

gamma (C=10)	classification error %	C (gamma=0.5)	classification error %
0.2	45	1	58
0.3	40	2	43
0.4	35	3	43
0.5	36	4	43
0.6	35	5	39
0.7	35	8	37
0.8	36	10	37
0.9	36	20	36
1.0	37	50	36
		100	36

Table 1. Effect of the kernel parameters on the classification performance of RBF kernel-based SVMs on the Deterding vowel classification task.

<b>Approach</b>	<b>Error Rate</b>
K-Nearest Neighbor	44%
Gaussian Node Network	44%
SVM: Polynomial Kernels	49%
<b>SVM: RBF Kernels</b>	<b>35%</b>
Separable Mixture Models	30%
RVM: RBF Kernels	30%

Table 2. The SVM classifier using an RBF kernel provides significantly better performance than most other comparable classifiers on the Deterding vowel classification task.

RBF gamma	WER (%) hypothesis Segmentation	WER (%) Reference Segmentation	polynomial order	WER (%) hypothesis Segmentation	WER (%) Reference Segmentation
0.1	13.2	9.2	3	11.6	7.7
0.4	11.1	7.2	<b>4</b>	<b>11.4</b>	<b>7.6</b>
0.5	11.1	7.1	5	11.5	7.5
0.6	11.1	7.0	6	11.5	7.5
<b>0.7</b>	<b>11.0</b>	<b>7.0</b>	7	11.9	7.8
1.0	11.0	7.0			
5.0	12.7	8.1			

Table 3. Comparison of word error rates on the Alphadigits task as a function of the RBF kernel width (gamma) and the polynomial kernel order. Results are shown for a 3-4-3 segment proportion with the error penalty, C, set to 50. The WER for the baseline HMM system is 11.9%.

Exp.	Information Source		HMM		Hybrid	
	Transcription	Segmentation	AD	SWB	AD	SWB
1	N-best	Hypothesis*	11.9	41.6	11.0	40.6
2	N-best	N-best	11.9	42.3	11.8	42.1
3	N-best + Ref.	Reference**	—	—	3.3	5.8
4	N-best + Ref.	N-best + Ref.	11.9	38.6	9.1	38.1

\* For the baseline HMM system, recognition is performed by rescoreing a word-lattice created from the N-best list.

\*\* For the baseline HMM system, experiments were not performed due to the lack of a time-aligned decoding mechanism.

Table 4. Experimental results comparing the baseline HMM system to a new hybrid SVM/HMM system. The hybrid system marginally outperforms the HMM system when used as a post-processor to the output of the HMM system where the segmentation is derived using the hypothesis of the HMM system. However, when the reference transcription is included, or when the reference based segmentation is used, SVMs offer a significant improvement in performance.