IDENTIFICATION OF UTERINE FIBROIDS USING OBJECT DETECTION

Abstract. The article developed uterine fibroids (leiomyomas or myomas), benign monoclonal tumors, are the most common benign tumors in women. Heavy or prolonged menstrual bleeding, abnormal uterine bleeding, resultant anemia, pelvic pain, infertility, and/or recurrent pregnancy loss are generally associated with uterine fibroids. Although curative treatment of this tumor relies on surgical therapies, medical treatments are considered the first-line treatment to preserve fertility and avoid or delay surgery. The aim of this review is to provide available and emerging medical treatment options for symptomatic uterine fibroids.

Keywords: uterine fibroids, e-health, mathematic model, algorithm.

I. INTRODUCTION

Uterine fibroids (leiomyomas or myomas) are the most common pelvic tumors and the most common benign tumors in women. It is estimated that 60% of
reproductive-aged women are affected, and 80% of women develop the disease during their lifetime.

Uterine fibroids are monoclonal tumors that arise from the uterine smooth-muscle tissue. The reasons fibroids develop and grow are not well understood, but many factors are recognized as growth promoters, with sex steroids, estrogen and progesterone, being the most frequently studied. Increasing age up to menopause, with incidence peaking in the fourth decade, Black ethnicity, and obesity are the well-known risk factors for fibroids. Both reproductive and environmental factors have been described. Some of the most common reproductive factors include nulliparity, early menarche, and the use of oral contraceptives before 16 years of age. Additional environmental factors, such as diet, particularly vitamin D deficiency, and environmental toxins, are the subject of ongoing investigations. Some dietary factors, including increased consumption of fruits, vegetables, and low-fat dairy products, are associated with a reduced risk.

The majority of women with uterine fibroids either remain asymptomatic or develop symptoms gradually over time. When patients are symptomatic, the number, size, and/or location of fibroids are critical determinants of its clinical manifestations. Commonly reported symptoms include heavy menstrual bleeding, dysmenorrhea, noncyclic pain, urinary symptoms, fatigue, and constipation. The association between infertility and fibroids is limited. A recent meta-analysis demonstrated that submucosal, intramural, and subserosal fibroids have different effects on fertility, and they are mostly related to submucosal lesions resulting in implantation defects.

II. CONCEPTS OF PATTERN RECOGNITION.

Pattern recognition as a methodology for decision-making based on the results of observations of objects and processes of the surrounding world, arose much earlier than modern computer systems and technologies. The first recognition methods were developed for electronic analog systems and were considered within the framework of signal processing theory. In the process of development of computer technology and information technology, this discipline, like the very concept of an image, has undergone significant changes and continues to develop.
intensively. Now it is difficult to strictly define the class of problems that belongs exclusively to pattern recognition, as well as to give a strict definition of the very subject of study.

In the ordinary sense, the image includes a whole set of our individual feelings, ideas and conclusions. Recognition images - a daily integral part of the activity human brain. Therefore, in the spectrum of computer disciplines, the tasks recognition refers to the problem of artificial intelligence. In the most general case, any information model of an object or process, abstract or real the world. A distinctive feature of such a model in the recognition problem is using only that subset of object characteristics research that provides the selection of one or more groups objects of a very specific type. The purpose of the recognition procedure is the answer to the question: does the object described by the given characteristics, to the categories of interest to us and, if applicable, to which one. Based on this, we can say that an image is a description of an object or process, allowing it to be separated from the environment and grouped with other objects or processes to make the necessary decisions. Those categories of objects that we want to highlight or for which we want to separate the whole set of patterns in the recognition process, usually called classes. The concept of a class in recognition appeared essentially earlier than in object information models. And the way of assignment classes here is determined not so much by the essence of the subject of research, how many features of the available information about objects and ways of its representation.

For an information processing system, an image is a collection of data about an object or phenomenon, including parameters and connections. Options are quantitative characteristics obtained with using measuring systems or mathematical models. Links can describe both the internal structure of the image and the features of its behavior if we are dealing with a dynamic object or process. Any recognition algorithm can be represented as an abstract functional system \( R \), consisting of three components:

\[
R = \{ A, S, P \},
\]

where \( A = \{ A_k \}, k = 1, ..., K \) is the alphabet of classes - the set of categories by which we must distribute our images,
\[ S = \{ S_j \}, j = 1, ..., n \] - dictionary of features - a set of characteristics, of which a description of the image is drawn up,

\[ P = \{ P_l \}, l = 1, ..., L \] is a set of decision-making rules.

The functioning of this system boils down to the following: at the entrance an image is served - some configuration of elements of the set \( S \), to it a certain sequence of rules from \( P \) is applied, as a result configuration is assigned an index corresponding to one of the elements set \( A \). The quality of the system functioning is determined by the fact that how often the index assigned to the image matches what we expect result. Components \( A, S \) are informational part system, and \( P \) - methodological. It is clear that the meaning of the concept of a class for different ways of describing images will be different. In turn, the way of describing the image depends on the physical nature of the objects recognition and formalization of the concepts corresponding to them.

Decision making methods are naturally interconnected with the way representations of objects of recognition. Therefore, any system recognition also includes the process of synthesis of images, that is, the formation descriptions of recognition objects and their classes, and image analysis, that is the decision-making process itself.

Depending on the characteristics of the information components of the system \( R \), there are three approaches to the problem of pattern recognition:

1) the principle comparison with the standard;
2) the principle of clustering;
3) the principle of generality properties.

The principle of comparison with the standard is applied in cases where each class \( A_k \) can be associated with a finite set of reference images

\[ \Omega_k = \{ \omega_m, m=1, ..., M_k \} \]

Therefore, the principle of comparison with the standard is different called the enumeration principle. In this case, the recognition process consists in a simple comparison of the input images recognizing device or algorithm, with standards \( \Omega_k \) of classes \( A_k \), on based on the selected measure of similarity.
CONCLUSION

The principle of comparison with the standard is one of the first approaches that have arisen when building technical recognition systems, when the possibilities computing devices were very limited. However, he and now used, in particular, in analog synthesis of images, although quite often this or that apparatus for making solutions, for example, statistical, can be applied for various methods of synthesis.

In the methodology of decision-making in pattern recognition, it is also there are three main areas:

1) heuristic methods;
2) mathematical methods;
3) linguistic (syntactic) methods for detection of myoma.

As why myoma have types and colors and size. By color detection we may know type of myoma.

References:


