

A MAJORITY VOTE CLASSIFICATION SCHEME FOR EARLY PROGNOSIS OF URINARY BLADDER CANCER RECURRENCE

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Abstract. *In this paper we investigated the potential of classifier combination in handling the difficult task of predicting recurrence in patients with superficial urinary bladder cancer. Three representative classifiers were used, namely, the Least Square Minimum Distance, the Quadratic and the Probabilistic Neural Network (PNN). We analyzed the predictive accuracy of each individual classifier and we explored the possibility of improving the predictive accuracy using the majority vote combination rule. From 112 biopsies of urinary bladder cancer and using quantitative light microscopy we extracted measurements of cell nuclei tendency to recur. In totally, thirty-six nuclear features were generated to encode the malignant behavior of the tumour. Each classifier was designed and evaluated independently using the exhaustive search procedure and the leave-one-out method. Finally, a combining classification scheme was designed based on the majority vote principle. Considering the performance of each individual classifier the PNN yielded the highest predictive accuracy of 74%. The combination scheme provided a further performance improvement of 77%. The proposed combination scheme seems to be promising for improving the prognosis of tumour recurrence, which is crucial for patient's follow-up, facilitating treatment selection*

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