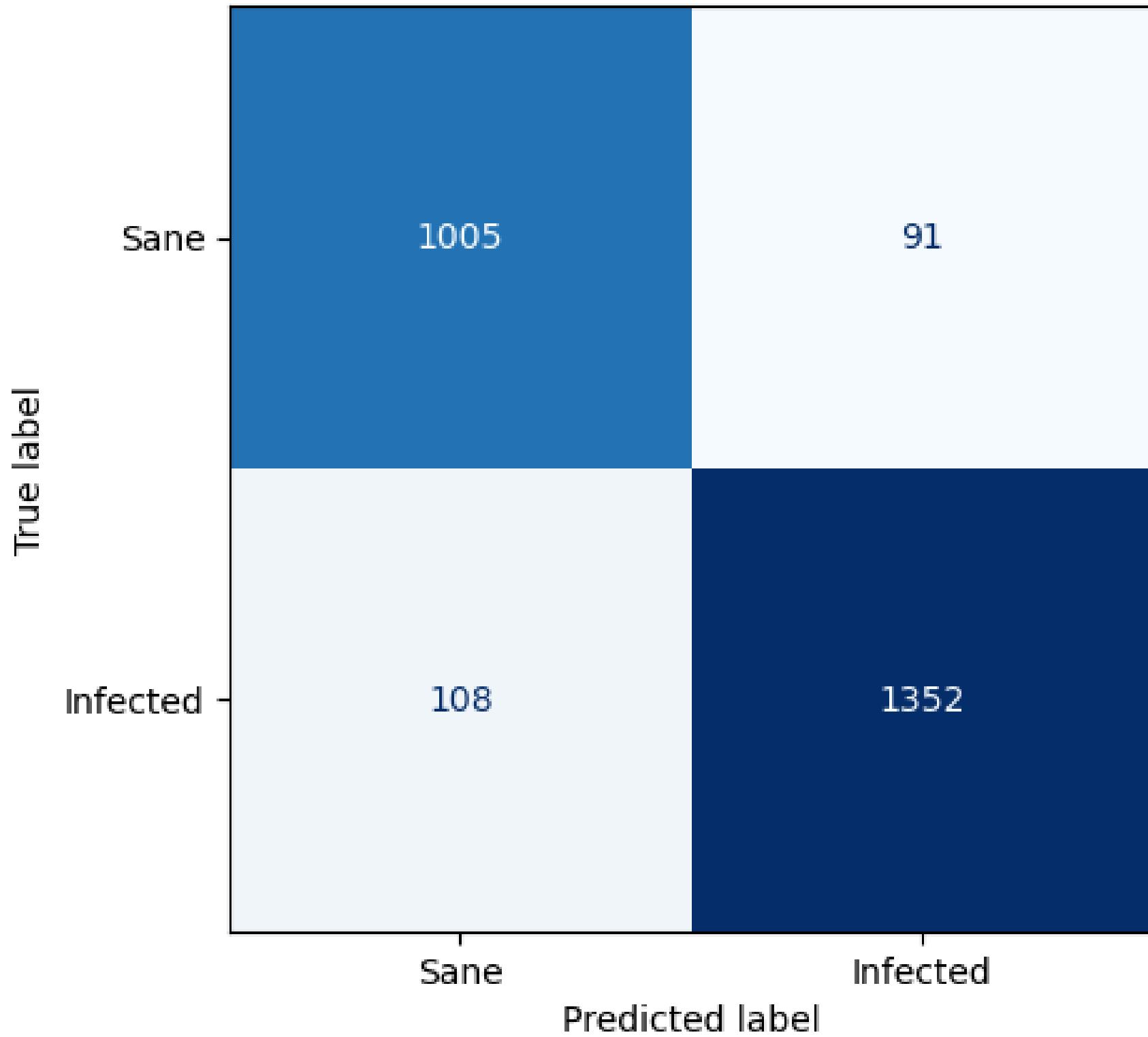
[...] N PATCHES

- 1) TOTAL NUMBER OF RED PIXELS
- 2) TOTAL ABSOLUTE DIFFERENCE OF RED PIXELS
- 3) MEAN RELATIVE DIFFERENCE OF RED PIXELS
- 4) PERCENTAGE OF POSITIVE PATCHES

# Results

# Patch Classification

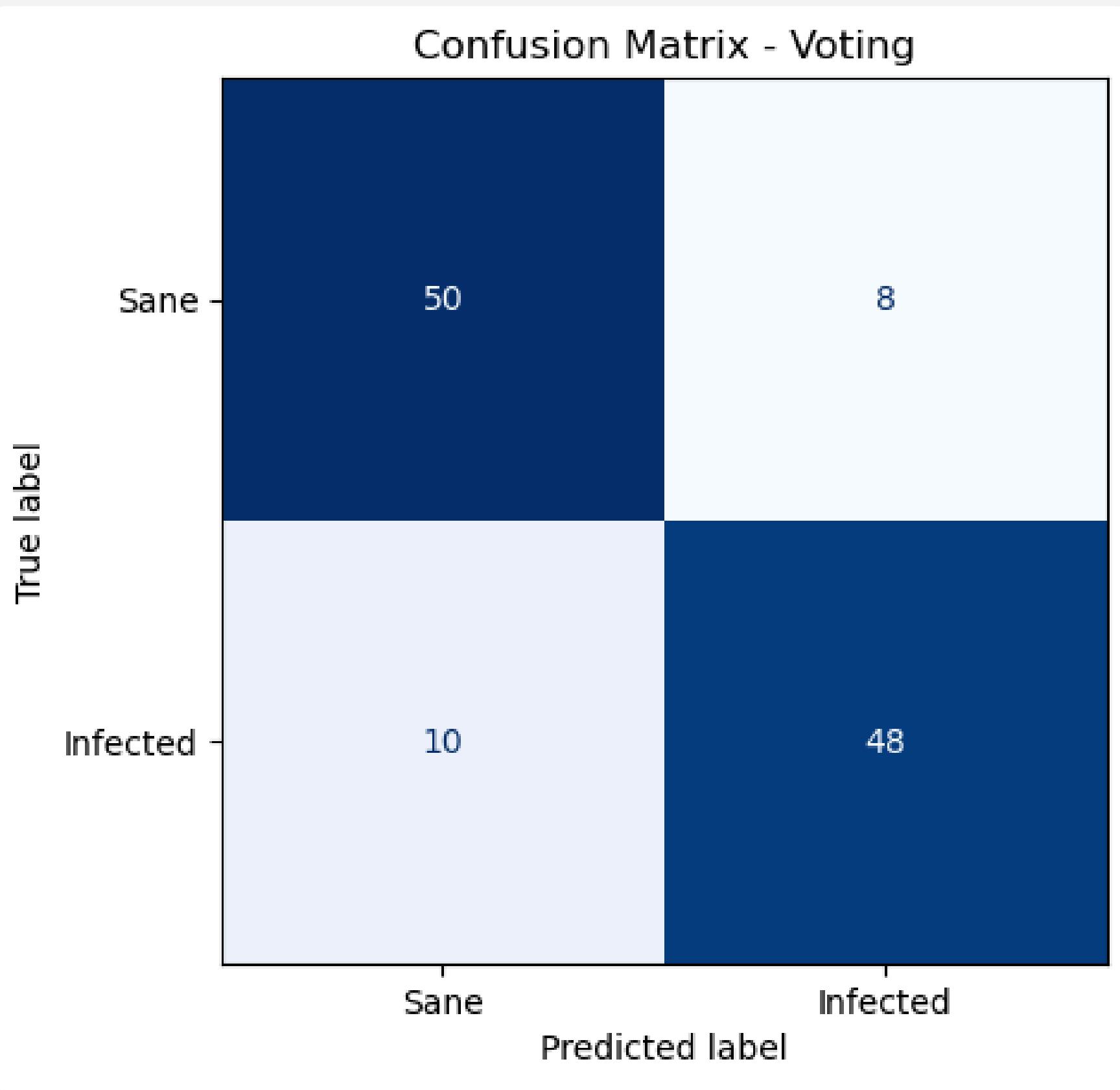
Confusion Matrix - Voting



PERFORMED OVER ALL  
LABELLED SET THROUGH  
CROSS-VALIDATION

	PRECISION	RECALL	F1 SCORE
SANE	90%	92%	91%
INFECTED	94%	93%	93%
ACCURACY	92%		

# Patient Diagnosis - Unseen data



PERFORMED OVER ALL TEST SET WITH THE PREVIOUSLY TRAINED CLASSIFIER

	PRECISION	RECALL	F1 SCORE
SANE	83%	86%	85%
INFECTED	86%	83%	84%
ACCURACY	84%		

# **Any questions?**