IN4307: Medical Visualization Final Project on “Object Detection in Medical Images”

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Abstract

1. Introduction

Motivation and context of your work, question what you are trying to solve, contribution (what did you actually do).

* HOG, MOTIVATION (COMPARE 2 APPROACHES AND CLASSIFIER PERFORMANCE)

2 Previous work (DONE)

4 Methods

THEORY

* 24 images in total 🡪 12 train 12 test
* 1. HOGs and obtention of feature vectors of known patches 2 training classifier with already known boxes 3 prediction taking HOGs of unknows boxes and classify them (not mentioning the program). Fit, predict, score (maybe here instead of fit, predict, score we say train of classifier, prediction and score without mention the name of the functions)…
* Difference between two approaches: in predict we apply NMS and in the other we take the most probable one… but… what is NMS? (next paragraph)
* NMS (how it works, what do we want and why do we keep the most probable patch anyway)
* **Three main experiments**:
  1. for overlap\_threshold🡪 influence in svc, kn and random forest changing different parameters of the classifier
  2. For overlap\_threshold again 🡪 compare these quanitites with max probability
  3. For step size and ot=0.6 (applying NMS)🡪 Scores with Same classifiers compared before. Comment what Korijn told me about step\_size
* “Furthermore…” we analyze performance of classifier in our system. A lot of classifiers analyzed (image in the **appendix**) , and we focus on three (Random Forest, KN and SVC).
* In order to analyze the performance… PRECISSION/RECALL CURVES. Using max\_prob\_patch (without NMS, due to the results about previous experiments)

CODE (implementation)

* Which programs are we using, which language
* A bit explanation of the program…

5 Results

Comment results of 1, 2, 3. FIGURES AND TABLES HERE.

1. Figure (SVC) Figures (KN) Figure (Random Forest)
2. Comment results of table but table in the **appendix**
3. Figure compaing step\_size 🡪 SVC sigmoid = 0 (its not visible)

6 Discussion / conclusion

FUTURE: More images in order to increase the score

Conlusions: NMS not better than other approach but it can be useful for other obtection problems in which you need to get two objects

Best classifier is…. (kN k=30 apparently? But watching ROC curves is…)

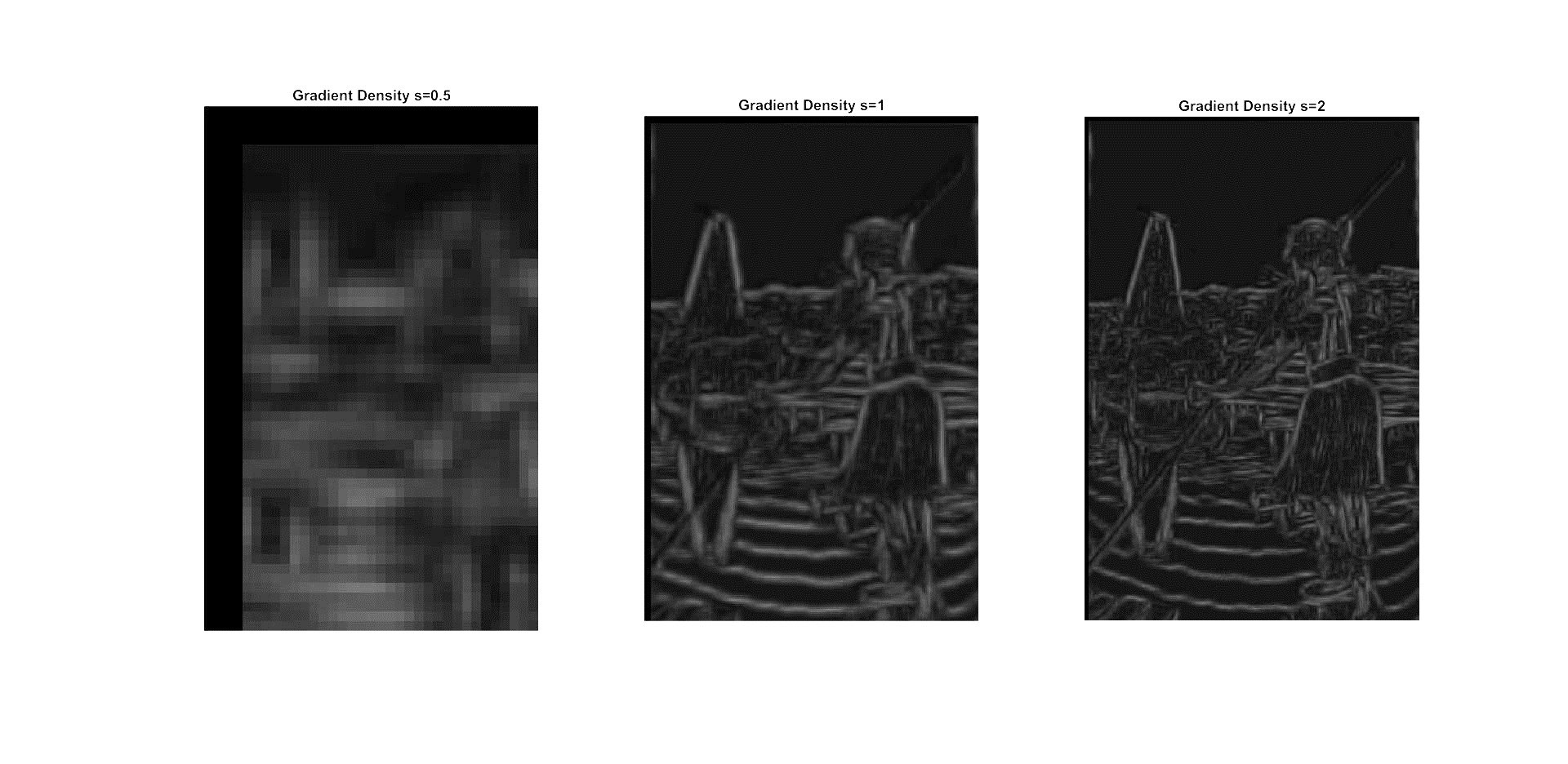
Problems that need to be solved: overlier, scales etc

References

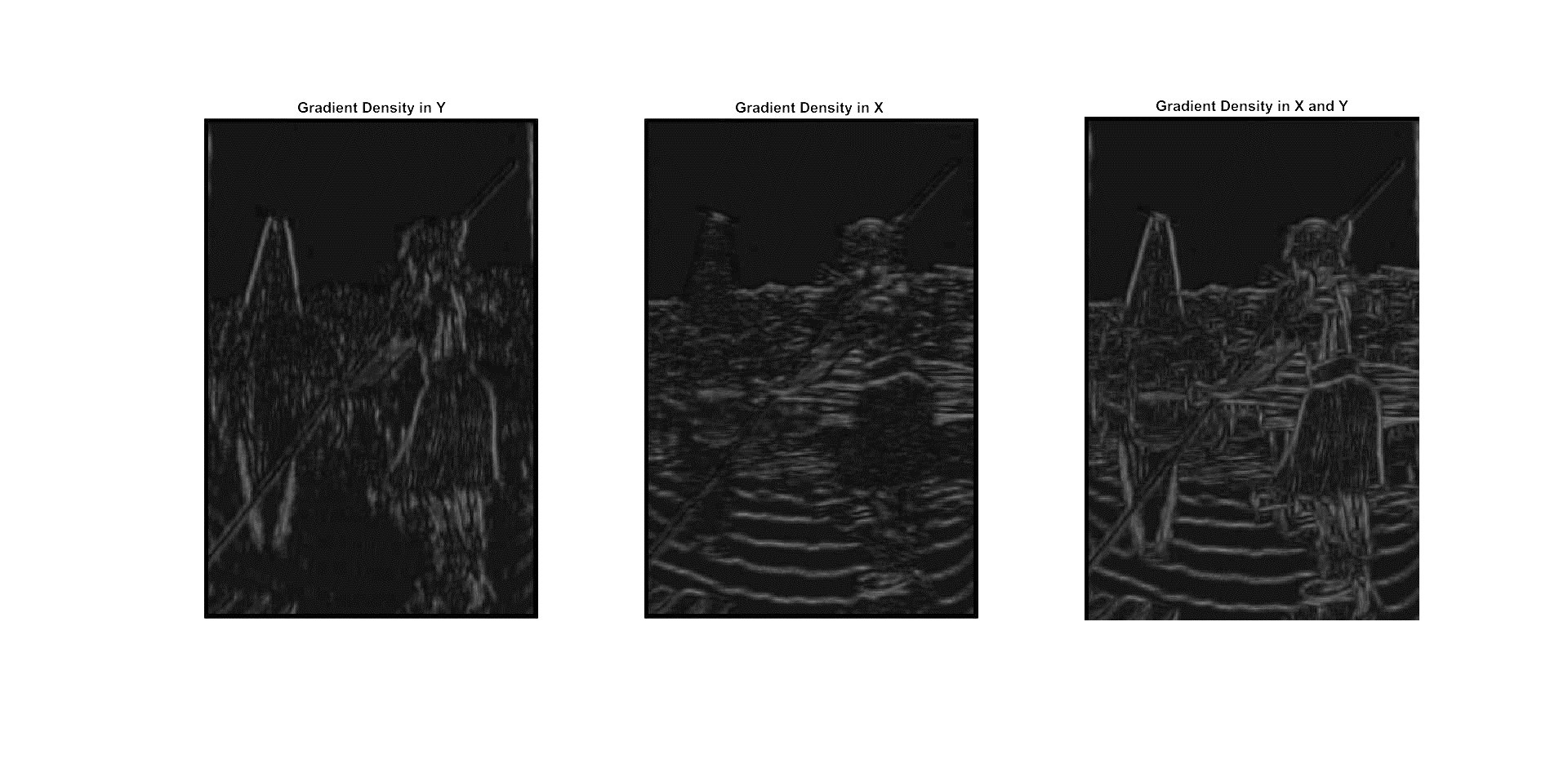
Figures (max 2 pages)

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**Fig. 1.** Illustrative representation of the local histograms with respect a central point (x,y) located at the center of the square. In this case, the angle θ is equal to 45º and the width of our region of interest is 50 pixels for illustrative purposes. (Courtesy of Arbelaez et all) If we don’t have space we add this just in the ppt… but I think it’s important so other classmates understand it.



**Fig. A.** Influence of scale in gradients’ magnitudes. Big scales images give rise to fine contours in contrast with the coarse contours acquired in the smaller scale image. The brightness of this image is increased by a 40% factor



**Fig. X.** Influence of θ in gradients’ magnitudes. Using one single orientation (θ=0º or θ=90º) is not enough to acquire contour quality, but the combination of both give rise to an efficient contour detector. The brightness of this image is increased by a 40% factor for illustrative purposes.

Notes:

1. I HAVE CHANGED THE BRIGHTNESS OF THIS IMAGE AND THE PREVIOUS OINE SINCE THEY SAY THAT PICTURES MUST HAVE AS MUCH CONTRAST AS POSIBLE… BUT MAYBE THAT IS “CHEATING”…SHOULD I MENTION IT SO THEY DON’T THINK SO?)
2. Maybe the pictures can be acquired again changing the font size of the graphs so they are more readable