

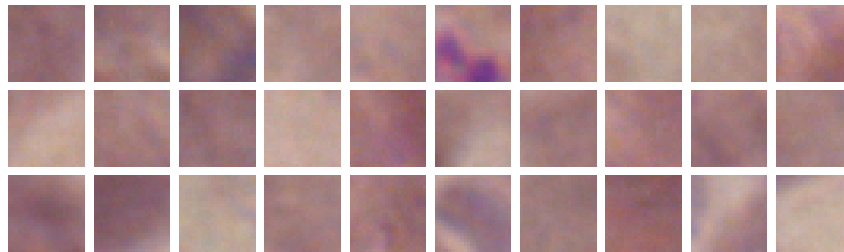
EXERCISE 3

PROF. DR. VÍCTOR UC CETINA

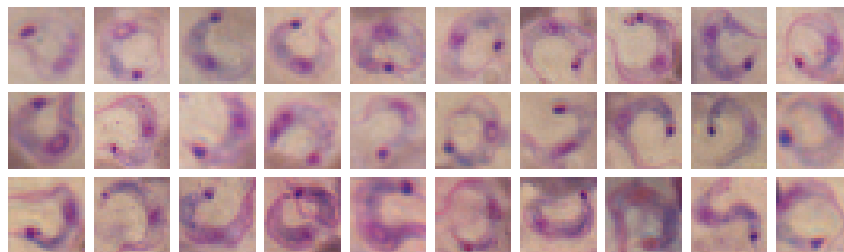
1. SUPPORT VECTOR MACHINES

- (1) Use support vector machines 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. EXERCISE SUBMISSION

- Deadline: May 13th, 2022.

3. STEPS TO FOLLOW

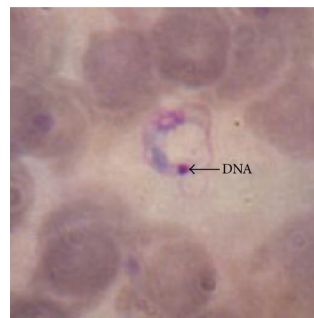
- (1) For each one of the 60 images obtain a feature vector. Example (R_min, G_min, B_min, R_avg, G_avg, B_avg). Now each image will be represented by its corresponding feature vector, for example:



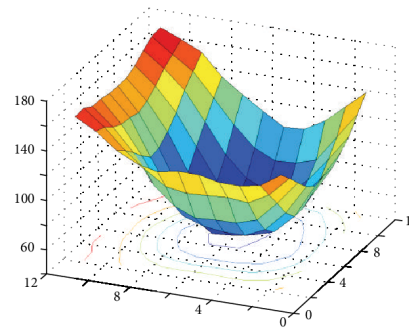
→ (50, 65, 89, 124, 174, 164) (*Note: these numbers were invented*)

- (2) Apply support vector machines to classify the Chagas parasite images using the feature vectors that you generated in exercise
- (3) You need to run experiments using the linear, polynomial (degrees $d = 1, 2, 3, 4$), sigmoid and radial basis kernels.
- (4) You can use the svm library from scikit-learn. Check the following website:
<https://scikit-learn.org/stable/modules/generated/sklearn.svm.SVC.html>.
- (5) To run experiments with your data, you need to find the optimal values for C and γ . Check the following website:
https://scikit-learn.org/stable/modules/generated/sklearn.model_selection.GridSearchCV.html.
- (6) Prepare a report containing 1) your final performances with each kernel; 2) descriptions of the features you used; 3) your conclusions.
- (7) Provide your code as a link to your notebook in Google Colab (make sure to give sharing permissions to your notebook). If you do not want to use Google Colab, please use jupyter notebooks and submit your code. Without code that can be easily run to verify your solution, it is difficult to assign you a score.

4. HINT: VISUALIZING AN IMAGE AS A SURFACE



(a)



(b)