

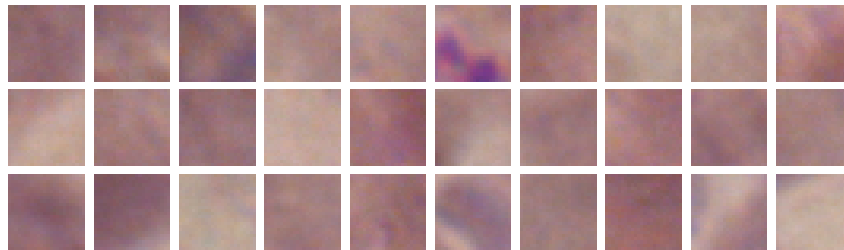
EXERCISE 5

PROF. DR. VÍCTOR UC CETINA

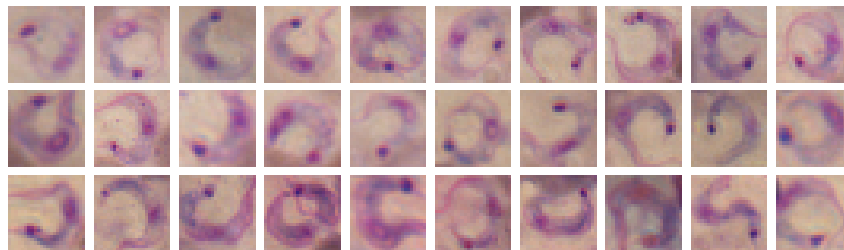
1. GAUSSIAN DISCRIMINANT ANALYSIS

- (1) Implement the Gaussian Discriminant Analysis model to create a binary classifier for Chagas parasites. There are 60 training examples available, 30 negatives (negatives.zip) and 30 positives (positives.zip). Choose at least 5 features that you consider useful.

Negative examples



Positive examples



- (2) Prepare a report containing your final model (including parameters) and the description of the features you used, plots, your analysis and conclusions.
- (3) Provide your code in the same document or as a link to your notebook in Google Colab (make sure to give sharing permissions to your notebook).

2. EXERCISE SUBMISSION

- Deadline June 17th, 2022.

3. STEPS TO FOLLOW

- (1) For each one of the 60 images obtain a feature vector. Example (R_min, G_min, B_min, R_avg, G_avg, B_avg). Now each image will be represented by its corresponding feature vector, for example:



→ (50, 65, 89, 124, 174, 164) (*Note: these numbers were invented*)

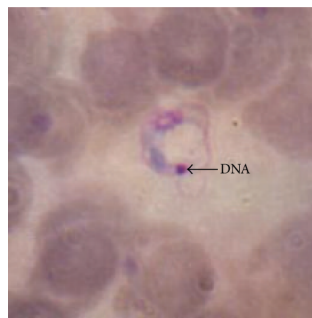
- (2) Estimate the parameters of your Gaussian discriminant classifier (Page 9 of slides): $\phi, \mu_0, \mu_1, \Sigma$.
- (3) Apply the Bayes rule to check how many of the 60 images are correctly classified (Page 5 of slides).

4. HINTS

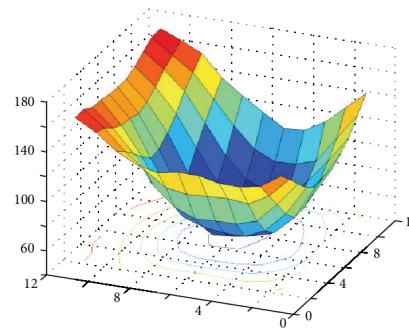
Some useful matlab/octave commands for this exercise:

- To load an image `n01.png` into variable `i`
`i = imread("n01.png")`
- To convert a matrix `i` of data type `uint8` to data type `double`
`x = double(i)`
- To display an image previously loaded into variable `i`
`imshow(i)`
- To compute the mean of the red-green-blue components of an image saved as a matrix of doubles `x` and size is `24 x 24 x 3`
`m = mean(x,3)`

5. VISUALIZING AN IMAGE AS A SURFACE



(a)



(b)