INTELLIGENCE DECISION SUPPORT SYSTEM FOR DIAGNOSTIC ONCOLOGICAL DISEASES

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Oncological diseases are the leading cause of death in the world and costs more in productivity and loss of life than any other illness. With the increase in the aging population and changes in lifestyle behaviour, the incidence of cancer is on the rise globally in economically developed and developing countries. The majority of the suits reviewed concerned breast cancer. There are several reasons for this. First, the tumours in these cases were most frequently discovered by the patients themselves. Any physician delay in securing prompt diagnosis and treatment is readily apparent to the patient. Second, physician misinformation remains common.

Breast lesions cannot be adequately evaluated either by palpation or by mammography alone. In one case, the doctor conscientiously followed a patient for two years, recording a clinical diagnosis of fibroadenoma repeatedly, until the enlarging mass was finally biopsied, and the cancer was revealed. Similarly, *it must be recognized once and for all that a negative mammogram does not exclude the diagnosis of breast cancer*. Because false-negative findings occur, therefore, all clinically suspicious lesions must be biopsied. Furthermore, images visual estimation, gained by biopsy method, is too complex and it is required considerable experience and high qualification and level of skill from physician-oncologist for recognition disease.

The aim of study is to develop intelligence decision support system (IDSS) for oncopathology diagnosis, in bounds of information-extreme intelligence technology (IEIT), on basis of analysis of morphological tissue images. IDSS assume recognition 3 basic oncological diseases, which are typical for daily clinical practice and occur very frequently. These classes are the following: fibroadenoma, mastopathy and cancer.

Single typical image of oncological disease was selected from one person. 90 persons were used to form the learning dataset. Each class of recognition has 30 realizations enabled to build a representative learning sampling. After the processing of the image in polar coordinates, multi-dimension learning matrix was formed in which every line involves 600 signs, describing the brightness of red, green and blue color.

This conception was implemented on the basis of IEIT with optimization of control tolerance for the recognition of signs. The basic idea of learning means the transformation from a priori fragmentation of sign space to non-fuzzy fragmentation of classes.

After the formation of learning matrix the algorithms of learning and parallel optimization of the control tolerances system were implemented, that enabled to build faultless error-free decision rules.

In the examination mode the recognition system must make (with reliability close to asymptotical) decision about belonging the image to the proper class from the alphabet, formed at the learning stage.

Such approach, either for therapy or for simple improvement will help to treat patients and increase diagnostic possibilities.