

# Assignment-2 (CS-729)

29-Mar-2013

You may refer any book/notes/web-resource etc. But you should NOT discuss with your classmate. You may contact me for clarifications. In all problems use `libsvm` to build the final model. Note that the software allows pre-computed gram-matrices, which is very handy for you in this assignment.

1. Repeat<sup>1</sup> the simulations in [1] from one of the following sections:
  - (a) Section 8.1. Compare the probability product kernel with the “tuned” Gaussian kernel.
  - (b) Section 8.3. Compare the probability product kernel with the “tuned” Gaussian kernel.
  - (c) Section 8.1. Compare the Rational<sup>2</sup> kernels: bi-gram, tri-gram and a regular expression count based with “tuned” Gaussian kernel.
2. Consider the multiple-regression (7 labels to be predicted for each datapoint) problem associated with the Sarcos dataset<sup>3</sup>. Use any universal kernel you learnt in the lectures and SVM to build a prediction model. Compare this with performance of 7 SVMs built individually.

## References

- [1] Tony Jebara, Risi Kondor, and Andrew Howard. Probability product kernels. *Journal of Machine Learning Research*, 5:819–844, 2004.

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<sup>1</sup>You should not blindly repeat the “short-comings” (if any) in the original simulations. You are welcome to improve based on learning in the course.

<sup>2</sup>Use the standard tool by Mohri.<http://www.openkernel.org/>

<sup>3</sup><http://www.gaussianprocess.org/gpml/data/> - sarcos dataset