Computer Assisted Histopathological Diagnosis of Neoplastic Changes

From Concept to Practice

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Abstract

Diagnosis of cancer is performed regularly by the pathologist using microscopic analysis of cells and tissues. The accuracy of this approach is largely dependent upon the individual training, skills and judgment.

The present project comprises an effort to develop an advanced objective system based on computer assisted analysis. The purpose of the development of such a system is to propose an everyday tool to support the pathologist in his analysis and therefore to improve cancer diagnosis. The technological methods of computer analysis were applied to distinguish between normal features and neoplastic changes in oral epithelial carcinoma.

Computer assisted histopathological analysis consists of the following steps.
1. Assembly of a wide database of neoplastic microscopic sections.
2. Acquisition, enhancement and analysis of histopathological images by dedicated algorithmic functions.
3. Evaluation of complex and customized features of cells and the tissues.

In addition to aiding pathologists in their initial diagnosis, one of the outcomes of the data generated is the identification of specific cellular and tissue patterns and properties that may be useful for assessing efficacy of cancer therapies or monitoring the development of lesions at a cellular and tissue levels.