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**PROGRAMA EN MATLAB**

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| % Llistar imatges d'una carpeta  files = dir('\*.jpg');    % == == tasca1 == ==  % trainging  for n = 1:150  % Llegir una imatge.  n = n+1050;  im\_color\_train = (imread(strcat('in00',num2str(n),'.jpg')));  % Convertir la imatge en escala de gris.  im\_grey\_train = rgb2gray(im\_color\_train);  imwrite(im\_grey\_train,strcat('grey\_train',num2str(n),'.jpg'))  end  % test  for n = 151:300  n = n+1050;  im\_color\_test = (imread(strcat('in00',num2str(n),'.jpg')));  % Convertir la imatge en escala de gris.  im\_grey\_test = rgb2gray(im\_color\_test);  imwrite(im\_grey\_test,strcat('grey\_test',num2str(n),'.jpg'))  end    % == == tasca2 == ==  % MEDIA  im\_train = (imread(strcat('in001051.jpg')));  im\_grey\_train = rgb2gray(im\_train);  im\_grey\_mean = uint32(im\_grey\_train);    for n = 1:149  % Llegir una imatge.  n = n+1051;  im\_train = (imread(strcat('in00',num2str(n),'.jpg')));  % Convertir la imatge en escala de gris.  im\_grey\_train = rgb2gray(im\_train);  im\_grey\_mean = im\_grey\_mean + uint32(im\_grey\_train);  end    im\_grey\_mean = uint8(im\_grey\_mean/150);  imwrite(im\_grey\_mean,strcat('grey\_test\_mean.jpg'));    % DESVIACIÓN  im\_train = (imread(strcat('in001051.jpg')));  im\_grey\_train = rgb2gray(im\_train);  im\_grey\_des = (uint32(im\_grey\_train - im\_grey\_mean)).^2;    for n = 1:149  % Llegir una imatge.  n = n+1051;  im\_train = (imread(strcat('in00',num2str(n),'.jpg')));  % Convertir la imatge en escala de gris.  im\_grey\_train = rgb2gray(im\_train);  im\_grey\_des = im\_grey\_des + (uint32(im\_grey\_train - im\_grey\_mean)).^2;  end  im\_grey\_des = double(im\_grey\_des);  im\_grey\_des = uint8(sqrt(im\_grey\_des/150));  imwrite(im\_grey\_des,strcat('grey\_test\_des.jpg')); | % == == tasca3 == ==  for n = 151:300  n = n+1050;  im\_train = imread(strcat('grey\_test',num2str(n),'.jpg'));  im\_seg = abs(im\_train - im\_grey\_mean);  im\_seg = im\_seg > 25;  imwrite(im\_seg,strcat('seg\_test',num2str(n),'.jpg'));  end  % == == tasca4 == ==  a=1.5;  b=5;  o=im\_grey\_mean;  [sz1,sz2]= size(o);    for i = 1:sz1  for j = 1:sz2  o(i,j)= a\*(o(i,j)+b);  end  end  for n = 151:300  n = n+1050;  im\_train = imread(strcat('seg\_test',num2str(n),'.jpg'));  res=im\_train-o;  res = res>0;  imwrite(res,strcat('frame',num2str(n),'.jpg'));  end    % == == tasca5 == ==  movie = avifile('videofinal.avi', 'fps', 17, 'compression', 'none');  for n=151:300  n = n+1050;  [aux,map]=imread(strcat('frame',num2str(n),'.jpg'));  imshow(aux);  frame=getframe;  movie = addframe(movie, frame);  end  movie = close(movie); |

**PROGRAMA EN PYTHON**

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| import os, numpy, PIL, cv2  from PIL import Image  #=============== tasca1 =========  #train  print "Executant Tasca 1"  w,h=Image.open("in00"+str(1050)+".jpg").size #320-240  for x in range(1050, 1200):  nombre = "in00" + str(x)+".jpg"  black=numpy.zeros((h,w),numpy.float)  black=numpy.array(Image.open(nombre).convert ("L"),dtype=numpy.float)  black=numpy.array(numpy.round(black),dtype=numpy.uint8)  out=Image.fromarray(black,mode="L")  out.save("train"+str(x)+".png")  # test  for x in range(1201, 1350):  nombre = "in00" + str(x)+".jpg"  nameimg = nombre  imag = Image.open (nameimg,mode='r')  imag = imag.convert ("L")  imag.save("test"+str(x)+".png")  #=============== tasca2 =========  # media  print "Tasca 1 Executada"  print "Executant Tasca 2"  #number of images  N=150  # Assuming all images are the same size, get dimensions of first image  w,h=Image.open("train"+str(1050)+".png").size #320-240  # Create a numpy array of floats to store the average (assume RGB images)  mean=numpy.zeros((h,w),numpy.float)  # Build up average pixel intensities, casting each image as an array of floats  for x in range(1050, 1200):  nombre = "train"+str(x)+".png"  immean=numpy.array(Image.open(nombre),dtype=numpy.float)  mean=mean+immean  mean=mean/N  # Round values in array and cast as 8-bit integer  mean2=numpy.array(numpy.round(mean),dtype=numpy.uint8)  # Generate, save and preview final image  out=Image.fromarray(mean2,mode="L")  out.save("mean.png")  w,h=Image.open("mean.png").size #320-2404  #=============== tasca2 =========  # desviacion  # Create a numpy array of floats to store the average (assume RGB images)  std=numpy.zeros((h,w),numpy.float)  # Build up average pixel intensities, casting each image as an array of floats  for x in range(1050, 1200):  nombre = "train"+str(x)+".png"  imstd=numpy.array(Image.open(nombre),dtype=numpy.float)  std = std + numpy.power((imstd - mean),2)  std = std/N  std= numpy.sqrt(std)  # Round values in array and cast as 8-bit integer  std=numpy.array(numpy.round(std),dtype=numpy.uint8)  # Generate, save and preview final image  out=Image.fromarray(std,mode="L")  out.save("deviation.png") | #=============== tasca3 =========  print "Tasca 2 Executada"  print "Executant Tasca 3"  #number of images  N=150  # Assuming all images are the same size, get dimensions of first image  w,h=Image.open("train" + str(1050)+".png").size  im\_mean=numpy.array(Image.open("mean.png"),dtype=numpy.float)  seg=numpy.zeros((h,w),numpy.float)  for x in range(1050, 1200):  seg=numpy.zeros((h,w),numpy.float)  nombre = "test" + str(x)+".png"  im\_seg=numpy.array(Image.open(nombre),dtype=numpy.float)    seg = abs(im\_seg - im\_mean)  seg = seg > 50  seg = numpy.array(seg, dtype=numpy.uint8)  out = Image.fromarray(seg, mode = '1')  out.save("seg\_test"+str(x)+".png")  print "Tasca 3 Executada"  print "Executant Tasca 4"  #=============== tasca4 =========  a0=1  b=5  w,h=Image.open("mean.png").size  im\_mean=numpy.array(Image.open("mean.png"),dtype=numpy.float)  o = numpy.zeros((h,w),numpy.float)  for i in range(0, h):  for j in range(0,w):  o[i,j]= a0\*(im\_mean[i,j]+b);  for x in range(1050, 1200):  res = numpy.zeros((h,w),numpy.float)  im\_test=numpy.array(Image.open("train" + str(x) + ".png"),  dtype=numpy.float)  res = abs(im\_test - o)  res = res>30  res = numpy.array(res, dtype=numpy.uint8)  out = Image.fromarray(res, mode = '1')  out.save("frame"+str(x)+".png")  print "Tasca 4 Executada"  print "Executant Tasca 5"  #=============== tasca5 =========  isColor = 1  fps = 25 # or 30, frames per second  nombre = "frame" + str(1050)+".png"  img = cv2.imread(nombre)  frameH, frameW = img.shape[:2]  writer = cv2.VideoWriter("video.avi",-1, fps, (frameW,frameH),isColor)  #Writing the video file:  nFrames = 70; #number of frames  for x in range(1050, 1200):  nombre = "seg\_test" + str(x)+".png"  img = cv2.imread(nombre) #specify filename and the extension  # add the frame to the video  writer.write(img)  writer.release()  print "Tasca 5 Executada" |