

Project Summary

Changes

First thing I noticed is that in the case of a crash the crash data is not added to the memory so I changed the code to also store crash data.

```

if playerHasHitBaddie(playerRect, baddies):
    terminal = True
    r_t = -1 #initially -1
    memory.append((s_t, action_index, r_t, s_t1, terminal)) #in case of crash add data to memory
    if (build_memory and t<=OBSERVE):
        file.write("%s|%s|%s|%s|%s\n" %(print_array(s_t),action_index,r_t,print_array(s_t1),terminal))
    if score > topScore:
        g = open("data/save.dat", 'w')
        g.write(str(score))
        g.close()
        topScore = score
    break
else:
    terminal = False

    r_t = 1 #initially 0

memory.append((s_t, action_index, r_t, s_t1, terminal))

```

Second I wrote functions to write the data obtained during the observation phase to a text file and also to read it and parse it to the memory. So if small mistakes happen the whole observation phase doesn't have to be repeated which decrease testing time.

I also tried to increase speed further by transforming the rgb image to an gray scale image and to cut the border of the image because the green and gray parts are not used anyways.

```

x_t = pygame.surfarray.array3d(pygame.display.get_surface())
x_t = x_t.reshape((600, 800, 3))
x_t = x_t[:,114:510,:] #cut border
x_t = cv2.resize(x_t, (80, 80))
x_t=(x_t[:, :,0]+x_t[:, :,1]+x_t[:, :,2])/3 #convert to gray scale
x_t = np.reshape(x_t,(80,80,1))
for i in xrange(0,80): #convert values to either 0 or 255
    for j in xrange(0,80):
        if x_t[i,j,0]>0:
            x_t[i,j,0]=255

```

Later one I tried to increase accuracy by using the skimage library (don't know if this is actually better

```

x_t = pygame.surfarray.array3d(pygame.display.get_surface())
x_t = x_t.reshape((600, 800, 3))
x_t = skimage.color.rgb2gray(x_t)
x_t = skimage.transform.resize(x_t,(80,80))
x_t = skimage.exposure.rescale_intensity(x_t,out_range=(0,255))

```

I modified the game further to only enable straight movement (left,right,up,down) not combinations of those.

Further I tried different rewards which included using the score as reward when not crashing and 0 when crashing. Finally I settled for -1 in case of crash and 1 in case of normal driving which seemed to work just fine.

General thoughts

Also I tried to use more layers but it was getting slow quickly and I was not able to test it since I don't have a PC which can handle such loads without taking forever.