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RESEARCH ON THE DEVELOPMENT OF MODERN CEMINI CAD TECHNOLOGY FOR DESIGNING WOMEN'S CLOTHES

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Annotation: This article provides information about modern automated systems used in the sewing industry and their current importance and convenience, the use of certain modules of Gemini CAD Systems products, methods for performing pattern placement of women's jackets, as well as the capabilities and efficiency of the Gemini Nest Expert X9 module.

Key words: process, clothes, structure, costs ,designing, automation, size , cooperation, plotter, production.

Introduction.

In the world, great attention is paid to improving the quality of clothing products through the use of new technologies. In developed countries, including China, the USA, Japan, Germany, Italy, a number of countries have achieved considerable success in developing automated methods for the design and production of clothing products, improving methods for controlling technological processes. In this regard, they hold a leading position in the market of high-performance technologies, which are considered one of the important factors ensuring the competitiveness of clothing products. At the same time, the creation of new technical means and technologies that take into account a targeted approach to the process of designing clothes, improving product quality, and increasing production efficiency remain important tasks [1].

In a market economy, the time factor is of paramount importance for clothing companies to produce fashionable clothes. It is known that an enterprise that produces a new product two weeks before its competitors will have a 50% market share. For the production of modern clothing, it is necessary to quickly take into account changes in demand and supply, use advanced industrial technologies, reduce labor and material costs when introducing new models into production, and ultimately increase the quality of the product and reduce the time it takes to introduce it into production, mainly due to the introduction of automated systems into sewing processes.

The stage of preparation of design and technological documentation in the process of designing and sewing clothes is the initial stage of the garment industry, where design solutions for new clothing models are formed. Modern automated design systems have developed subsystems such as "Constructor", "Designer", "Technologist", which allow for the automated introduction of new clothing models into production. The use of these subsystems leads to a reduction in time and labor costs, an increase in the quality of the project at the design and technological stages.

The design process can be carried out in three ways: automated, automated (interactive) and non-automated.

In an automated process, the design procedures are carried out entirely by computer devices without human intervention. For example, in the design of clothing, special software of automated design systems is used to automatically reproduce the dimensional drawing.

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In an automated (interactive) process, design procedures are performed with the direct participation of a computer and a person. Most of the ALT special programs that are widespread in the garment industry are designed to work in an interactive manner. The convenience of automated design is that a person can directly participate in the process of accepting, changing and correcting design solutions for design operations.

Non-automated design procedures are performed manually with only human intervention. The set of computer languages used to describe and express automated design procedures and design solutions, ALT languages, are divided into programming languages and design languages.

Examples of modern programming languages used to design complex objects and solve technological process problems include Turbo Package, Java, Java Script, C#, PHP, C++, Python, C, SQL, Ruby, Objective-C, Perl, .NET, Visual Basic, Swift. Information technologies used in garment production include:

- technologies for analyzing and reengineering business processes;

– a set of organizational methods for radically changing the structure of an enterprise in order to increase the efficiency of its activities. These technologies allow for the transition from paper-based document exchange to electronic document exchange and the introduction of new methods of product production;

- technologies for providing information about the product in electronic form – a set of methods for providing information about the product life cycle processes in electronic form. These technologies are designed to automate certain processes;

- technologies for collecting (integration) information about the product

- technologies for collecting electronic information related to the life cycle processes of the product within a single information space[2].

Below we will consider information technologies that are widespread in the mechanical engineering and military industries, and are now being introduced into the garment industry. The multifunctional system for automated clothing design “Gemini CAD” is the latest development of the company “Gemini CAD Systems” in the field of designing clothes, shoes, hats, bags, charms, furniture upholstery. The “Gemini CAD” system meets the requirements of manufacturing enterprises of various capacities: design studios, small and medium-sized enterprises, large-scale production, etc.

Gemini CAD Systems was founded in 2002 by Luca Troyan in Romania. The creators of ALT set themselves the goal of creating a completely new product that would meet the needs of a wide range of users and have the most advanced design tools in its arsenal. A new multifunctional system for automated design - Gemini CAD Systems - quickly gained a worthy reputation in Uzbekistan, and the number of its users is constantly increasing.

The Gemini CAD Systems system includes the following software modules:

1. Gemimi Pattern Editor - design and modeling of products;
2. Gemimi PhotoDigitizer - digitization of patterns (entering patterns into a computer);
3. Gemimi Cut Plan - calculation of beds, automated optimization of the order;
4. Gemimi Nest Expert - high-performance automatic pattern nesting.

In the Gemini Pattern Editor module, the base mesh can be built in the following 3 ways: - By drawing directly in the Pattern Editor “Drawing” section - - By entering ready-made templates on the computer in the “Photodigitizer” using the “Building Block BC” module. In the

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"Building Block BC" module, you can easily and quickly build the structure of the item. In the "Gemini Pattern Editor" engineering program, you can design any type of clothing and items, leather goods, furniture upholstery using any methodology. The "Gemini CAD Systems" company was one of the first to provide the ability to check geometric shapes, rotate them in a free position, and automatically check details, and continues to research and update this area[3].

In the " Block of Construction BK " module, clothing construction can be performed in two ways: in the first step, by entering the exact values of the dimensions, you can obtain a set of templates of only one size, and in the second step, by creating and entering a size table using existing standards, you can generate a set of all templates for the selected sizes.

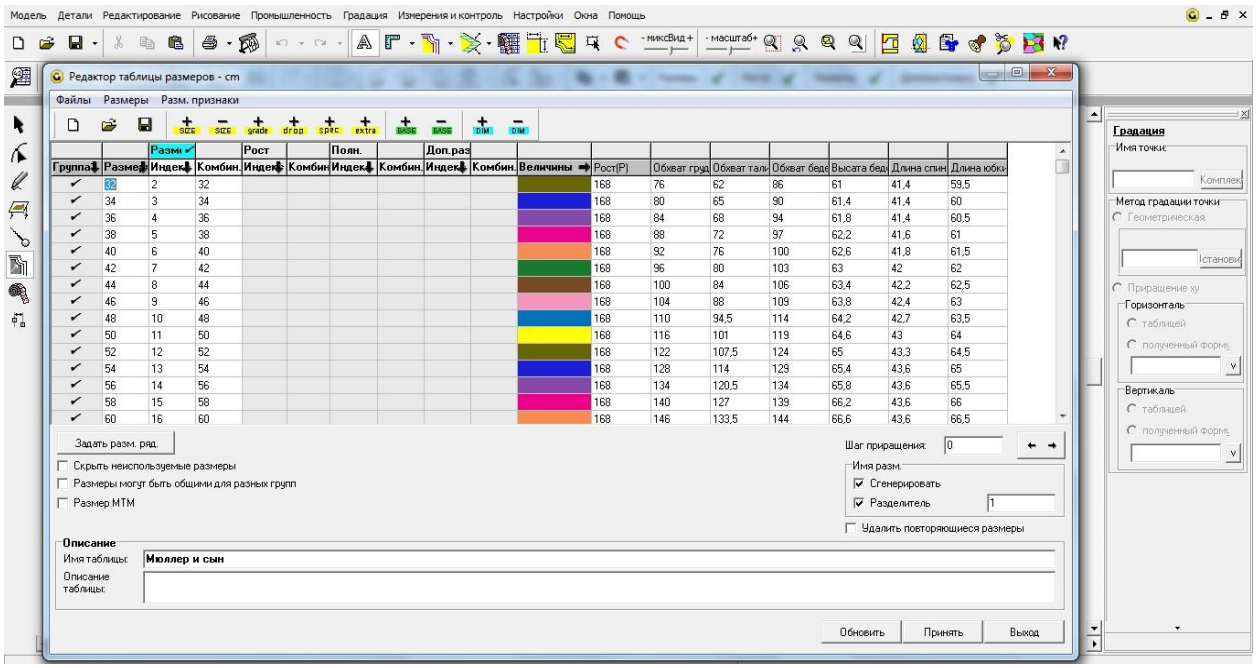

Figure 1. Standard size database

When the data entry in the size table is completed, the garment design process is considered relevant for all selected sizes, and all sizes are designed at the same time.

In this case, this operation is called technical reproduction of patterns, that is, gradation. To implement automatic gradation, it is necessary to enter the incremental differences between sizes when filling out the size table. In the process of work, previous gradation schemes can be applied to a new model. The program has the ability to immediately cancel gradation at all details or points, change the contours of the main pattern without affecting the remaining sizes, and perform gradation at any angle.

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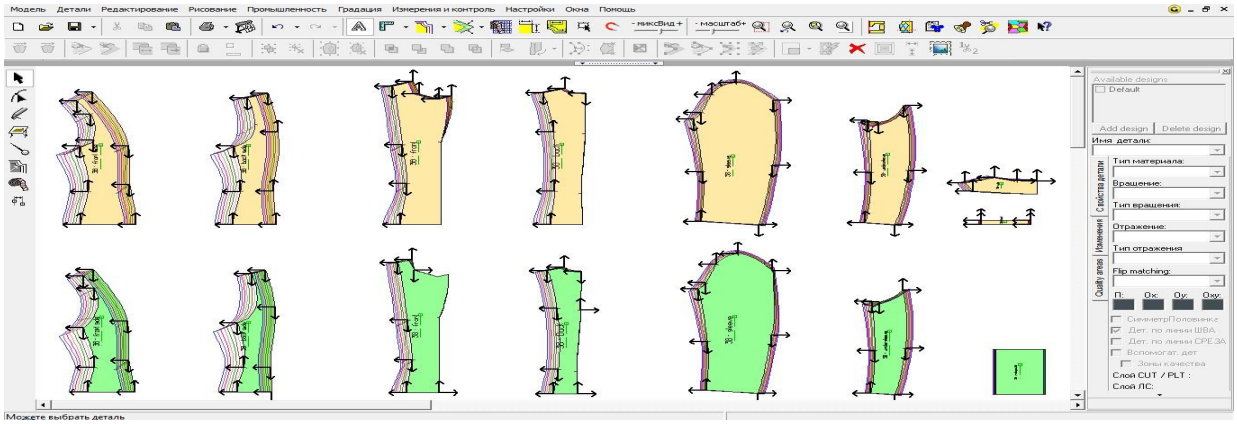

Figure 2. View of women's jacket detail templates

The Gemini ALT system has the ability to place and modify technical documents. Automatically create and modify size charts, create model technical cards and template specifications, create a garment card, Functions such as uploading a model sketch and preparing detailed reports on models allow for precise control of the workflow.

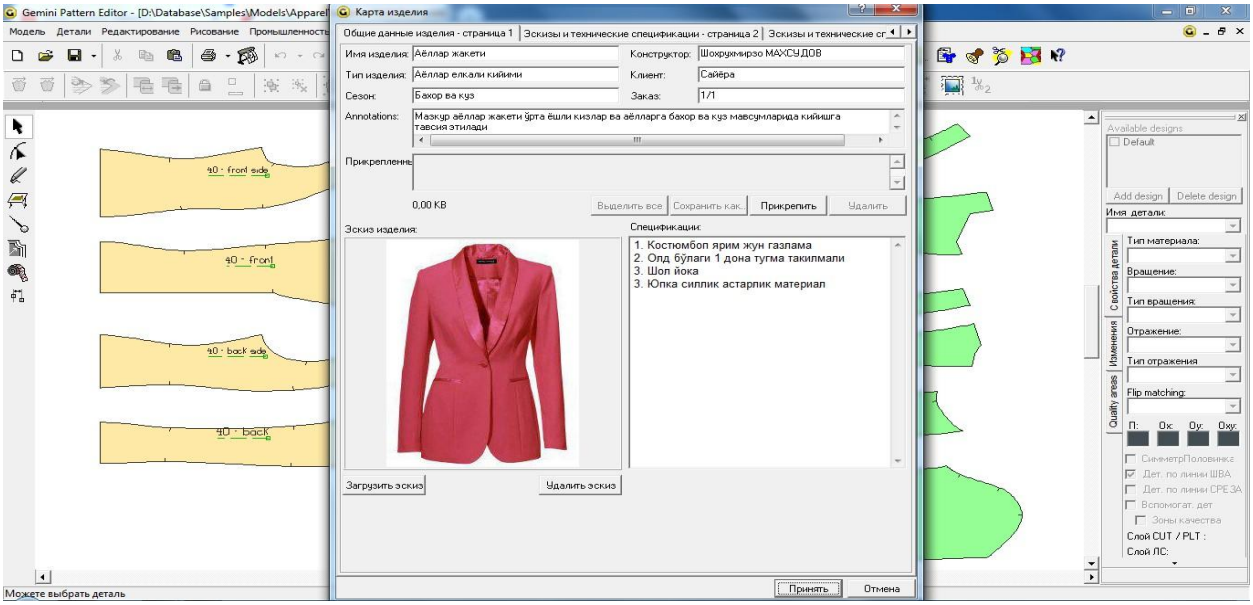

Figure 3. Preparation of technical documentation for a women's jacket

At the end of the technical documentation creation stage, the templates generated are sent to the Gemimi Nest Expert module. Gemini Nest Expert module - developed by Gemini CAD

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Systems to automatically perform optimal pattern placement in light industry. Advantages of the Gemini Nest Expert software module: fully automated, capable of performing highly efficient optimal pattern placement in a short time; equipped with special functions for displaying checkered, striped fabrics, pleats or grooves, glued details, and marking penetrating fabrics.

It is also open to other ALT users, i.e. templates created in Gerber, Lectra, Assyst programs can be saved in the DXF-AAMA standard format and opened directly in the Gemini Nest Expert module, used or printed using any plotter or cutter. It usually takes 3-5 minutes to complete an average nesting of 8 meters in length. The average result obtained in terms of speed and efficiency is significantly higher than the result of manual nesting.The module saves nesting results in its own format with the extension "*.pt" or "*.mrk", and also exports to all major industry standards DXF-AAMA, HPGL-PLT, ISO-CUT, RS274D[4].

Gemini Nesting Server is a high-volume optimization station, capable of processing up to 200 nestings per day. It can directly import nestings from other ALTs such as Assyst, Gerber, Lectra, Investronica and export them for printing on cutters and plotters.The expected economic efficiency from the implementation of the Gemini CAD system is determined by a several-fold increase in the efficiency of designers and fabricators, a reduction in production preparation times, an increase in the quality of manufactured models, and, as a result, an increase in the competitiveness of the product.

Gemini CAD ALT ensures high accuracy of cutting details and mutual compatibility of cuts; minimum material costs, reliability of ALT work, reduction of product production time; increases production capabilities and mobility due to interaction with companies using different ALT, which increases the efficiency of the sewing shop.

During the study, several methods of laying out details of a women's jacket were tested.A total of 48 pieces of women's jacket details were placed in the selected sizes 40, 42, and 44, and the length of the placement was 2.582 m with a fabric width of 160 cm, and the fabric efficiency was determined to be 86.21% (Figure 4).

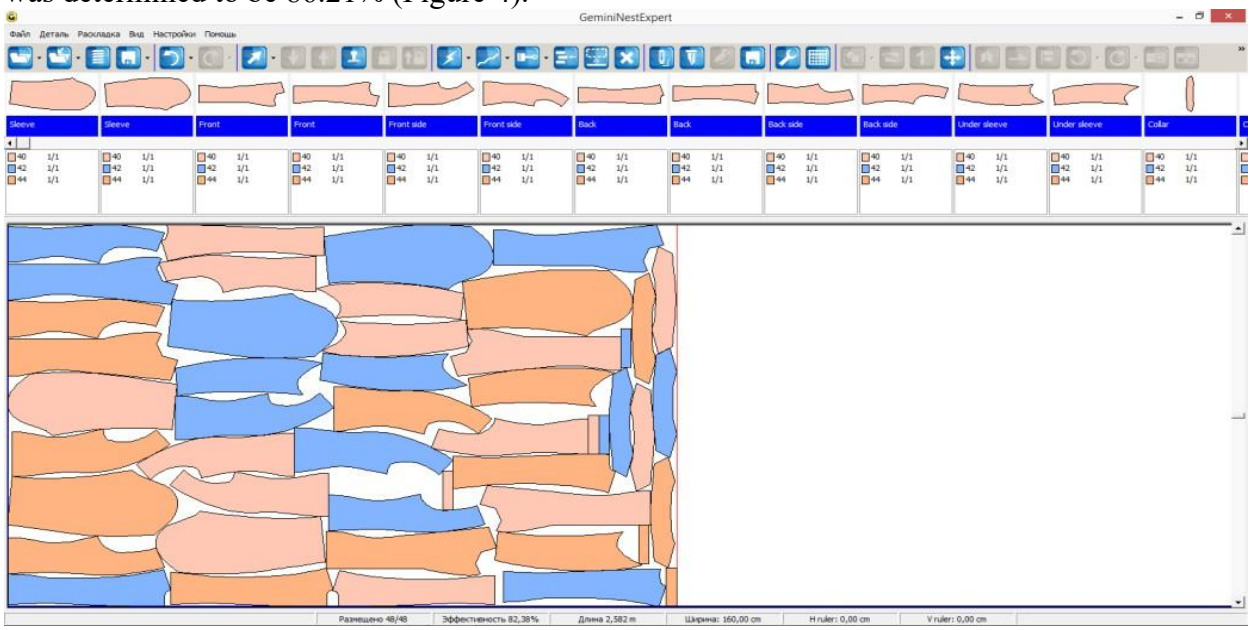

Fig 4. Layout of women's jacket templates in the Gemini Nest Expert module

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According to the results obtained, a total of 128 pieces of women's jacket details were placed in the selected sizes 38,40,42,44,46,48,50,50, and the length of the placement was 7.045 m, with a fabric width of 160 cm. The fabric efficiency was determined to be 89.92% (Figure 5).

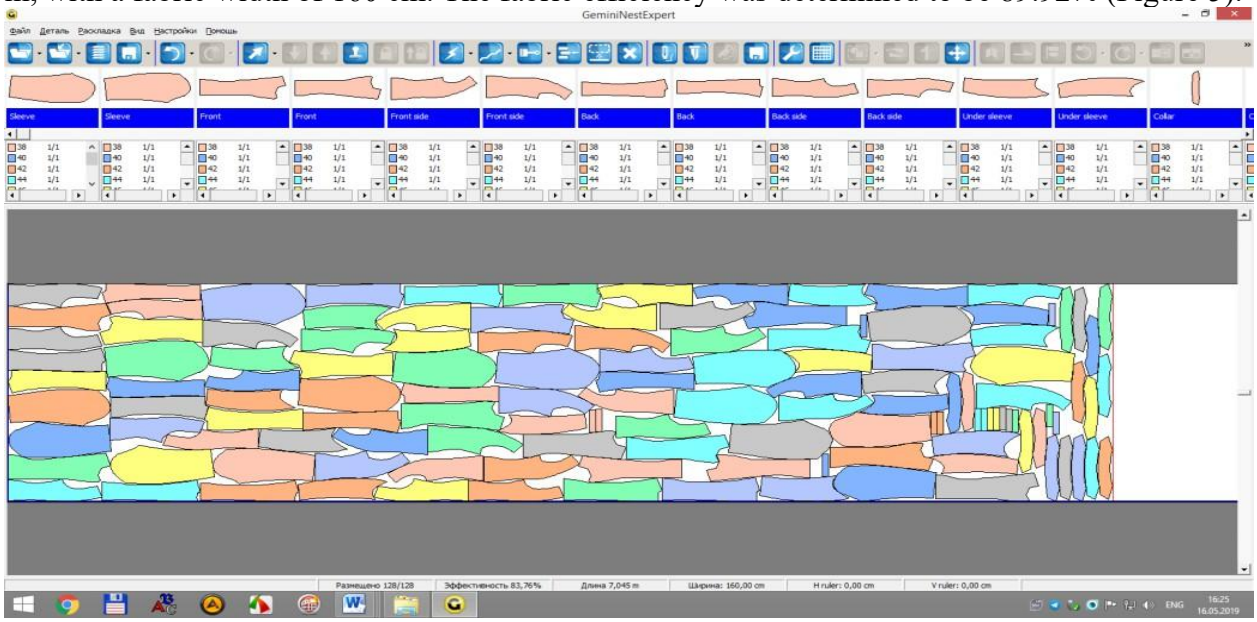

Fig 5. Layout of women's jacket templates in the Gemini Nest Expert module

References

1. M.A. Abdukarimova “Development of women's clothing design technology based on non-contact methods”. Doctoral dissertation. Tashkent 2018.
2. F.U. Nigmatova, M.Sh. Shomansurova “Automated system for designing garments”. Tutorial. Tashkent 2017.
3. https://mycad.geminicad.com/cad-cam-products.html
4. https://cdn.geminicad.com/wp-content/uploads
5. https://www.geminicad.com
6. https://www.perevalov.ru/sapr/software/modelling/