

SCI-CONF.COM.UA

SCIENTIFIC ACHIEVEMENTS OF MODERN SOCIETY



**ABSTRACTS OF III INTERNATIONAL
SCIENTIFIC AND PRACTICAL CONFERENCE
NOVEMBER 6-8, 2019**

**LIVERPOOL
2019**

SCIENTIFIC ACHIEVEMENTS OF MODERN SOCIETY

Abstracts of III International Scientific and Practical Conference
Liverpool, United Kingdom
6-8 November 2019

**Liverpool, United Kingdom
2019**

UDC 001.1

BBK 83

The 3rd International scientific and practical conference “Scientific achievements of modern society” (November 6-8, 2019) Cognum Publishing House, Liverpool, United Kingdom. 2019. 549 p.

ISBN 978-92-9472-193-8

The recommended citation for this publication is:

Ivanov I. Analysis of the phaunistic composition of Ukraine // Scientific achievements of modern society. Abstracts of the 3rd International scientific and practical conference. Cognum Publishing House. Liverpool, United Kingdom. 2019. Pp. 21-27. URL: <http://sci-conf.com.ua>.

Editor

Komarytskyy M.L.

Ph.D. in Economics, Associate Professor

Editorial board

prof. Jan Kuchar, CSc.

doc. PhDr. David Novotny, Ph.D.

doc. PhDr. Zdenek Salac, Ph.D.

prof. Ing. Karel Marsalek, M.A., Ph.D.

prof. Ing. Jiri Smolik, M.A., Ph.D.

prof. Karel Hajek, CSc.

prof. Alena Svarcova, CSc.

prof. Marek Jerabek, CSc.

prof. Vaclav Grygar, CSc.

prof. Vaclav Helus, CSc.

prof. Vera Winterova, CSc.

prof. Jiri Cisar, CSc.

prof. Zuzana Syllova, CSc.

prof. Pavel Suchanek, CSc.

prof. Katarzyna Hofmannova, CSc.

prof. Alena Sanderova, CSc.

Collection of scientific articles published is the scientific and practical publication, which contains scientific articles of students, graduate students, Candidates and Doctors of Sciences, research workers and practitioners from Europe, Ukraine, Russia and from neighbouring countries and beyond. The articles contain the study, reflecting the processes and changes in the structure of modern science. The collection of scientific articles is for students, postgraduate students, doctoral candidates, teachers, researchers, practitioners and people interested in the trends of modern science development.

e-mail: liverpool@sci-conf.com.ua

homepage: sci-conf.com.ua

©2019 Scientific Publishing Center “Sci-conf.com.ua” ®

©2019 Cognum Publishing House ®

©2019 Authors of the articles

VIDEO DERMOSCOPY STUDY OF THE SKIN

Isaieva Olha Andriivna

Student

Avrunin Oleg Grygorovich

Doc. of Sc., Professor

Kharkiv National University of Radioelectronics

Kharkiv, Ukraine

Annotation: The work is devoted to the study of the main pathologies of the skin, the possibility of diagnosing them using video dermatoscopy. Determining the differences between digital dermoscopy and video dermoscopy. The difference between the diagnosis of common skin diseases from malignant and tumors is considered. The science of fluorescent technology is being studied. The diagnostic capabilities of digital dermatoscopy are discussed.

Key Words: skin features, video dermatoscopy, skin diagnostics, melanoma, skin pathologies

Skin pathology is observed in 20-25% of the population. Skin changes can be a manifestation of both diseases of the skin itself and internal diseases. Skin diseases are numerous.

The skin is a very complex and multifunctional organ that is sensitive to the action of various environmental factors. This is one of the main barriers that protect a person from infectious agents. Between the epidermis, dermis and appendages of the skin, there are complex interactions that ensure the normal structure and functioning of the skin and subcutaneous tissues.

It is no coincidence that the skin is considered an independent organ that has a complex structure and performs vital functions, the violation of which leads to the corresponding pathological conditions. Their feature is the ability to visualize from the earliest stages, which allows you to immediately begin treatment. On the other

hand, these diseases give people severe psychological discomfort, especially when it is not possible to quickly eliminate the symptoms. Therefore, timely diagnosis and adequate therapy can accelerate the treatment of dermatological diseases.

Currently, one of the primary methods of examination in the diagnosis of skin diseases is video dermatoscopy. This method allows using special optical devices - video dermatoscopes to conduct a visual assessment of the condition of the skin and to inspect neoplasms with magnification from tens to hundreds of times with different depth of field, with different types of lighting and the use of optical filtering. The method is non-invasive and allows you to determine the nature and risk of degeneration into a malignant form by the color and shape of the skin formation. [1, 3]

It is very important to diagnose skin diseases in the early stages and to understand whether the formations are malignant or not. Each disease needs its own diagnosis.

Therefore, the aim of the work is to study the main pathologies of the skin and the ability to diagnose them with devices designed for video dermatoscopy. Develop a complete system of digital video demodscopy, justify the use of basic modules and methodological support.

Results. There are many pathologies associated with skin diseases. In the course of research, the main groups of diseases were identified. For example, diseases such as dermatitis and dermatoses, which also include psoriasis, are not contagious, but can significantly worsen a person's physical condition. Accordingly, the diagnosis of such pathologies will be different than the diagnosis of melanoma.

It turned out that diseases such as dermatoses and dermatitis can be diagnosed with ScinScope, which is widely used in modern cosmetology and dermatology.

Own research on this device showed that the girl has various skin disorders, such as age spots, caused by the influence of UV rays, as well as age-related changes. (see Fig. 1) Dry skin, dehydration associated with climate change. Conducting our own research, we improved the SkinScope and attached the camera Sony to the device and carried through the application Imaging Edge Mobile an image that could enlarge and see skin pathologies.



Figure 1 - Shooting from a SkinScope

SKINSCOPE is a patented system for diagnosing skin with polarized light.

Based on the results of the diagnosis, the cosmetologist will select you home care and develop an individual plan of cosmetic procedures.

In identifying pathologies, we relied on color characteristics. (see Fig. 2)

Thus, 1 color - blue or white indicates healthy skin. 2 color - white spots show us dead cells. 3 color - violet fluorescence - skin without enough moisture. 4 color - brown means age spots. 5 color - light purple - dehydration of the skin. 6 color - bright fluorescence - moisturized skin. 7 color - yellow or sometimes pink - oily skin or comedones (a type of cyst formed when the hair follicle is blocked by horny masses (desquamated epithelium mixed with thick fat) with hyperkeratosis.) 8 color - white fluorescence - a thick layer of the cornea.

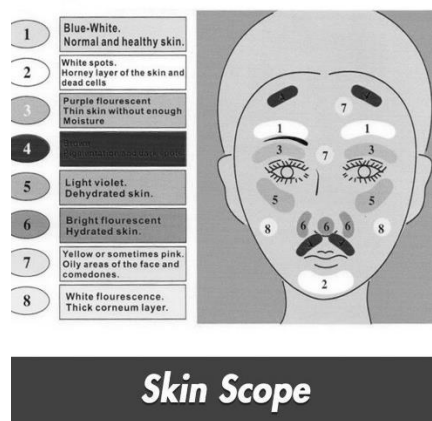


Figure 2 - Color chart table

The science of fluorescence technology.

Fluorescence is caused when one radiation wavelength is absorbed by a compound which is reflected back at a different wavelength. Certain compounds excite electrons in molecules that change the wavelength energy such that it converts from shortwave UV light to longer wave visible light. (see Fig. 3)

When a specific range of UV light (320-365nm) illuminates skin, it reacts in different ways based on what it comes in contact with. Melanin absorbs the light showing as an absence of color, but other compounds “excite” follicular fluorescence in the skin, changing the wavelength to colors visible to the human eyes. Based on the visible shades that are reflected back from the skin, characteristic diagnosis can be made.

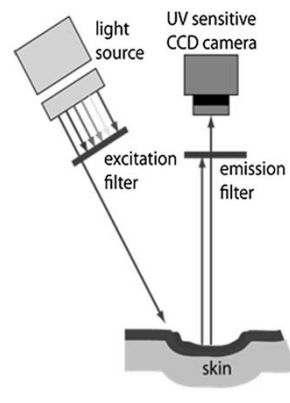


Figure 3 - The effect of fluorescence on the skin

The next group of diseases is malignant diseases, which also include melanoma. It was determined that such diseases cannot be diagnosed with conventional devices that are used in cosmetology. Diagnosis of the tumor should be carried out very carefully, with the study of all the symptoms and risk factors. All spots and moles that may be related to skin cancer, as well as lymph nodes in the inguinal and axillary areas, on the neck and especially near the suspicious focus, should be studied, since they can also be affected by a malignant tumor.

A diagnostic method for self-treatment of a patient with complaints of symptoms characteristic of melanoma is digital dermatoscopy.

Based on the range of tasks to be solved, the modern digital dermatoscopy system includes (see Figure 4)[4, 5]:

- an optical image acquisition unit - a device consisting of an achromatic or apochromatic (to reduce chromatic aberrations) lens optical system, which allows to obtain an enlarged (usually from 10 to 300 times) image. At the same time, to improve image quality, preference should be given to optical modules with sets of interchangeable lenses designed for fixed magnifications and smooth sharpness adjustment over a wide range of distances to the skin surface being examined;
- a digital camera that allows you to register a color optical image on a matrix of photodetectors. From the point of view of minimizing noise components, it is advisable to use sensors with matrices of about 5 megapixels and the largest size of sensitive elements. A further increase in the number of photosensitive elements of the sensor with standard examination dermatoscopic optics will more contribute to the enhancement of noise components than to an increase in the resolution of the recorded image. Separately, it is necessary to dwell on the parameters of the camera's lighting unit, which provides uniform illumination of the field of view and has the ability to install light filters in the visible range, or use specialized illuminators, for example, in the range of black ultraviolet radiation, Wood's lamp, etc.;

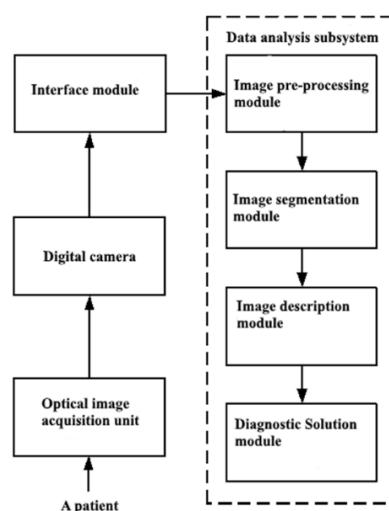


Figure 4 - The system of digital video dermatoscopy

- an interface module that includes hardware and software for transmitting information to the data analysis subsystem. It can be realized both autonomous (with removable media, for example, memory cards), and directly connected via wired or wireless communication channels. In the first case, the most common is the USB interface of various standards, in the second case, the most respectful are Wi-Fi or Bluetooth. The main requirement for the interface is noise immunity and the ability to transmit video stream with a minimum delay, which affects the convenience of focusing the image. Given the somewhat inertia (about tenths of a millisecond), especially when transmitting video data over wireless interfaces, it is advisable to supply the video dermatoscope with an autonomous screen to which information is displayed with a minimum delay to facilitate focusing
- data analysis subsystem, which is implemented on a graphic workstation and consists of the following modules: (see fig.5)
 - pre-processing of images, which includes methods for suppressing noise components and histogram correction of the brightness and contrast of the input image;
 - image descriptions - obtaining the geometric and optical characteristics of objects segmented in the previous module. These characteristics usually protrude color coordinates as well as the area, perimeter, shape factors of the analyzed objects.
 - a module for the formation of a diagnostic solution, which is classified according to the characteristic features of the analyzed objects, as which their color and geometrical characteristics are most often selected, taking into account a priori and additional diagnostic information about the patient. It should be noted that in this module the formation of not a final, but a preliminary diagnostic decision, helps the doctor to make a final diagnosis.

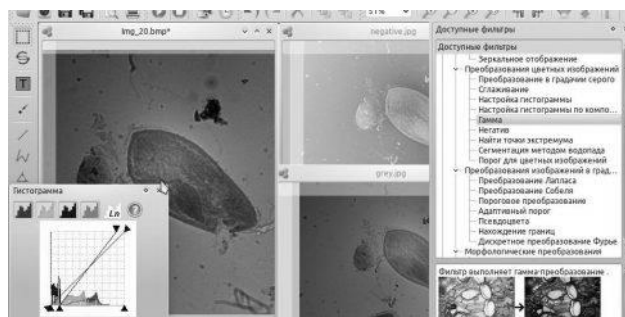


Figure 5 - Data analysis subsystem

Findings. It has been determined that digital dermatoscopy and video dermatoscopy are different. It is known that the first method is used for more malignant diseases, while the second method is used in modern cosmetology. The main groups of skin diseases were identified. In the tasks of diagnosing various skin pathologies, it is advisable to choose those methods that are convenient for each of the diseases. In the tasks of automated processing of video dermatoscopic data, the perception of the field of view is associated with a priori information about the image under study. When developing methods for processing dermatoscopic images, it is advisable to choose methods that facilitate the subsequent stages of data analysis. The main indicators of the effectiveness of the developed methods and systems are high stability and repeatability of recognition of skin objects and the ability to process images in real time. The prospect of work is the development of a complete system for digital video dermatoscopy and its subsequent preliminary clinical trials.

BIBLIOGRAPHY.

1. Isaeva O. A. Development of an automated system for video dermatoscopy / O. A. Isaeva, O. G. Avrunin // Materials of the 23rd International Youth Forum. T. 1. - Kharkiv: KNUR. 2019. -- S. 165 - 166.
2. Avrunin O.G., Bezshapochny S. B., Bodyanskiy E.V., Semenets V.V., Filatov V.O. Ntektualni technological model of hirurgic hands. - Kharkiv: KNURE, 2018. - 224 p.
3. Isaeva O. A. Videodermatoscopy in the aviation method of accession / O. A. Isaeva, O.G. Avrunin // Zbirnik tez dopovidey II All-Ukrainian science-practical

conference of young students, cadets and students "Aviation, industry, suspension" - Kremenchuk, 2019. –S. 272-274.

4. Avrunin O. G. Experience in developing a biomedical system of digital microscopy / O. G. Avrunin // Applied Radioelectronics. - 2009. - T.8. - No. 1. - S. 46-52.

5. Avrunin O.G. Visualization of the ventrolateral nucleus of the thalamus of the human brain / O. G. Avrunin, V. V. Semenets, S. Yu. Maslovsky // Radioelectronics and Informatics. - 1998.– No. 1 / (2). - C. 132–134.