

Visual Object Recognition and Detection (TSBB17)

Written Exam (2017-10-17)

Instructions: The exam consists of **16** questions that require description of terms, phenomena, relations, etc. Each question gives a score **[0,1,2]**, for:

0: Wrong/No Answer

1: Almost Complete/Partially Correct Answer

2: Complete and Correct Answer

Each exam question can give a maximum score of **2p**, and a total of **32p** for the whole exam.

In order to pass with grade **3**, at least **15p** are required.

In order to pass with grade **4**, at least **22p** are required.

In order to pass with grade **5**, at least **27p** are required.

All questions should be answered on **separate sheets** that are to be attached to the exam. It is fine to answer multiple questions on one sheet. Be brief and to the point.

Write your AID-number and the date on all paper sheets that you attach to the examination.

In addition, these sheets should be numbered in consecutive order.

Good luck! Fahad Khan, Per-Erik Forssén, and Michael Felsberg.

Question 1: Describe what a spatial pyramid pooling (SPP) layer does.

Question 2: Describe briefly Marr's vision (stages of visual representation).

Question 3: Describe at least one similarity and one dissimilarity between object detection and object tracking.

Question 4: Describe what a visual word is, and give an example of how to compute them from an image.

Question 5: Name at least two advantages of ReLU compared to tanh?

Question 6: Name at least two advantages of CNNs.

Question 7: What are the different purposes of training data and validation data in CNNs?

Question 8: What is the effect of a dropout-layer?

Question 9: What is the purpose of batch normalization?

Question 10: What does MOSSE stand for? Briefly explain what it means.

Question 11: Briefly explain at least two advantages of Continuous Convolution Operators.

Question 12: What is the purpose of zero-padding in CNNs?

Question 13: What does SVM stand for? Briefly explain what it means.

Question 14: Why is it meaningless to construct a multi-layer network without activation functions?

Question 15: How does the validation set help to characterize overfitting and underfitting in CNNs?

Question 16: Describe at least two advantages of strides in CNNs.