ICAMaT 2022

12th International Conference on Advanced Manufacturing Technologies

Book of Abstracts

&

Conference Programme

October 21st, 2022
Bucharest, Romania

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Conference Programme

Friday, 21st of October 2022

Time: 09.00 – 10.00
Room: CK 104 main hall

- **Participants registration**

Time: 10.00 – 10.30
Room: CK 104b

Welcome speech:

- **Prof. Cristian DOICIN,** Dean of the Faculty of Industrial Engineering and Robotics (IIR), POLITEHNICA University of Bucharest, Romania
- **Prof. Tom SAVU,** Head of Manufacturing Engineering Department (TCM), Faculty of Industrial Engineering and Robotics (IIR), POLITEHNICA University of Bucharest, Romania

Time: 10.30 – 13.30
Activities: **Paper presentations on sections**
Location: according to the sections programme (see below)

Time: 16.00 – 20.00
Activities: **Early Dinner**
Location: POTCOAVA Restaurant

Book
of
abstracts

Section 1. Integrated Products and Systems Development

Section 1. Programme

Room CK 104a

Time: 10.30 -11.50 / 12.10 -13.30 (RO)

Section Chairs: Cristian Vasile DOCIN, Daniel GHICULESCU

No. & Start time	Author(s) *Paper title*
1. 10.30	Andrei Dumitrescu *Perceived characteristics of materials as tools for designer*
2. 10.55	Miruna Lucreția Comeagă *Digital transformation of the laboratories*
3. 11.20	Ileana Dugăeșescu, Gabriela-Marina Pârvu, Vlad-Cristian Enache *Development of an additive fabricated biped mechanical system*
11.45 - 12.10	Coffee Break

No. & Start time	Author(s) *Paper title*
4. 12.10	Daniel Ghiculescu, Raluca Crețu, Ovidiu Alupei *Research concerning ultrasonic chains with torsional vibrations for different industrial applications*
5. 12.35	Nicolae Ionescu, Mihaela-Elena Ulmeanu, Cristian Vasile Doicin, Cătălin Ionescu, Paulina Spânu *Prescribed precision for medical products obtained with additive manufacturing technologies*
6. 13.00	Bogdan Adrian Nicolin, Ilie Nicolin *Simulation of the hydraulic steering device, for a nose landing gear*

Section 1. Abstracts

S1 - 1. Perceived characteristics of materials as tools for designer

Andrei Dumitrescu

Manufacturing Engineering Department, POLITEHNICA University of Bucharest,313 Splaiul Independentei, Bucharest 060042, Romania

Abstract. When conceiving a new product, the designer usually selects the materials based on strictly functional considerations, neglecting the perceived characteristics (like elegance, prestige, and timeless quality). This paper presents the results of two experiments aimed at ranking the main classes of materials (metal, plastic, wood, and ceramics) from the perspective of perceived characteristics. The influence of the design was considered, design being varied on three levels: minimal, elaborate, and exceptional. In the case of minimal design, metal and plastic occupied the first and last positions respectively, and ceramics and wood occupying intermediate positions. The elaborate design influenced in a certain degree the perception of the material characteristics, and the exceptional design considerably diminished the importance of the perceived characteristics in the observer perspective.

S1 - 2. Digital transformation of the laboratories

Miruna Lucreția Comeagă

University POLITEHNICA of Bucharest, Faculty of Mechatronics and Mechanical Engineering, Department of Mechatronics and Precision Mechanics, 313 Spl. Independentei st., 060042, Bucharest, Romania

Abstract. The scientific world is evolving; laboratory processes that were once entirely manual are being optimized through automation and data connectivity. While documents previously had to be printed, signed, and physically stored in boxes, the recent developments of data management systems and software platforms allow scientists to sign and store electronic records in a secure and future-proof format. Advanced analytics solutions, such as artificial intelligence and machine learning, are being used to connect, collate and analyse data from different facilities around the globe. Digital transformation is occurring in many aspects of the everyday life, from the ability to control household appliances through apps, to monitoring our health through wearable devices. But it is not just happening at home: the fourth industrial revolution is already in full expansion and digital technologies connect automated processes and equipment, monitor and control supply chains and work alongside robots programmed to leverage artificial intelligence (AI). The decision to digitally transform the laboratory is not without its challenges. New methodologies need to be evaluated and approved by the relevant regulatory body. The diverse scope of applications around the world makes it difficult for organizations looking to adopt such capabilities, despite the potential benefits. In addition to exploring the benefits and challenges of digital transformation, this article will show how new and practical solutions can be integrated to increase laboratory productivity and accelerate scientific research.

S1 - 3. Development of an additive fabricated biped mechanical system

Ileana Dugăeșescu, Gabriela-Marina Pârvu, Vlad-Cristian Enache

University POLITEHNICA of Bucharest, Faculty of Industrial Engineering and Robotics, Department of Manufacturing Engineering, Splaiul Independentei 313, Bucharest, Romania

Abstract. The use of mechatronic components and the incorporation of additive manufacturing into the process of product development have grown in popularity over the past several years. The goal of the research conducted in this paper is to develop a prototype of a monomobile biped mechanical system and to optimize the printing parameters for the additive manufacturing stage. This paper presents the modelling of the components of a biped mechanical system and the simulation of their operation. The modelling step is followed by setting the printing parameters in the dedicated Z-Suite software and creating the G-code for the Zortrax M300 Plus additive manufacturing equipment. Lastly, the paper presents the connection of the sensors to the Plusivo board, the mounting procedure to the 3D printed parts that make up the biped mechanical system as well as the operation methodology of the sensors. The resulting prototype is then used to monitor parameters specific to the sensors used.

S1 - 4. Research concerning ultrasonic chains with torsional vibrations for different industrial applications

Daniel Ghiculescu, Raluca Crețu, Ovidiu Alupei

University POLITEHNICA of Bucharest, Faculty of Industrial Engineering and Robotics, Department of Manufacturing Engineering, Splaiul Independentei 313, Bucharest, Romania

Abstract. The paper deals with design, modelling, and testing of an ultrasonic (US) chain with torsional vibrations that includes a tool at its end and could be used for different industrial applications such conventional and nonconventional machining of revolution, helicoidal, and curved surfaces or various types of materials. The US chain includes a horn with helicoidal channel whose profile was studied aiming at growing the amplification of amplitude of the tool, positioned in an antinode point. After the shape design of US horn, finite element analysis was applied to simulate the torsional vibrations of the horn and integrated tool with highest amplitude. Some experiments were made at electrical discharge machining (EDM) aided by torsional ultrasonic vibrations. The results emphasized the technological parameters improvement like machining rate increase and surface roughness decrease, compared to usual EDM without US.

S1 - 5. Prescribed precision for medical products obtained with additive manufacturing technologies

Nicolae Ionescu[1], Mihaela-Elena Ulmeanu[1], Cristian Vasile Doicin[1], Cătălin Ionescu[2], Paulina Spânu[1]

[1] Manufacturing Department, Faculty of Industrial Engineering and Robotics, University POLITEHNICA of Bucharest, Splaiul Independenței 313, Sector 6 Bucharest, Romania
[2] GHI Hornos Industriales S.L., Barrio de Aperribai, 4 – 48960 Galdakao, Biscay, Spain

Abstract. The paper highlights the importance of corelating the function of a medical product, with its' design and manufacture stages within the global product design and development process. Dimensional accuracy, macro-geometric and micro-geometric shape accuracy, relative surface position accuracy and other prescribed characteristics of medical products should take into consideration a variety of factors, such as custom requirements, regulated by the product functions. In an ideal scenario, with unlimited resources, prescribed characteristics dictate the selection of the manufacturing technology and equipment. Nonetheless, in most cases the design stage takes into consideration capabilities of available technology, correlated with bespoke requirements. In this context, the authors propose a clear distinction between precision, accuracy, repeatability, and resolution, as to properly address each issue in the lifecycle of a medical product manufactured using additive technologies. Using a real application for an upper limb prosthesis, the nominal position precision is prescribed, based on size-dependent geometric tolerances, for a cylindrical surface in relation to three reference surfaces, with the application of the maximum and minimum material principles.

S1 - 6. Simulation of the hydraulic steering device, for a nose landing gear

Bogdan Adrian Nicolin, Ilie Nicolin

INCAS – National Institute for Aerospace Research "Elie Carafoli", B-dul Iuliu Maniu 220, Bucharest 061126, Romania

Abstract. The hydraulic steering simulation is done with SIMULINK, part of the MathWorks MATLAB® application. All parts, subassemblies, and assemblies that define the nose landing gear (NLG) and nose wheel steering are fully defined in 3D, with CATIA V5 - a computer-aided design software used for modeling, it is possible to carry out simulations that allow preliminary evaluation, theoretically and experimentally. The purpose of this simulation is to confirm the correctness of the steering gear kinematics, that the two hydraulic cylinders have been sized correctly and can overcome the resistive steering moment, and that the steering time complies with design specifications for the nose landing gear of a military training aircraft.

Section 2. Flexible and Intelligent Manufacturing and Control Systems

Section 2. Programme

Room CK 104b

Time: 10.30 -11.50 / 12.10 -13.30 (RO)

Section Chairs: Marian GHEORGHE, Tom SAVU

No. & Start time	Author(s) *Paper title*
1. 10.30	Diana Irinel Băilă, Sergiu Tonoiu *Properties of photo-curable polyurethane resins used in SLA manufacturing*
2. 10.55	Tom Savu, Bogdan Alexandru Jugravu *Vehicles fleet communications in data infrastructure unavailability situations*
3. 11.20	Laurențiu-Aurel Mihail, Alexandru Filip, Adrian Mija *Researches on the geometrical and dimensional accuracy for complex thin parts made of electrical steel by abrasive waterjet machining*
11.45 - 12.10	Coffee Break

No. & Start time	Author(s) *Paper title*
4. 12.10	Marian Gheorghe, Flavia Petruța Georgiana Stochioiu, Daniel-Silviu Manolache, Manuela-Roxana Dijmărescu, Dragoș Iliescu *Analysis and development on general structure and characteristics of laser interferometry systems*
5. 12.35	Flavia Petruța Georgiana Stochioiu, Constantin Stochioiu, Ana Maria Eulampia Rolea, Nasim Gannam *Interferometric evaluation of positioning error and position repeatability on CNCs*
6. 12.50	Ioan Alexandru Popan, Nicolae Bâlc, Alina Ioana Popan, Andrei Nicolae Cerciu *Experimental studies on turning process, using the Prime turning processing strategy, proposed by Sandvik Coromant*

Section 2. Abstracts

S2 - 1. Properties of photo-curable polyurethane resins used in SLA manufacturing

Diana Irinel Băilă, Sergiu Tonoiu

Manufacturing Engineering Department, University Politehnica of Bucharest, 313 Splaiul Independentei, Bucharest, 060042, Romania

Abstract. Stereolithography (SLA) is the oldest additive manufacturing technology, and it is a 3D printing technology used to create industrial concept models, rapid prototypes or different parts with complex geometries in a very short time. By SLA technology, it is possible to manufacture parts with extremely high feature resolutions and quality surface finishes, using a wide selection of materials. SLA 3d printing is frequently used for manufacture: the parts requiring high accuracy and features as small as 0.07mm, smooth surfaces with good rugosities and form and fit testing. In this article were presented the mechanical properties of the photocurable polyurethane resins used in SLA technology, the SEM analysis and for establish the composition contain, it was used the ATR-FTIR analysis. In conclusion, new photo-curable polyurethane resins, used in SLA technology, allow the creation of parts with a high degree of accuracy, with good mechanical properties, which can be used both in industry and in medicine domain.

S2 - 2. Vehicles fleet communications in data infrastructure unavailability situations

Tom Savu, Bogdan Alexandru Jugravu

Manufacturing Engineering Department - TCM, University POLITEHNCA of Bucharest, 313 Splaiul Independentei, sector 6, Bucharest, 060042, Romania

Abstract. The paper describes a solution for operating a fleet of AGVs or AMRs, when an appropriate communication infrastructure is not available, by using messages send from one vehicle to another. All vehicles are equipped with two-way radios and a server (fixed or placed on one vehicle) is managing the network messages and is storing the data about the position of each vehicle. A set of rules was defined for message management and the messages format was defined in detail. It was also defined an algorithm, running on the server, for defining the chain of vehicles to be used for sending one message in the network and for updating the data about the vehicles' network structure. It was developed and tested the software to be implemented in the radio communication modules for managing the messages flow. Tests were performed for assessing the coverage area in a real environment and the results, proving the correct software implementation, are explained.

S2 - 3. Researches on the geometrical and dimensional accuracy for complex thin parts made of electrical steel by abrasive waterjet machining

Laurențiu-Aurel Mihail[1], Alexandru Filip[1], Adrian Mija[2]

[1]"Transilvania" University of Brașov, Bdul Eroilor nr.29, Romania
[2]Electroprecizia Electrical Motors Ltd., str.Electroprecizia nr.3, Săcele, Romania

Abstract. The electrical steel laminations which compose the rotor and stator core for electrical motors have complex 2D shapes. When these parts require small batches of production, they can be efficiently manufactured only by flexible methods. The paper presents the results of using abrasive waterjet machining (AWJ) to obtain such parts within the frame of a research project with EU funding. The main objective of the research was the analysis of geometrical and dimensional accuracy of the parts which will confirm that AWJ is a suitable process in this case. The parts were measured on an optical digital profilometer. The measurement process was not simple because the parts are relatively large and cannot be focused only by one shot by the camera. Also, another important issue were the profile edges inconsistencies due to the burrs. Those problems and the limitations of the measurement technology did not allow the automation of measurement. The results and discussions proved that AWJ can be used successfully for manufacturing such parts and the machining process is traceable.

S2 - 4. Analysis and development on general structure and characteristics of laser interferometry systems

Marian Gheorghe[1], Flavia Petruța Georgiana Stochioiu[2,3], Daniel-Silviu Manolache[1], Manuela-Roxana Dijmărescu[1], Dragoș Iliescu[4]

[1]University POLITEHNICA of Bucharest, Manufacturing Engineering Department, Splaiul Independentei, 313, 060042 Bucharest, Romania
[2] PhD Student, University POLITEHNICA of Bucharest, IER Doctoral School, Splaiul Independentei, 313, 060042 Bucharest, Romania
[3]Nat'l Inst. of Res. & Dev. in Mechatronics and Measurement Tech. (INCDMTM), Soseaua Pantelimon, 6 – 8, Sector 2, Bucharest, Romania
[4]Nuclear NDT Research and Services, Soseaua Berceni, 104, Bucharest, Romania

Abstract. The laser interferometry systems have been developed for scientific studies, industrial operations, artworks investigation, etc. They present common generic elements, such as laser, optics, beam, polarization, splitting, interferometry, etc., but also diverse specific components and features, such as He-Ne or femtosecond laser, quantum cascade lasers, nonpolarising beam splitter, collimating lens, high reflecting mirror, photodetector, attosecond pulse train, etc. The paper presents, also, a development on general structure and characteristics of laser interferometry systems. Analytical descriptors are introduced concerning the main implied entities, as well as some qualitative features referring to measurement object, coordinate system, lasers, laser beams, optics, output beams, detectors, environmental sensors and compensation modules, electronics, process software and computer, assembly, calibration and other elements. The conclusions accord attention to further laser interferometry development regarding the interacting processes, analytical modelling, operational characteristics, etc.

S2 - 5. Interferometric evaluation of positioning error and position repeatability on CNCs

Flavia Petruța Georgiana Stochioiu[1,2], Constantin Stochioiu[2], Ana Maria Eulampia Rolea[1], Nasim Gannam[3]

[1] National Institute of Research and Development in Mechatronics and Measurement Technique Bucharest (INCDMTM), Șoseaua Pantelimon 6-8, Bucharest, Romania, 021631
[2] University POLITEHNICA of Bucharest, Splaiul Independenței 313, Bucharest, Romania,
[3]Dr. Köcher S.R.L., Baicului Street 82A, Bucharest, Romania, 021784

Abstract. The interferometer is widely used for various applications concerning high precision distance and position measurements, especially for the calibration of numerically controlled machines. While the setup procedures of the interferometer may be provided by the manufacturer, some calibration procedures are well defined by the international standards. Since the operation of interferometers requires qualified personnel, some helpful hints for the novice users are to be presented in this paper. Even if the interferometer is highly recommended by international calibration standards, some factors are prone to intervene into the quality of results. This paper presents the experimental results for the evaluation of positioning accuracy and repeatability on Y axis of two vertical machining centres. The results show the high importance of environmental conditions compensation, the impact of time pauses during the measurement procedure and the implications of the increment of measuring target positions.

S2 - 6. Experimental studies on turning process, using the Prime turning processing strategy, proposed by Sandvik Coromant

Ioan Alexandru Popan, Nicolae Bâlc, Alina Ioana Popan, Andrei Nicolae Cerciu

Technical University of Cluj-Napoca, Department of Manufacturing Engineering, Bdul Muncii, no. 103-105, Cluj-Napoca.

Abstract. CNC turning process is a common machining process in the industrial application. The requirement on turning process is to increase the productivity and cost reductions. The paper presents preliminary research of the turning process optimization by using the Prime Turning strategy, proposed by the Sandvik Coromant company. Using a CNC turning machine, parts with complex surfaces were manufactured and two process strategies were compared. The first machining strategy is conventional roughing and finishing in the longitudinal direction and the second is the strategy developed by Sandvik company, called Prime Turning. The experimental results show that by using the Prime turning strategy and tools the productivity can be increased, with lower power consumption.

Section 3.
Industrial Products and Systems

Section 3. Programme

Online on MS Teams platform – ICAMaT 2022 – S3.IPS

Time: 10.30 -11.50 / 12.10 -13.00 (RO)

Section Chairs: Cristian TARBĂ, Manuela-Roxana DIJMĂRESCU

No. & Start time	Authors *Paper title*
1. 10.30	Adelina Hrițuc, Andrei-Marius Mihalache, Laurențiu Slătineanu, Oana Dodun, Gheorghe Nagîț, Marius Ionuț Rîpanu *The influence of the Cooling Conditions and Inclination of Surfaces Obtained by 3D Printing on the Roughness Parameters*
2. 10.50	Ciprian Rad, Olimpiu Hancu, Ciprian Lăpușan *Aspects Regarding the Modelling and Design of 3D-printed Bending Soft Pneumatic Actuators*
3. 11.10	Elhocine Chiba, Mourad Abdelkrim, Abderrahim Belloufi, Imane Rezgui and K. Maou *Monitoring the Temperature of Contact Wheel/Rail in a Tramway with an Infrared Sensor Programmed by a Microcontroller*
4. 11.30	Paul Tucan, Florin Graur, Andrei Caprariu, Corina Radu, Alin Burz, Calin Vaida, Nadim Al Hajjar, Tiberiu Antal and Doina Pisla *A Functional Design Analysis of a Robotic-guided Brachytherapy Instrument*

No. & Start time	Authors *Paper title*
11.50 - 12.10	Break
5. 12.10	Sergiu Pascu, Nicolae Bâlc, Adrian Augustin Pop *Reconstruction of Orbital Wall by Using Hybrid Manufacturing Operations*
6. 12.30	Crina-Andreea Duta, Nicoleta Luminița Căruțașu, Iulia Cristina Stanica and Andrei Georgian *Criteria for analyzing online traffic encountered in web and mobile applications in order to model an automated application testing system*
7. 12.50	Goran Munđar *Development and control of a virtual industrial process for assembling computers*
8. 13.10	Liviu Mihai Sima *Testing mechatronic systems and their integration into the digital enterprise*

Section 3. Abstracts

S3 - 1. The influence of the cooling conditions and inclination of surfaces obtained by 3D printing on the roughness parameters

Adelina Hriţuc, Andrei-Marius Mihalache, Laurenţiu Slătineanu, Oana Dodun, Gheorghe Nagîţ, Marius Ionuţ Rîpanu

"Gheorghe Asachi" Technical University of Iaşi, Romania

Abstract. A characteristic of the evolution of manufacturing processes in recent years is the expansion of technologies based on additive manufacturing, especially in the case of parts made of plastic materials. One of the accessible processes for making plastic parts is fused filament fabrication. In many situations, when using fused filament fabrication, it is necessary to obtain surfaces characterized by certain values of roughness parameters. Several factors can influence surface roughness. Some of these factors consider the materialization conditions of the 3D printing process. Starting from the hypothesis that the cooling conditions and the surface position can influence the roughness parameters values, experimental tests were carried out by modifying the values of the two factors. The experimental results were mathematically processed, and power function type mathematical models were determined for the roughness parameters *Rz, Rt, Rp, Ra, Rq, Rc*. These models provide information on the direction of action, the intensity of the influence exerted by the cooling conditions, and the angle of inclination of the test sample surface on the values of the mentioned roughness parameters.

S3 - 2. Aspects regarding the modelling and design of 3D-printed bending soft pneumatic actuators

Ciprian Rad, Olimpiu Hancu, Ciprian Lăpușan

Department of Mechatronics and Machine Dynamics, Technical University of ClujNapoca, 400114 Cluj-Napoca, Romania

Abstract. Soft robotics has the potential to revolutionize our society and industries due to its increased adaptability and soft interaction with environment. In this context, the paper presents the results of finite element modelling and design of two 3D-printed bending soft pneumatic actuators made from NinjaFlex® flexible filament. Geometrical parameters of the actuators were chosen based on the recommendations from the literature and NinjaFlex® material elastic properties were modelled using Ogden hyperelastic model. The simulation was implemented in ANSYS® Workbench software and both designs were compared and analysed in terms of bending angle performance and equivalent (von-Mises) stresses for an input pressure of 0.1÷0.5 MPa with an increment of 0.1 MPa. The obtained simulation results can be used as a design guideline for 3D-printed bending soft pneumatic actuators made from flexible thermoplastic polyurethanes.

S3 - 3. Monitoring the temperature of contact wheel/rail in a tramway with an infrared sensor programmed by a microcontroller

Elhocine Chiba, Mourad Abdelkrim, Abderrahim Belloufi, Imane Rezgui and K. Maou

University Kasdi Merbah Ouargla, Faculty of Applied Sciences, Department of Mechanical Engineering, Ouargla 30000, Algeria
Laboratory of Applied Mechanics and Energy Systems, Faculty of Applied Sciences, Department of Mechanical Engineering, Ouargla 30000, Algeria

Abstract. Conditions monitoring of railway transportations has become a global interest, and also need a requirement for increased safety, dependability and efficiency are the most important aspects of the railway industry world. The approaches to condition of monitoring the temperature of the contact wheel and rail in railway transport systems especially in the tramway have been evolving and have become equally significant and challenging. Usually, the sensors are used to monitor the strain, vibration, temperature, acceleration, movement...etc., in continuous manner. Because the tramway is completely covered, unlike the trains, it is therefore very difficult to use the measuring equipment, so the sensors are used, which are programmed with a microcontroller. The aim of this paper is the creation of a measurement tool, programmed with a microcenter designed for accurate measurement of the temperature of wheel and rail in contact.

S3 - 4. A functional design analysis of a robotic-guided brachytherapy instrument

Paul Tucan[1], Florin Graur[2], Andrei Caprariu[1], Corina Radu[2], Alin Burz[1], Calin Vaida[1], Nadim Al Hajjar[2], Tiberiu Antal[1] and Doina Pisla[1]

[1]CESTER, Technical University of Cluj-Napoca, 400114 Cluj-Napoca, Romania
[2]Iuliu Hatieganu University of Medicine and Pharmacy of Cluj-Napoca, 400012 ClujNapoca, Romania

Abstract. The paper presents the functional design analysis-based improvements of a robotic guided medical instrument for brachytherapy. The initial design of the medical instrument isanalyzed, and its weaknesses are identified and analyzed from several points of view (functionality, ergonomics and materials). The design analysis reveals the specific improvementsfor the instrument components to achieve a better functionality of the medical instrument and increase the accuracy and safety of the robotic-assisted medical procedure.

S3 - 5. Reconstruction of orbital wall by using hybrid manufacturing operations

Sergiu Pascu[1], Nicolae Bâlc[1], Adrian Augustin Pop[2]

[1]Department of Manufacturing Engineering, Technical University of Cluj Napoca, Romania
[2]Department of Electrical Machines and Drivers, Technical University of Cluj Napoca, Romania

Abstract. This paper will discuss the solutions and the main parameters used to print a mold that will be used in a manufacturing process for a personalized implant in orbital fracture situations. The main purpose of this article is to rebuild the damaged orbit. The new orbit should have dimensions and accuracy similar to one of the original elements. Based on the computed tomography (CT) of the patient, the images are extracted and processed. With that information, a customized implant is manufactured. In this article, a case study of a patient suffering from an orbital fracture is presented. Based on the CT images, a mold was printed on additive manufacturing equipment (AM). The manufacturing parameters being highly correlated with the requirements that are needed for this case such as hardness, accuracy, surface roughness and support removal were chosen based on a series of tests and results from other studies. Another aspect that was analysed was related to the material from which was manufactured the mold. The forming and cutting of the mesh are simplified, by introducing the formed metallic mesh making it ready to be applied to real patients and therefore decreasing the effective time required for this kind of operation.

S3 - 6. Criteria for analyzing online traffic encountered in web and mobile applications in order to model an automated application testing system

Crina Duta[1], Nicoleta Carutasu[2], Iulia Stanica[3] and Andrei Georgian[4]

[1]Doctoral School of Industrial Engineering and Robotics, Faculty of Industrial Engineering and Robotics, University Politehnica of Bucharest, Splaiul Independenţei 313, Bucharest, Romania.
[2]Department of Robots and Production Systems, Faculty of Industrial Engineering and Robotics, University Politehnica of Bucharest, Splaiul Independenţei 313, Bucharest, Romania.
[3]Department of Computers and Information Technologies, Faculty of Engineering in Foreign Languages, University Politehnica of Bucharest, Splaiul Independenţei 313, Bucharest, Romania.
[4]Doctoral School of Entrepreneurship, Engineering and Business Management, University Politehnica of Bucharest, Splaiul Independenţei 313, Bucharest, Romania.

Abstract. Over time, the evolution of technology has left its mark on our lives and has highlighted its need for and importance of all areas of activity, both social and economic. There is a global increase in the trend of automation of work processes and the use of software products more and more often in any type of activity to optimize and increase work capacity. The growth of e-commerce is one of the segments favored by the emergence and evolution of technology, allowing us to always be connected to market demand and supply. In order to improve ecommerce, we need to make sure that the software available to users is adjusted to their needs. In this paper, we propose a technique for analyzing the necessary criteria to develop an automatic testing system for web and mobile applications based on the analysis of user behavior and reports extracted from recorded online traffic. By trying to reproduce the real behavior of users in the testing process it can enhance the risk management and improve the quality of the delivered product.

S3 - 7. Development and control of a virtual industrial process for assembling computers

Goran Munđar

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Abstract. A virtual manufacturing method represents the emerging approach that allows companies to improve their processes in order to introduce new products more quickly to their markets in a cost-effective manner. This involves building a synthetic and integrated environment based on software tools and systems, such as Virtual Reality and Simulation, to facilitate such processes. This paper presents the development of virtual industrial environment, highlighting the development and control of virtual industrial process for assembling computers by combining two simulation software tools. Development of industrial process was performed using Factory I/O software tool, while the control program was developed using FluidSim software tool. This paper also highlights the usage of OPC communication protocol, that was used for communication between software tools during simulation.

S3 - 8. Testing mechatronic systems and their integration into the digital enterprise

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Abstract. When a mechatronic system is built, certain considerations prevail. The product needs to follow certain steps in production. Here is discussed the need to test an industrial mechatronic system during production and the interfaces of its components. As mechatronic systems tend to become increasingly complex, the test methods should include certain strategies that allow the delivered to the customer with the desired specifications and in a timely manner. With the help of the digital factory, a product is stored electronically and a new or an improved variant of the product could be at any time created, with less effort in production, before this one becomes uninteresting on the market.