ML : Projet 2021

Optical Character Recognition

26.04.2021

David Lavanchy/Maurizio Tognolini

Team creation

Planning End ML

Date	Tasks
26.04.2021	Team creation
03.05.2021	Kickoff project
10.05.2021	Project work + **Intro DeepLearning**
17.05.2021	Project work + Guest : G.Baudat - ML presentation
Pentecote	
31.05.2021	Project work
07.06.2021	Project work
14.06.2021	Presentation

Teams

- 10 teams of 2 peoples + 1 team of 3 peoples
- Subscription on Teams under canal «Projet\Team»
- One Responsible by team
  - Planning
  - Communication with professor

Group	Responsible (Nom1)	Collaborater (Nom 2)
1	Anderes Loïc	
2	Bommottet Joan	
3	Chattot Stéphane	
4	Courvoisier Daniel	
5	Del Rossi Stefan	
6	Deriaz Sébastien	
7	Mielecka Maja	
8	Volet Quentin	
9	Macherel Rémy	
10	Lieberherr Tristan	
11	Nobs Raymond	

Presentation Time

- Oral presentation by team (25 minutes)
- Individual evaluation
- Subscription on Teams under canal «Projet\Presentation»

Heures passages (30 minutes)	Group
13h	
13h30	
14h	
14h30	
15h	
15h30	
16h	
16h30	
17h	
17h30	
18h	

Evaluation

- Presentation by team (25 minutes)
  - Presentation : 10 min
  - Teacher test set : 5 min
  - Questions : 10 minutes
- Individual evaluation based on question&answer
- Bonus 1pt for the best project
- Cheat and copy between team is sanctioned to 0pts for project

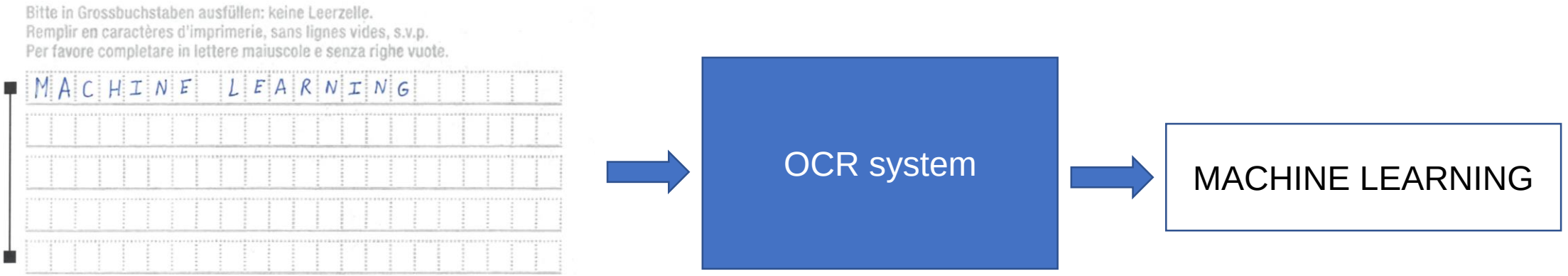
Evaluation Project	**Ratio**
Presentation	30%
Questions	30%
Teacher test set	10%
Code quality	30%
Total	100%

Evaluation ML	**Max Points**
Coursera finished	6pts
Project	3pts
Best Project	1pt
Total	**10pts**

Kickoff

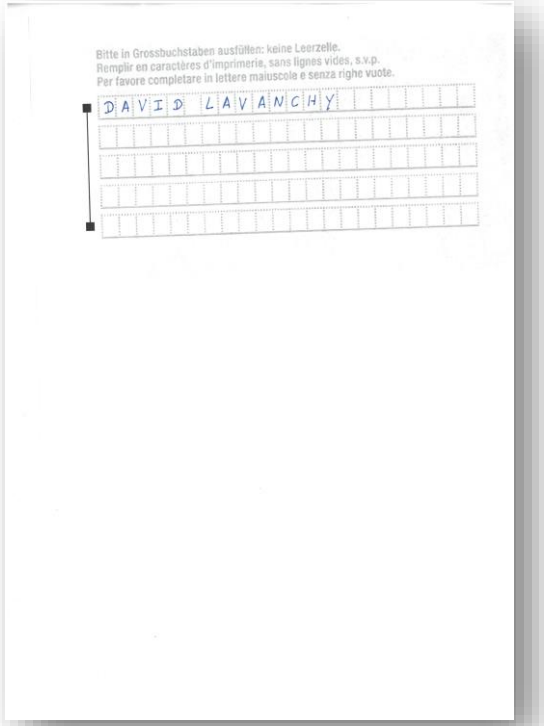
Project Goals

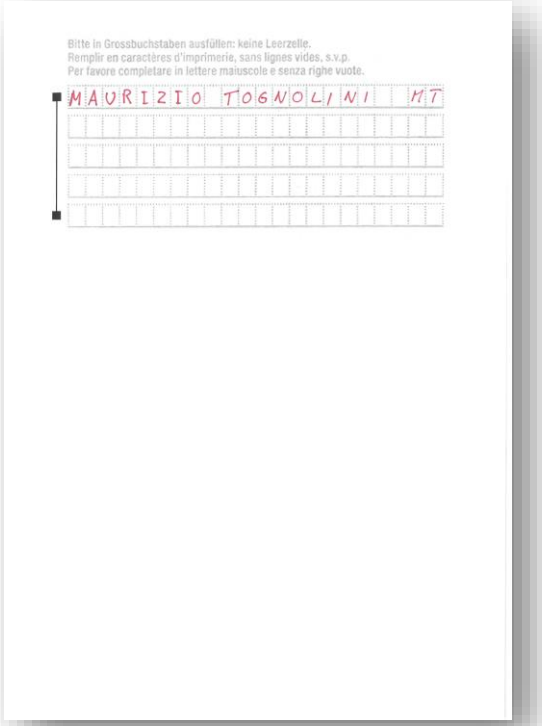
- Create an OCR classification system that can automatically recognize the letters on a sticker from the swiss post
- The recognition system should be fully designed by each team

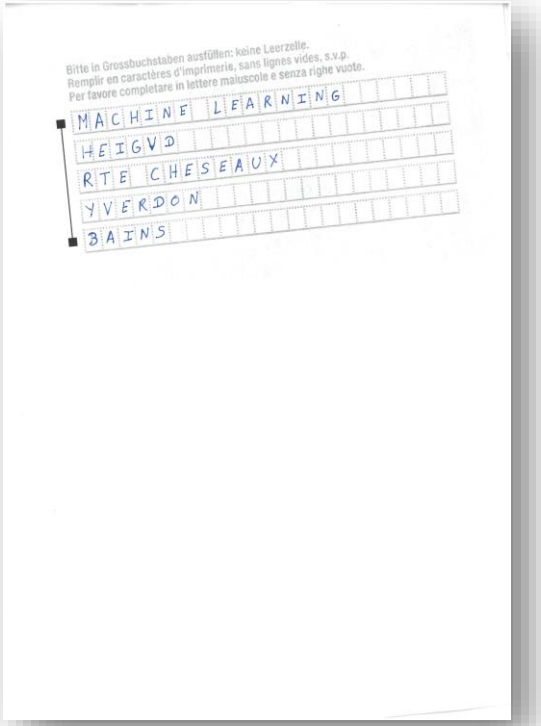


Input Images

- JPEG – 2480x3507
- Writting in different colors
- No special characters. Only (A-Z) in uppercase
- Scan with small angle (<10°) and offset error (<2cm)
- One sticker per image
- Two markers to detect angle and text position







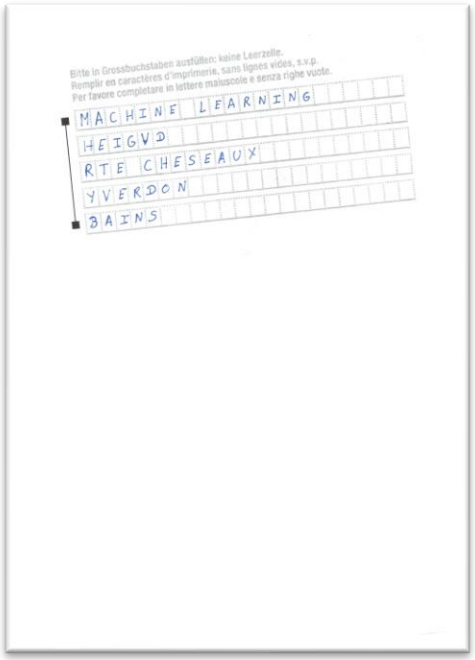
Delivery

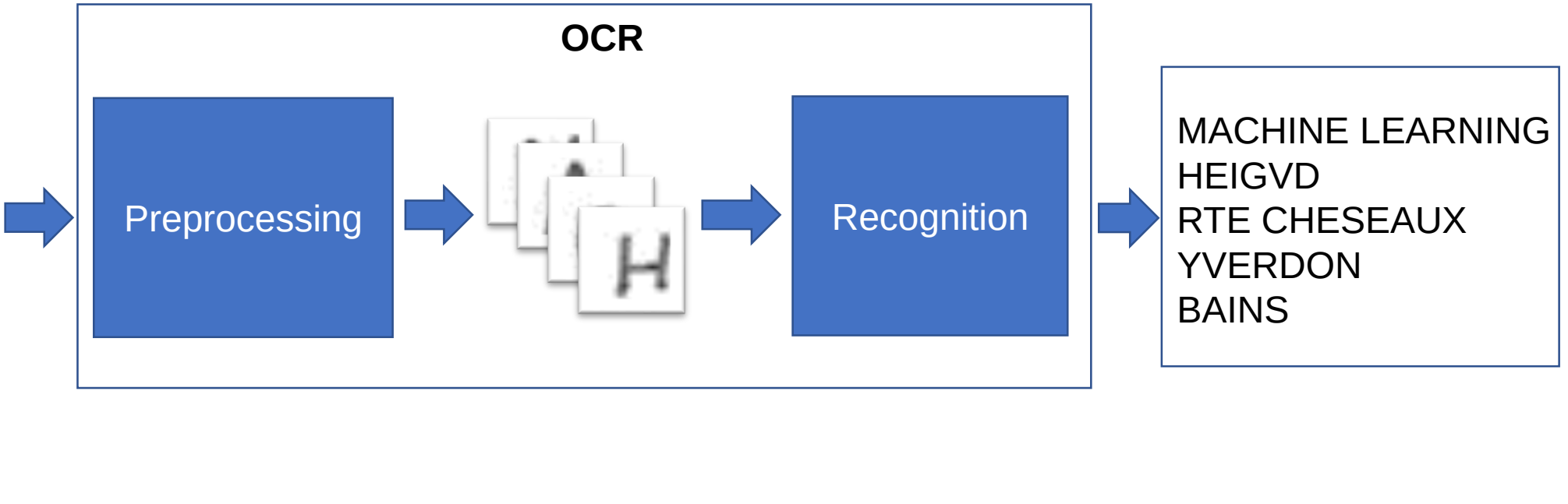
- **Presentation by team to show :**
  - Data analysis
  - Model comparison (Classification performance, size of the model, computation time for learning and test)
  - Performance on “DataSet” and “Teacher TestSet”

- **Teacher test set:**
  - New images provided during presentation to classify in live

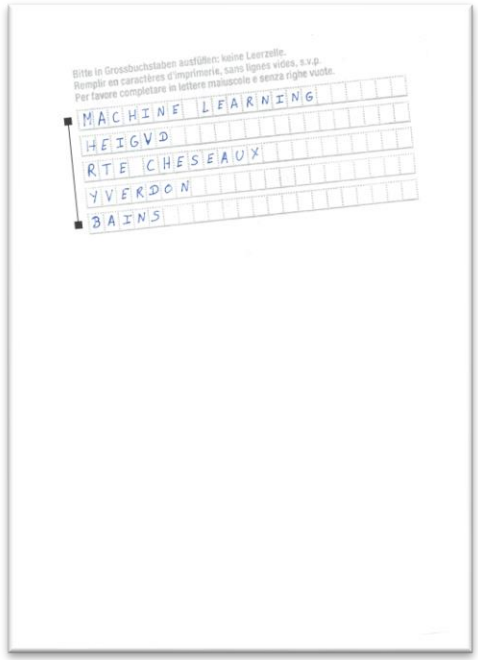
- **Delivery:**
  - Support presentation (.ppt or .pdf)
  - Code (.m)
  - Data set

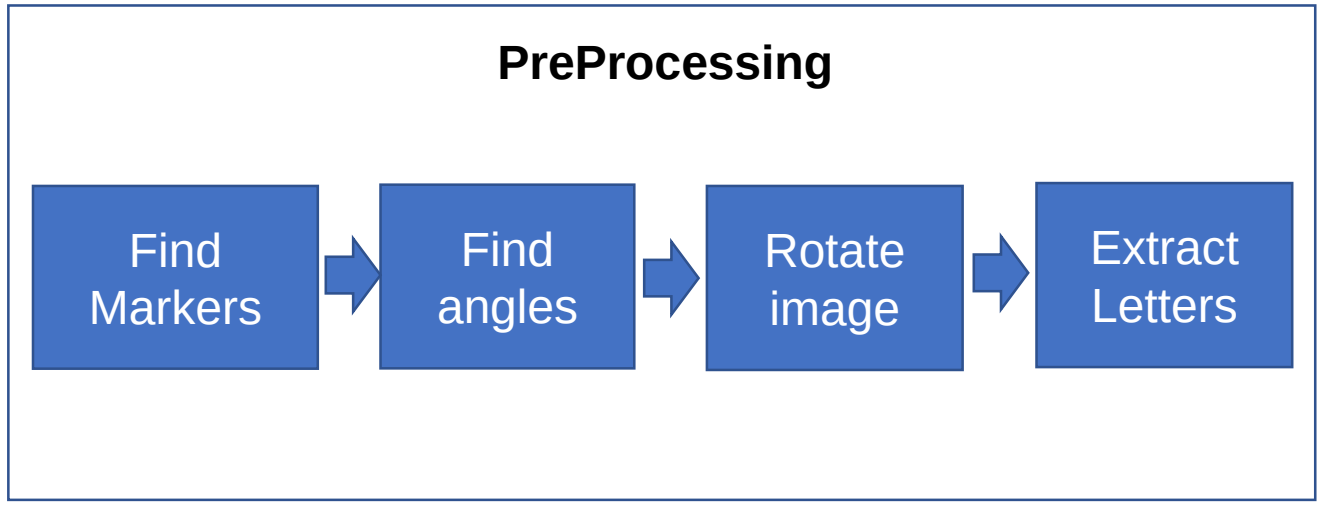
Pipeline


Bitte in Grossbuchstaben ausfüllen: keine Leerzelle.
Remplir en caractères d'imprimerie, sans lignes vides, s.v.p.
Per favore completare in lettere maiuscole e senza righe vuote.
MACHINE LEARNING
HEIGVD
RTE CHESEAUX
YVERDON
BAINS

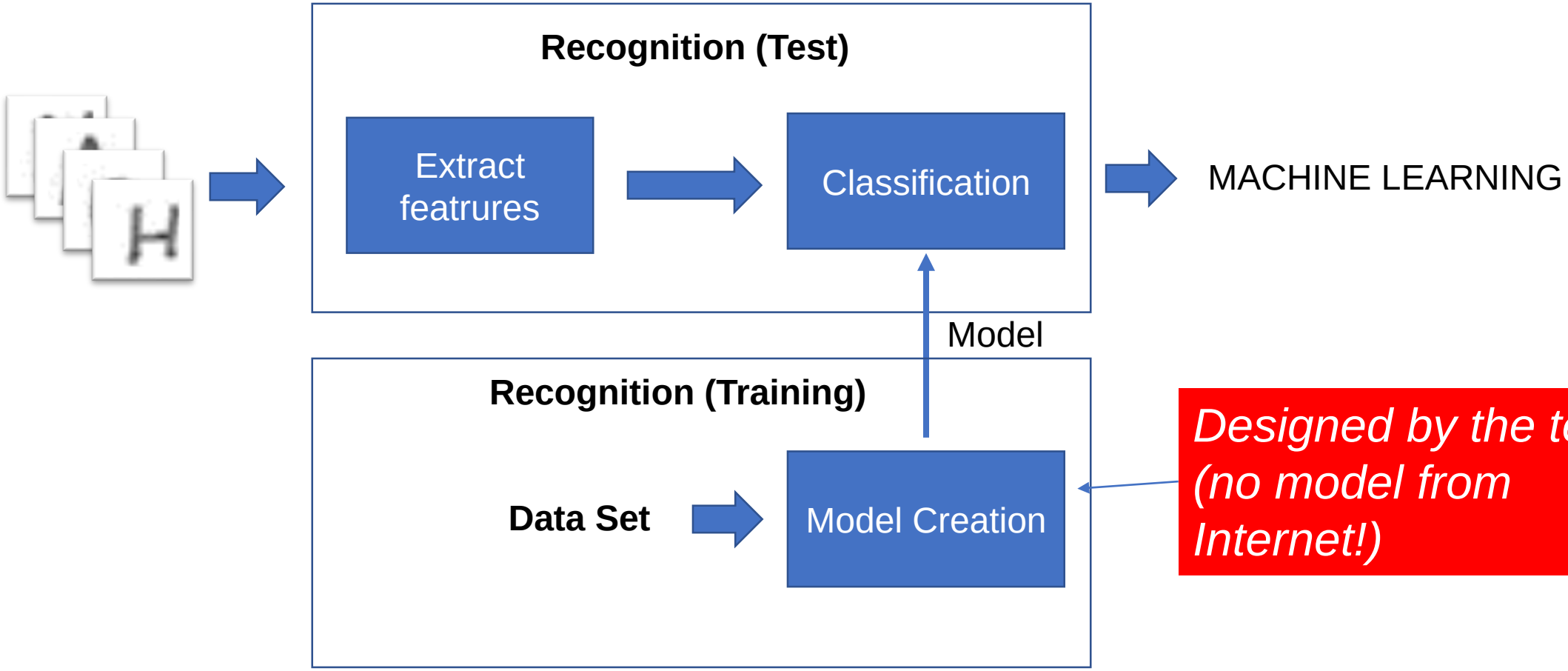

OCR
Preprocessing
Recognition
MACHINE LEARNING
HEIGVD
RTE CHESEAUX
YVERDON
BAINS

PreProcessing





Recognition

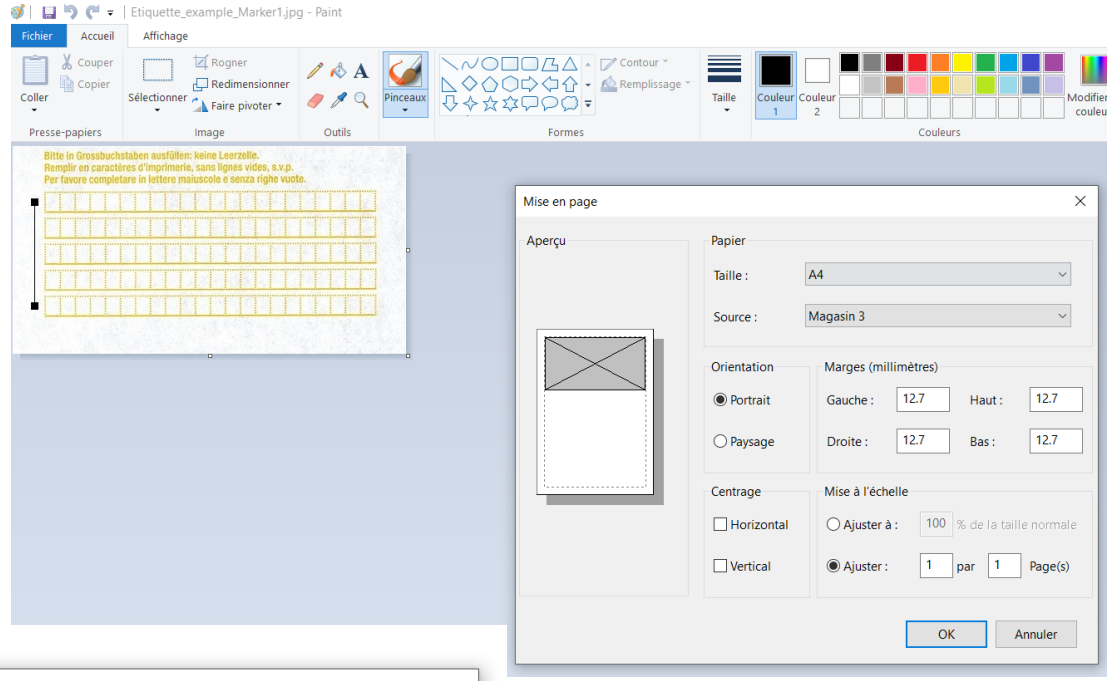


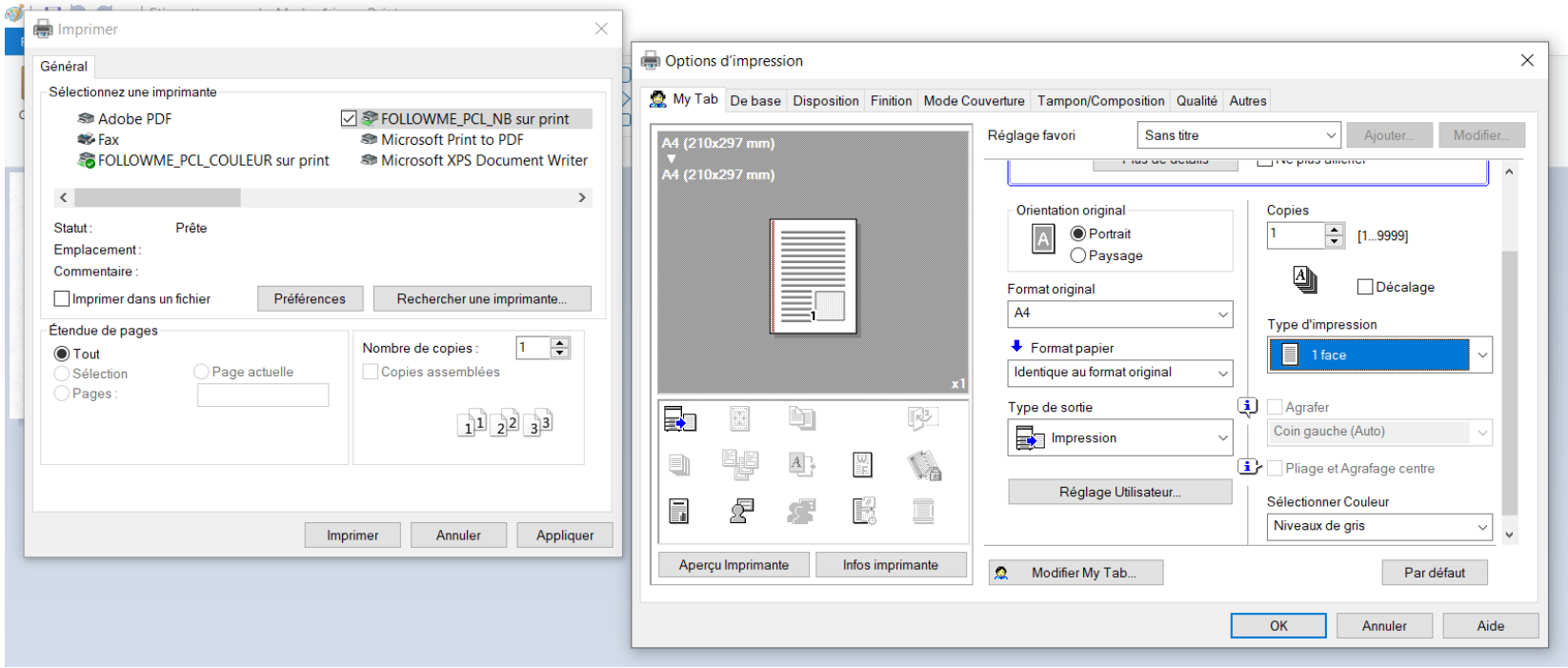
Useful Matlab functions

Matlab functions	Description
im = imread(filename)	Read image
imR = im[:,:,1]	Select the color plan Red
SE = strel('square',20) im = imclose(im,SE)	Remove every black connected points smaller than 20 pixels x 20 pixels
SE = strel('square',3) im = imdilate(im,SE)	Make white line bigger by one pixel
SE = strel('square',3) im = imerode(im,SE)	Make black line bigger by one pixel
bw = im < 100	Binarize image. Every pixel smaller than 100 will be white
figure; imshow(im)	Display image on a figure
regionprops(bw,'centroid')	Provide centroid of every white connected points
regionprops(bw,'area')	Provide area of every white connected points
im = imrotate(im,alpha)	Rotate image by alpha
imCrop = im(r1:r2,c1:c2)	Crop image from row 1 to row 2 and from column 1 to column 2
im = imresize(im,[rows,cols])	Rescale image to a new number of rows and columns
imwrite(im, 'output\im.bmp')	Write image in the output directory

Print Sticker settings

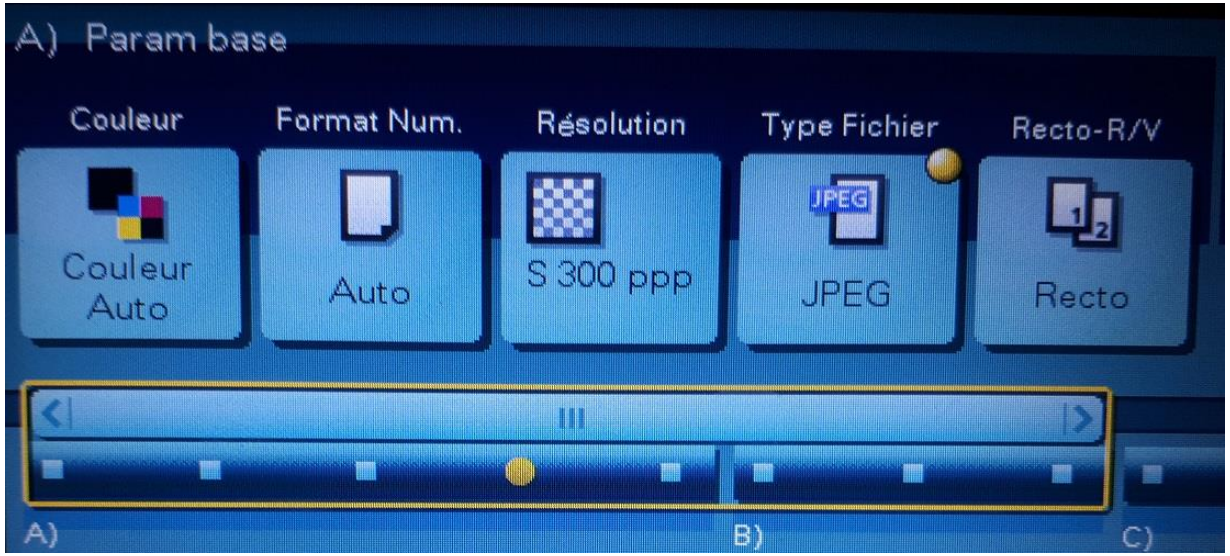
- Heig-vd Printer (close to C33)
- A4 – Portrait – Niveau de gris





Scan Sticker settings

- Heig-vd Printer (close to C33)
- S 300 ppp
- JPEG
- 1 sticker/Jpeg



Project planning

- Every weeks, we will have a call between Professors and individual Team to follow the progress and answers questions

Date	Tasks
26.04.2021	Team creation
03.05.2021	Kickoff + Start to create data set
10.05.2021	Pre-Processing
17.05.2021	Features Extraction and Data analysis
Pentecote	
31.05.2021	Model creation and test
07.06.2021	Model creation and test + prepare presentation
14.06.2021	Presentation

Collaborative for DataSet creation

- Raw images should be put on the server:
\\eistore0.einet.ad.eivd.ch\public\MachLearn\Projet_OCR\RawImages\

- Each team should write a subset of letters and share with others

Group	Letters
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	