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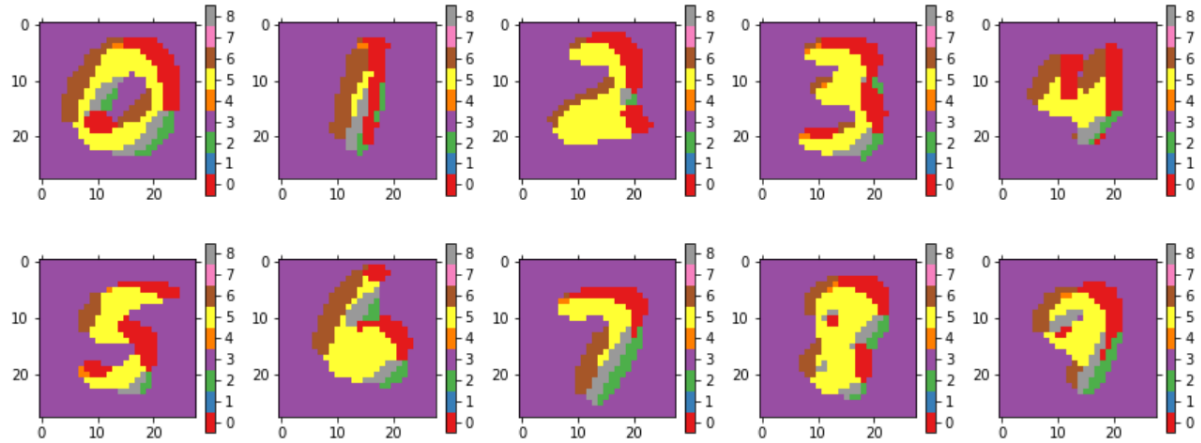
Massimo De Santis
Florian Feuillade

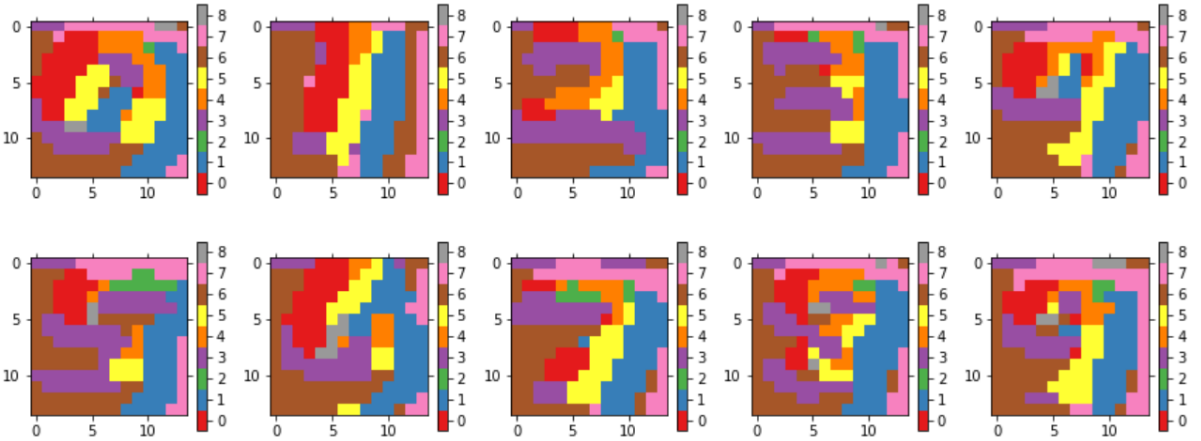
ex 1

results:

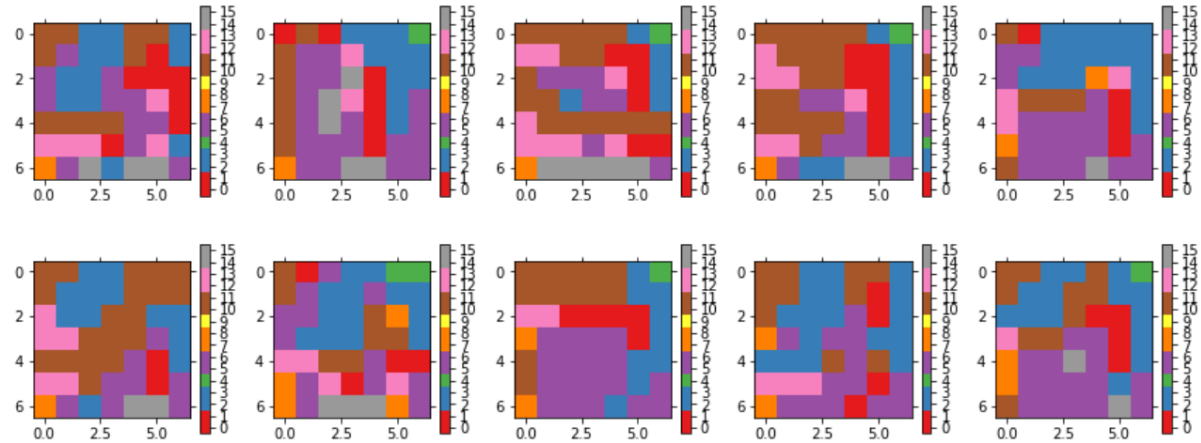
Layer 1 :



Layer 2 :



Layer 3 :



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The filters activations demonstrate that each filters extract some information in the image, for example the filter 5 detects the internal surface, the filter 6 detects external left vertical lines, the filter 3 detects the background.

In the consecutive layers, for example layer 2 the same principle applies but not necessarily the same filters, as we can see the filter 3 now detects the horizontal lines.

But further we go from layer 1 and more difficult it is to interpret the activations of the filters as features maps are based on previous ones, the extracted features become more and more abstract and high level.

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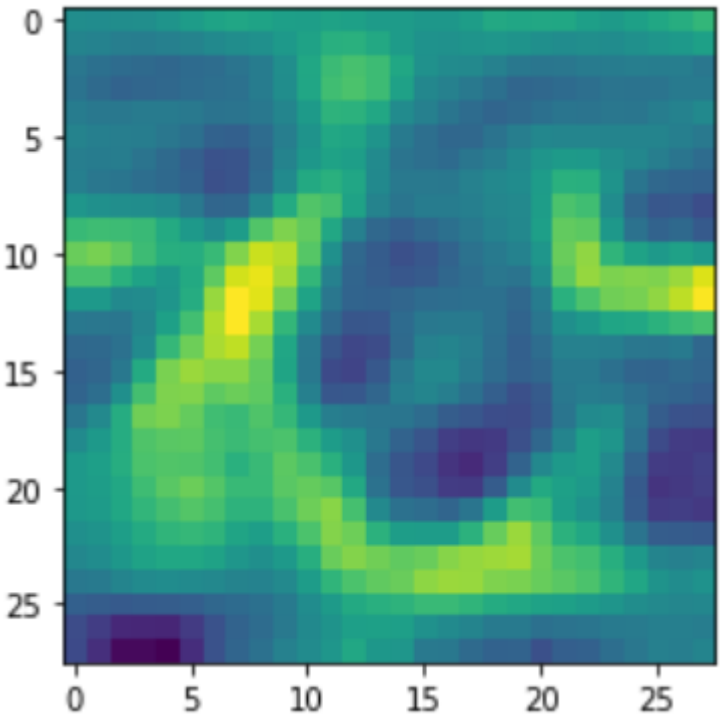
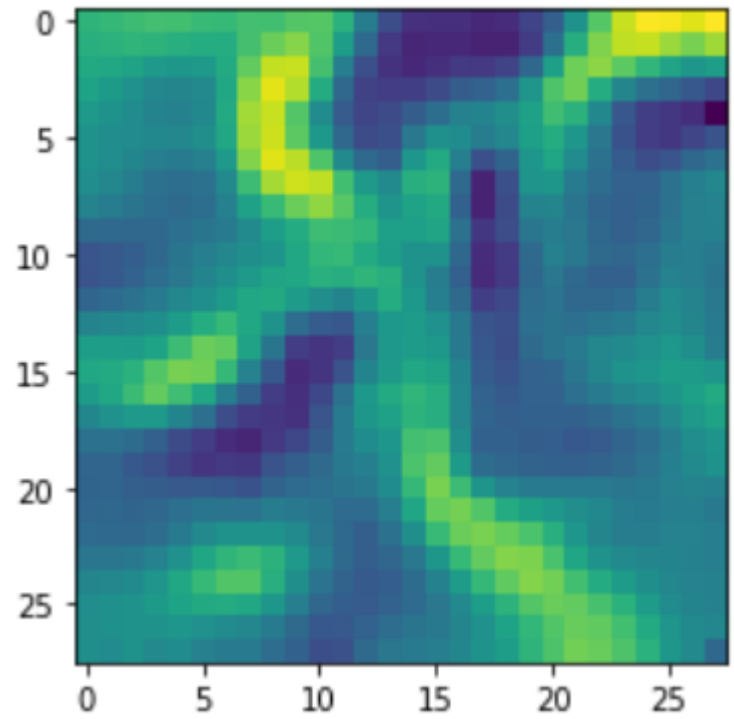
Ex 2

most realistic images were obtained with tv_weight of 2 or 4.



0



1

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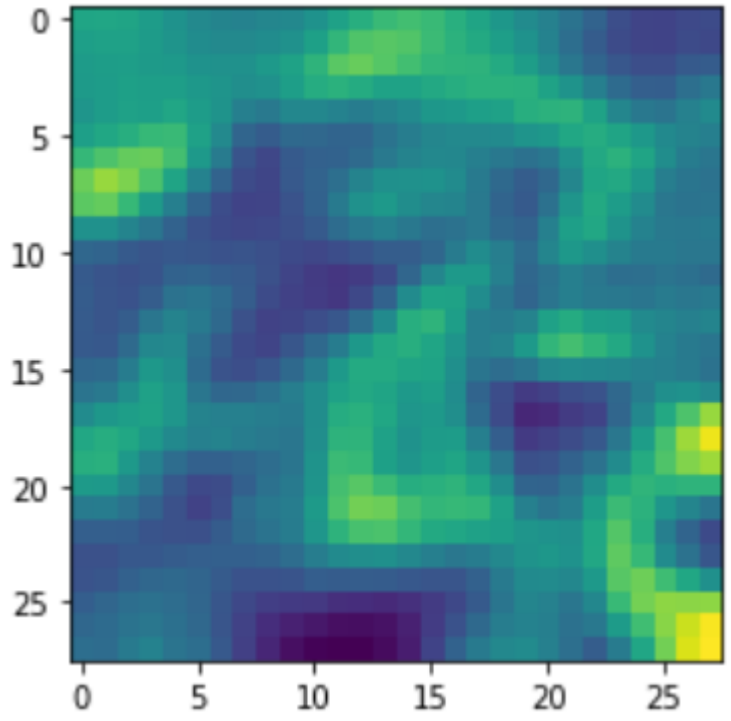
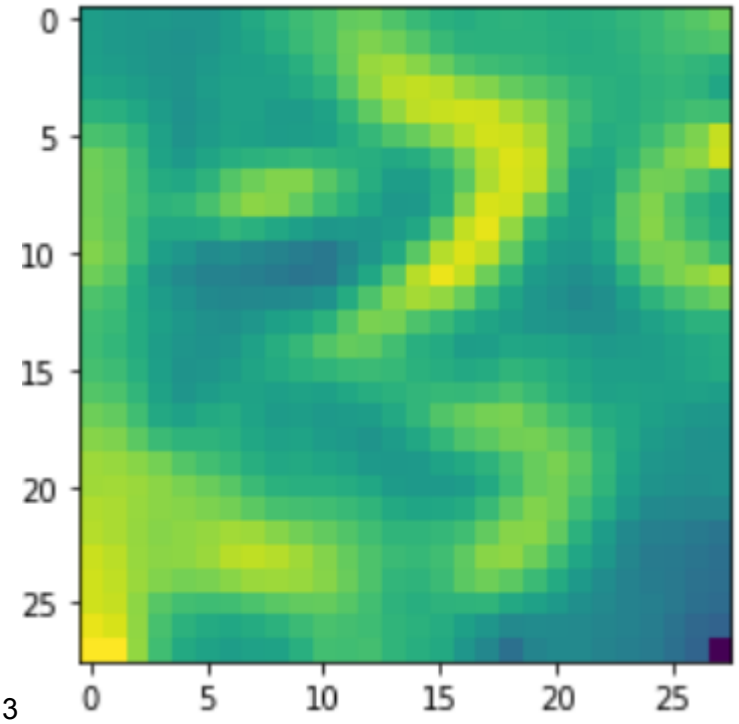


2



3

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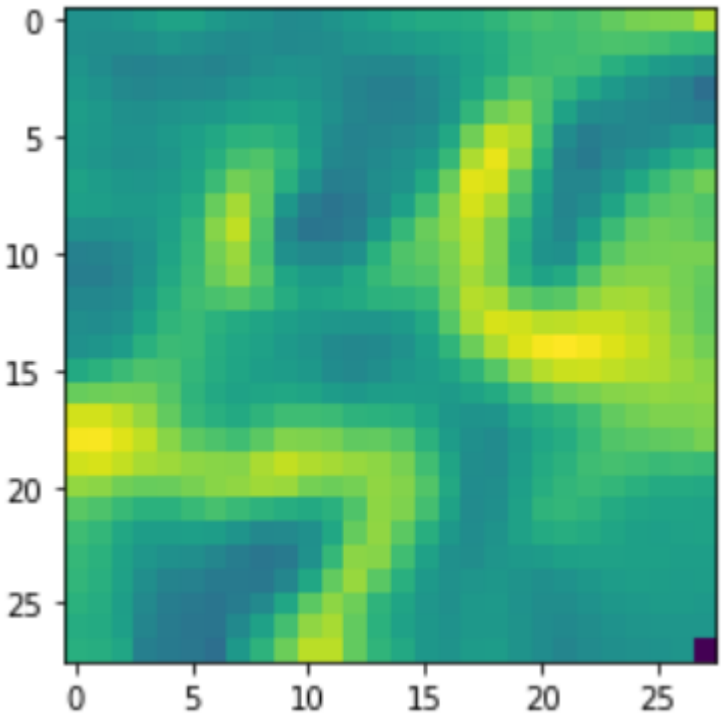
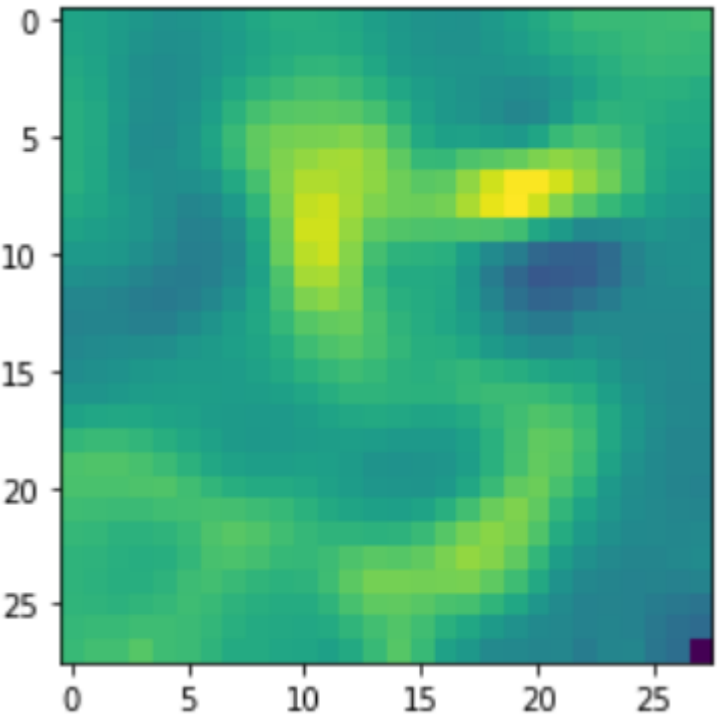


4



5

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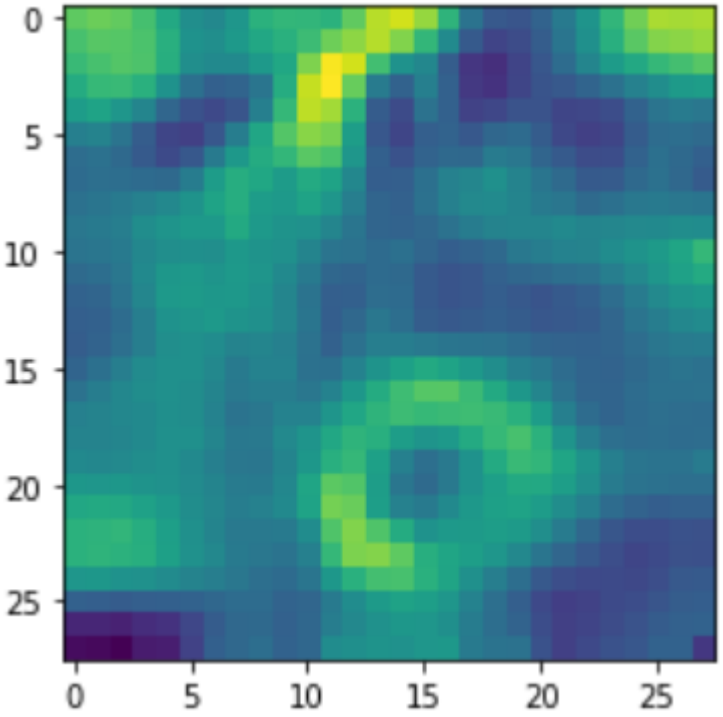
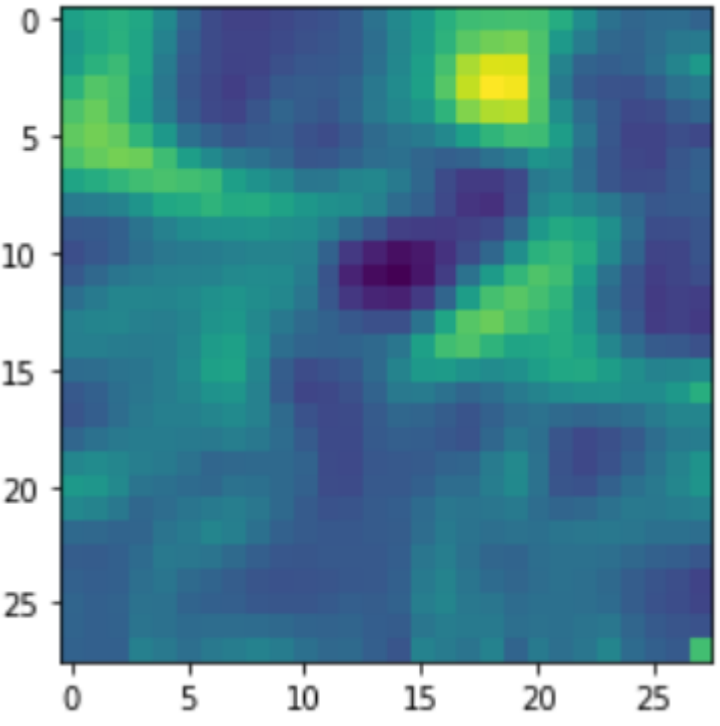


6



7

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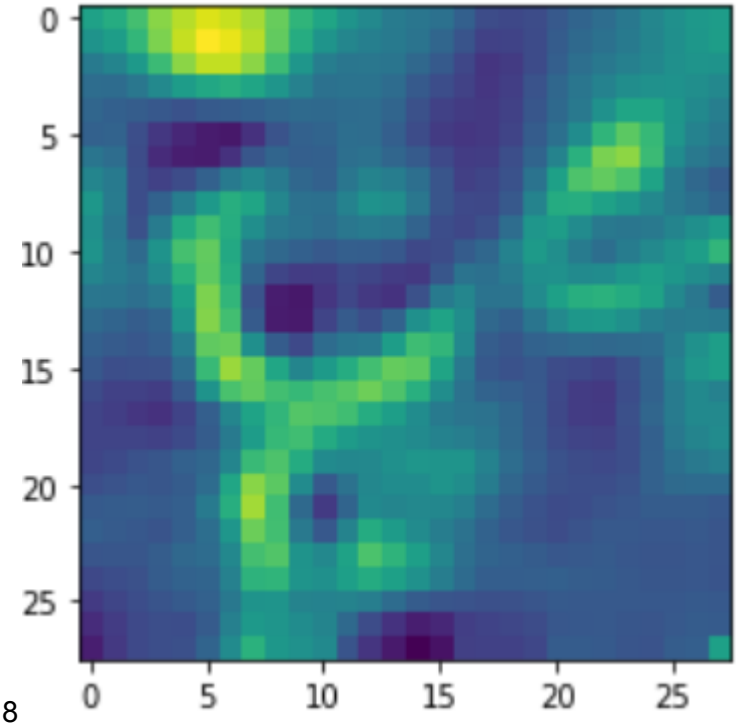
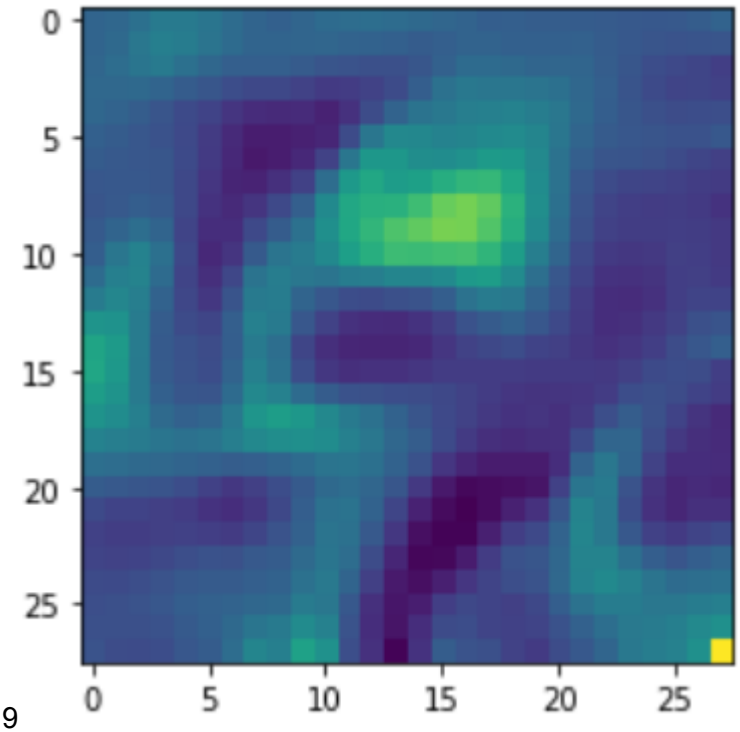


8



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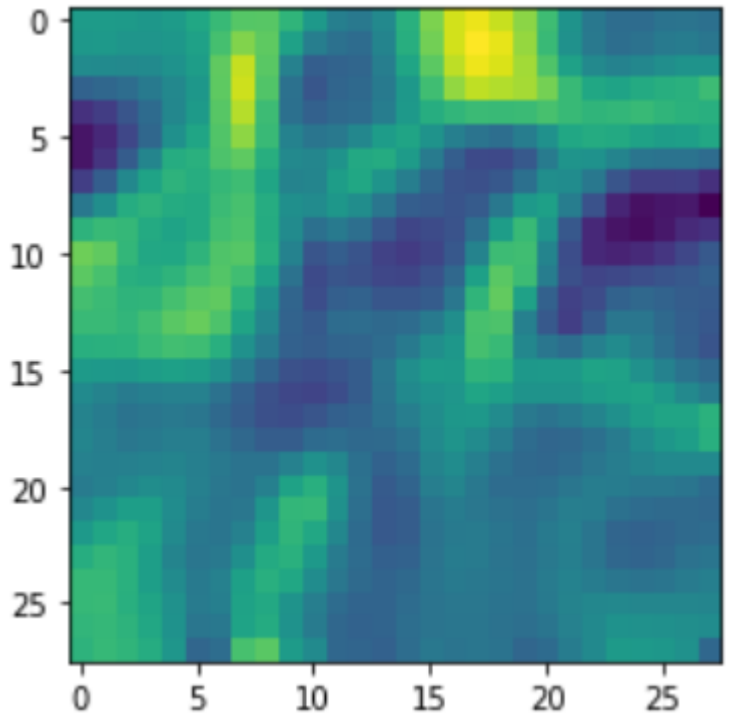
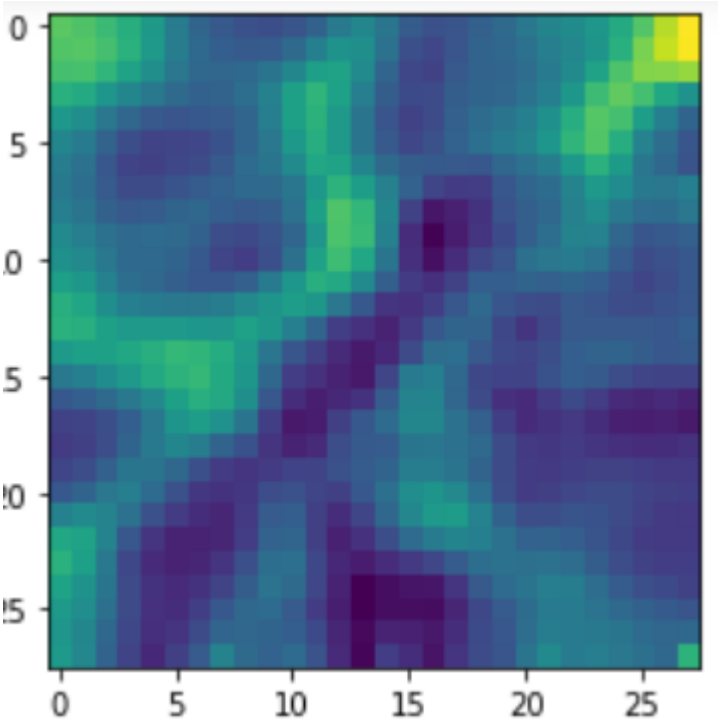
1 and 7:



1 and 8:



This technique can be used to see what part of the input data are used to determine the class. It also shows which parts are considered as similar or are used to decide the class between two.

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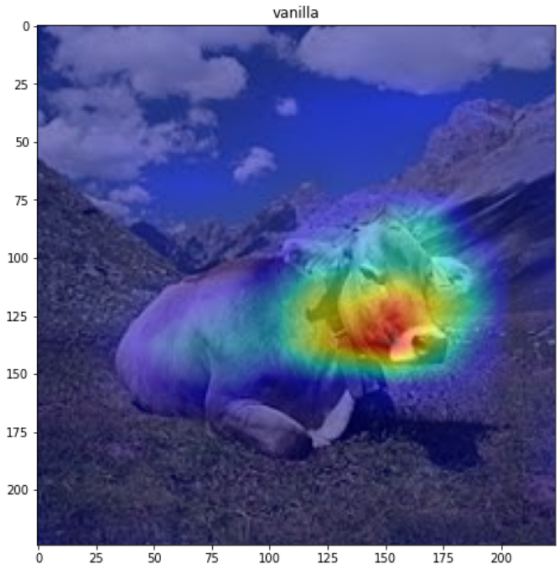
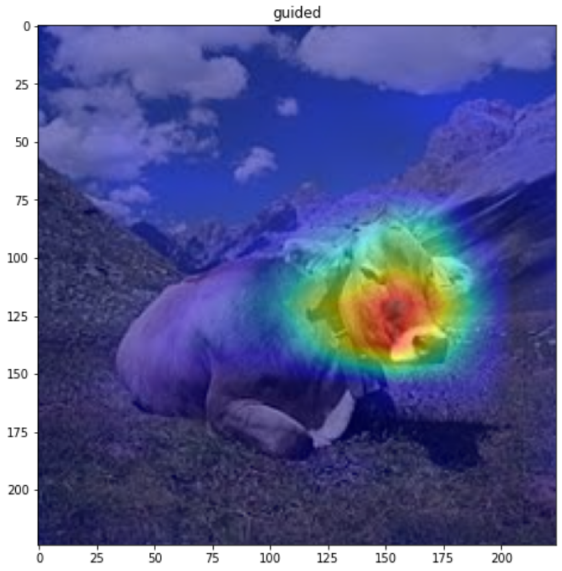
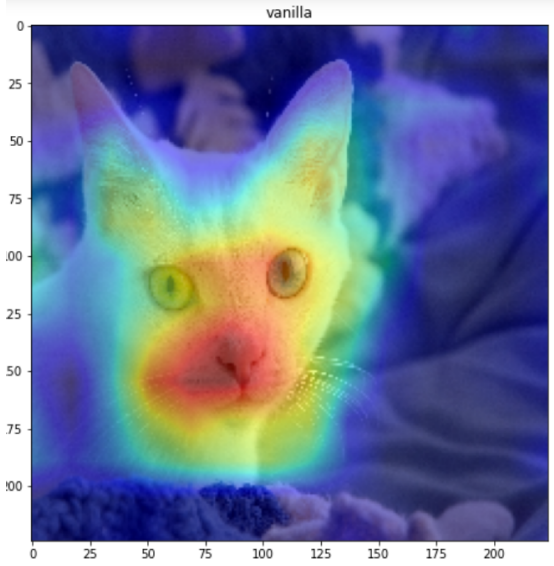
Ex 3

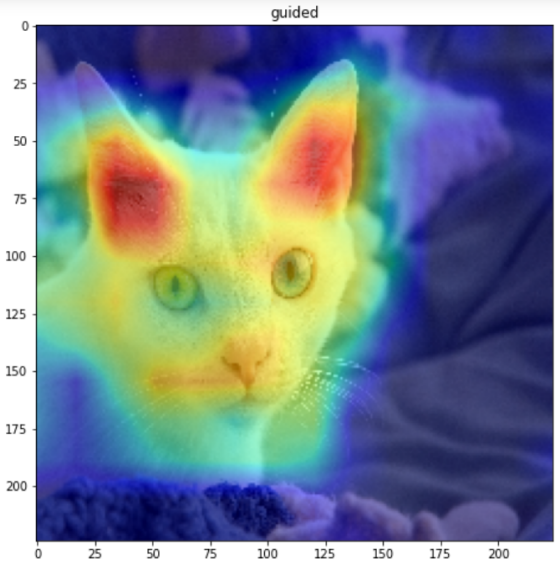
Ox :





Egyptian cat :





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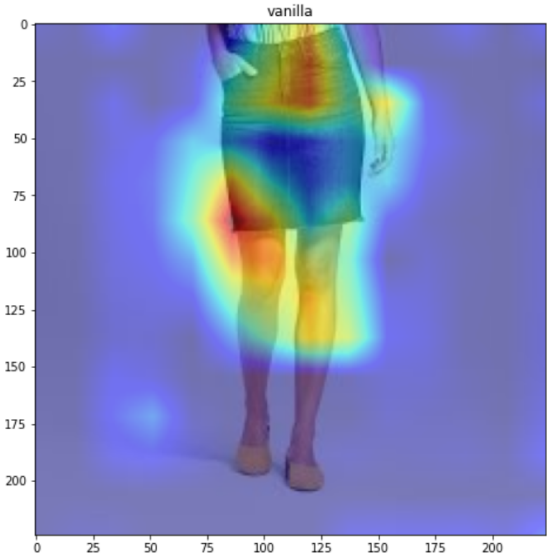
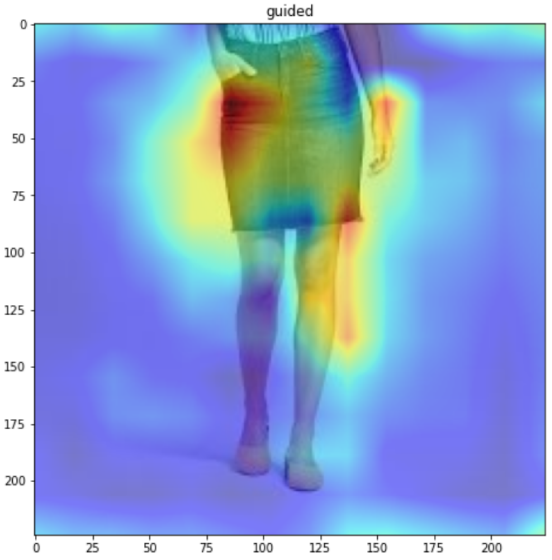
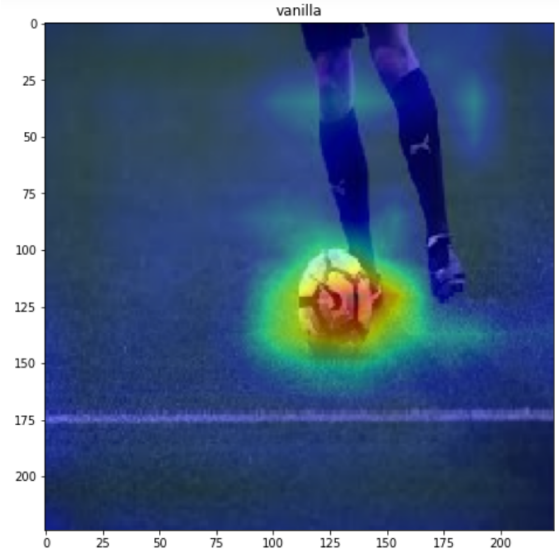
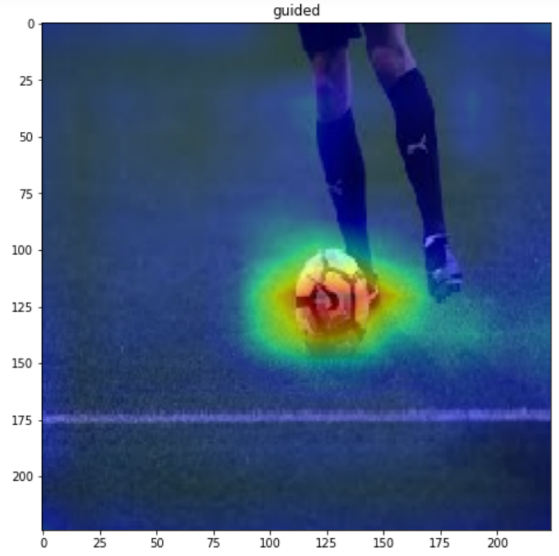
Miniskirt :





Soccer ball :





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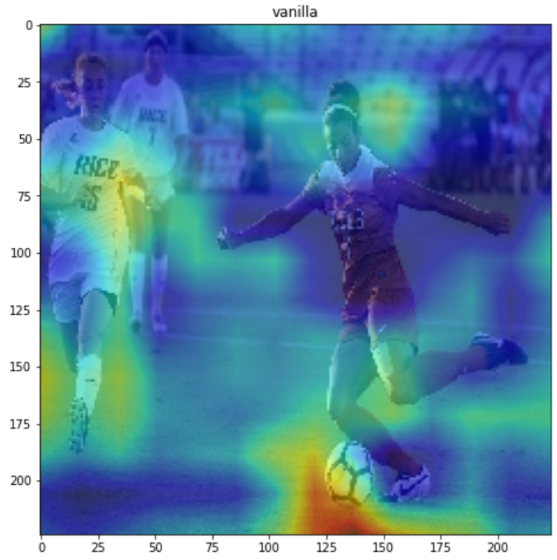
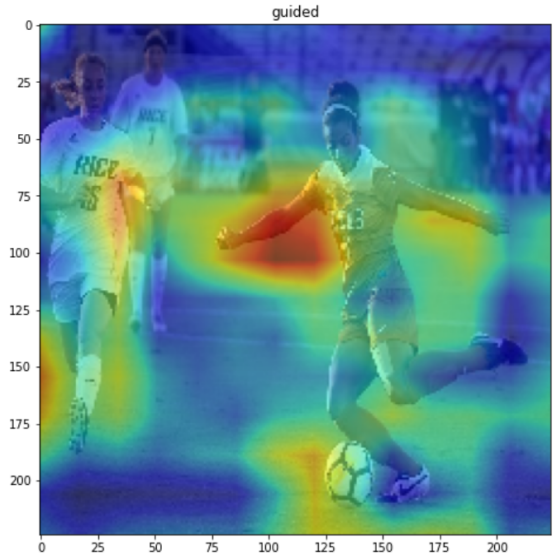
Soccer ball :





1. Do the maps reflect the class of the pictures?

   For the miniskirt, maps highlight the border of the skirt and the legs of the woman, probably to estimate the length of the cloth. But strangely, the hand is also used for the detection.

   For the second soccer image, maps highlight some strange parts that are not characteristics of soccer. The vanilla looks more accurate in finding the ball and the guided one is very focused on the arm of the player.

   However, for the other image, the maps fit well with the class of the pictures.

2. Are there images in which the activation maps highlight zones that do not belong to the object? Which ones?

   soccer3 highlights the arm of the player which isn't part of the soccer ball.

   miniskirt uses the arm of the woman.

3. Look at the provided images and observe the images that were used to train the classifier on these specific classes (i.e., soccer ball). Do you think that all images have been labelled appropriately ? explain.

   Some images are too similar. Mostly while in game. Doesn't really make sense as only a few pixels are different and on some we don't even see the ball. They seem to have put a lot of images designed to trick the model to improve him.

4. Hypothesize about the behavior of the network observed in 3.

   The network is probably searching for something at the foreground of the image that is the thing to detect. When there is a lot of information and no clear object at the

foreground like in the last image, it is harder for him to define the object it has to labelize.