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PRELUCRAREA PARALELĂ A IMAGINILOR PENTRU ADAPTAREA DIGITALĂ A TINERILOR PROFESIONIȘTI ÎN TRANZIȚIA LA NOILE TEHNOLOGII

PARALLEL IMAGE PROCESSING FOR DIGITAL ADAPTATION OF YOUNG PROFESSIONALS IN THE TRANSITION TO NEW TECHNOLOGIES

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Annotation: *Parallel image processing for digital adaptation of young professionals in the transition to new technologies, focuses on: optimization of sensory-perceptual activity; media education, development of media competence and thoughtful attitude towards media; the ability to use visual information more effectively, analyze it and identify the various interests that are associated with it.*

Key words: *information technology, innovative techniques, academic adaptation, didactic efficiency, digital technology, images, parallel processing, psychology of computerization, globalization, informatization*

It is a well-known fact that more than 60% of information is perceived visually. Modern realities are based on the type of data transmission that we perceive with our eyes. The process of digitization has led to the fact that in the 21st century, for an individual to work with images has become commonplace. Human perception, however, is different from the way digital cameras and video cameras see the world. For reference, the minimum possible time in which the brain processes an image is 13 milliseconds, this is 76 frames per second when the camera has a bandwidth of 30 frames per second [1].

The changing culture of information consumption has led to a need for a new generation of professionals to consistently improve existing learning processes with digital technologies, to meet emerging needs. In an adaptive approach, changes are based on past experiences, to maximize the improvement of already existing techniques.

The need to search for new approaches to the problem of academic adaptation of specialists to enter the system of world culture and education through the prism of the Bologna process makes active use of computer technologies and innovative methods, which is an objective need for the harmonization of education.

In the XXI century, it is required for a young specialist to be more and more erudite, fast in the field of acquiring new knowledge, and have the ability to master all the achievements of computer technology.

Modern technology makes it possible not only to capture the moment but also to edit it afterward. Image processing is often used to achieve a certain level of beauty, clarity, or sharpness. It is also a means of translation between the human viewing system and digital imaging devices and is widely used in many application areas, including the film industry, medical imaging, industrial manufacturing, weather forecasting, forensics, aviation, astrology, etc. In some of these areas, the image size is very large but the processing time needs to be very small, and sometimes real-time processing is required.

Currently, computers process a huge amount of data. Complex mathematical algorithms are built into various information systems and hardware complexes in almost all fields of science and technology.

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Parallel processing is a vital part of any high-performance computing model. It involves using a large number of computational resources to perform a complex task or problem. The resources specific to parallel processing are the processor and memory. Image processing using parallel computing is an alternative way to solve time or resource-intensive problems. Eliminating noise, speeding up processing, color image histogram alignment, and content analysis are all needed for more than just aesthetic reasons.

Applications with a sequential algorithm can no longer rely on technology scaling to improve performance [2]. Image processing is characterized by a high degree of parallelism and is an excellent example for multicore platforms. The main goals of parallel processing are not only to achieve high performance but also to provide a solution in less time and hence better use of resources.

Parallelization optimizes processing speed, through data parallelism, task parallelism, and instruction-level parallelism.

Simply put, parallel computing is part of the multicore processors in our phones and laptops that keep them running efficiently.

The dramatic changes in the media environment and the increase in the volume of information are affecting people much more than before. To survive in the new media and information environment, to function successfully in it, and find effective solutions to problems in all spheres of life - media education is needed.

In Council of Europe documents, "media education is defined as teaching/education that seeks to develop media competence, understood as a critical and thoughtful attitude towards the media, to develop responsible citizens who can make their judgments based on the information they receive. It empowers them to use relevant information, analyze it, and identify the economic, political, social, and cultural interests that go along with it. Media education teaches how to interpret and create messages, and how to choose the most appropriate media for communication. It allows people to exercise their right to freedom of expression and information, which not only contributes to personal development but also increases social participation and interactivity. In this sense, media education prepares for democratic citizenship and political understanding. It is necessary to develop media education as part of the concept of lifelong learning" [3].

Thus, the integration of media education with specific subjects (or subject areas) can serve as a bridge to the international requirements of the educational standard, which will ensure a reasonable combination of attention to the factual basis of the subject. This will help provide an individual educational trajectory for adolescents in the learning process, make the teaching process more interesting and coherent, closer to reality, but also prepare students to interact with the real world and help them make sense of the enormous flow of information bombarding them from various sources.

"Given the fact that UNESCO has identified media education as a priority area of cultural and pedagogical development in the XXI century, media pedagogy has great prospects. Media-education with its rich history and vast geography turns out to be more and more demanded, and most importantly - necessary in the modern sociocultural situation" [4].

Considering parallel programming in the key of media handling, it is important to note that any processing is a method of performing some actions to obtain improved image quality or extract useful information [5]. It is a type of signal processing in which the input is an image and the output may be an image or features/functions associated with it. Currently, image processing is among the rapidly developing technologies. It forms a major research area within engineering disciplines and computer science.

Image processing mainly involves the following three steps:

1. Import an image;
2. Image analysis and manipulation;

3. Output, which can result in a modified image or a report based on image analysis.

There are two types of methods used for image processing, namely, analog and digital image processing. Analog image processing can be used to process hard copies such as prints and photographs. Digital image processing techniques help to manipulate digital images using computers. The three common phases that all types of data must go through when using digital techniques are preprocessing enhancement and display and information extraction [6].

Digital image processing techniques aim to transform, enhance, reconstruct or encode an image.

Parallelization of these processes leads to a reduction of execution time and, consequently, to optimization of work.

One prime example is the Blackbox browser extension, created by Richard Rizk, which semantically processes a real-time image or a still image from a video and copies the recognized text to the clipboard (Fig.1).

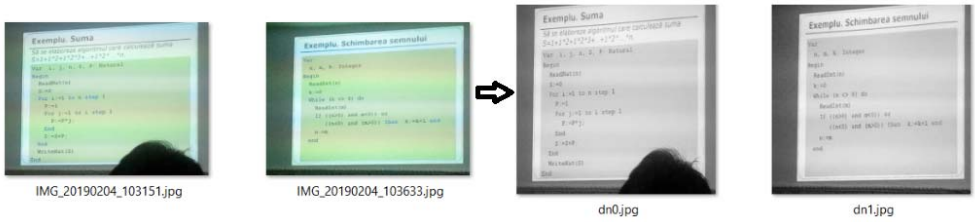
Figura 1

Another application is digitization. Often physical books are used as teaching materials, but not everyone has the opportunity to use them, hence transferring books to the digital space will help to better design the theoretical part and certainly create an interactive practical part.

There are many optical character recognition software available. Tesseract is an open-source text recognition engine that has gained popularity among text recognition developers. Although implementation and modification can sometimes be problematic, there have not been many free and powerful text recognition alternatives on the market.

Below is the image pre-processing for the following text recognition (Fig. 2).

Figura 2. Initial and processed images



The results are written to a file:

Exemplu. Suma
Var
I, j, n, S, P: Natural
Begin
ReadNat (n)
S:=0
For i:=1 to n step 1
P:=1

```
For j:=1 to i step 1
 P:=P*j
end
S:=S+P
End
WriteNat(S)
end
```

Parallel implementation of this program already yields outstanding results when the number of processes is doubled - from 128 seconds the time is reduced to 68.

Proceeding from the stated above, we can conclude the effectiveness of parallel programming and also trace the dependence of acceleration on the number of processor cores.
Image processing is the essential task of analyzing and manipulating digital image files to create new versions of these images or to extract important information from them. Such digital images are represented by pixel tables which are RGB values or essentially tuples of numbers. Thus, digital images are simply multi-dimensional matrices of numbers that result in image processing tasks that are usually reduced to a heavy numerical grind. Parallel programming and the development of efficient parallel programs, are essential in high-performance scientific computing.

Since in some image processing applications the images can be analyzed and considered independently of each other, collaborative and parallel programming - in particular multiprocessing - provide some way of achieving a significant improvement in execution time for such an application.

Parallel image transformation methods are also very helpful in the image preprocessing phase in machine learning, to prepare training material in e-learning tools that correspond to all levels of a cognitive process.

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