Introductory notes for the Acta IMEKO second issue 2021 General Track

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1. INTRODUCTORY NOTES FOR THE ACTA IMEKO GENERAL TRACK

This issue includes a General Track aimed to collect contributions that do not relate to a specific event. As Editor in Chief, it is my pleasure to give readers an overview of these papers, with the aim of encouraging potential authors to consider sharing their research through Acta IMEKO.

Elena Fitkov-Norris et al., in 'Are learning preferences really a myth? Exploring the mapping between study approaches and mode of learning preferences', present an interesting study on the presence of the conversion effect in the mapping related to the strength of students' preferences for receiving information in a visual, auditory, reading/writing, or kinaesthetic modality and the study approaches they adopt when taking notes in class, learning new concepts, and revising for exams. This paper opens up the possibility of new measurement frontiers, as it stimulates research on the definition of new measurement methods and instruments for assessing and describing the approach taken by students to their studies.

In 'A colour-based image segmentation method for the measurement of masticatory performance in older adults', Lorenzo Scalise et al. present a specific measurement method based on the automatic segmentation of two-coloured chewing gum and colour features using the K-means clustering algorithm. The proposed solution aims to quantify the mixed and unmixed areas of colour, separated from any background colour, in order to evaluate masticatory performance among older people with different dental conditions. This innovative measurement method will ameliorate people's quality of life, especially the elderly.

Using the example of measurements of ion activity, Oleksandr Vasilevskyi in 'Assessing the level of confidence for expressing extended uncertainty: a model based on control errors in the measurement of ion activity' proposes a method for estimating the level of confidence when determining the coverage factor based on control errors. Based on information on tolerances and uncertainty, it is possible to establish a reasonable interval around the measurement result, within which most of the values that can be justified are assigned to the measured value.

A novel design that changes the accelerometer mounting support of a commercial pneumatic shock exciter is described in 'Investigating the transverse motion of a pneumatic shock exciter using two different anvil mounting configurations' by Christiaan S. Veldman. The aim is to reduce the transverse motion to which the accelerometer is subjected during shock excitation. The author describes the mounting support supplied by the manufacturer, the design changes made, and the measurement data to compare the transfer motions recorded using two different mounting designs.

Roberto De Fazio et al., in 'Sensor-based mobile robot for harsh environments: functionalities, energy consumption analysis and characterisation', illustrate the design of a semi-custom wheeled mobile robot with an integrated high-efficiency mono- or polycrystalline photovoltaic panel on the roof that supports the lithium ion batteries during specific tasks (e.g. navigating rough terrain, obstacles, or steep paths) in order to extend the robot's autonomy.

A new e-textile-based system for the remote monitoring of biomedical signals, named SWEET Shirt, is presented by Armando Coccia et al. in their paper 'Design and validation of an e-textile-based wearable system for remote health monitoring'. The system includes a textile sensing shirt, an electronic unit for data transmission, a custom-made Android application for real-time signal visualisation, and desktop software for advanced digital signal processing. The device allows the acquisition of electrocardiographic, bicep electromyographic, and trunk acceleration signals. The study's results show that the information contained in the signals recorded by the novel systems are comparable with those that can be obtained by a standard medical device used in a clinical environment.

Valery Mazin, in 'Measurements and geometry', demonstrates the points of contact between measurements and geometry, which is done by modelling the main elements of the measurement process by the elements of geometry. It is shown in the study that the basic equation for measurements can be established based on the expression of a projective metric and represents its particular case. Commonly occurring groups of functional transformations of the measured value are listed.

In 'Towards the development of a cyber-physical measurement system (CPMS): case study of a bioinspired soft growing robot for remote measurement and monitoring applications', Stanislao Grazioso et al. report a preliminary case study of a CPMS, namely an innovative bioinspired robotic platform that can be used for measurement and monitoring applications in confined and constrained environments. The innovative system is a 'soft growing' robot that can access a remote site through controlled lengthening and steering of its body via a pneumatic actuation mechanism. The system can be endowed with different sensors at the tip or along its body to enable remote measurement and monitoring tasks; as a result, the robot can be employed to effectively deploy sensors in remote locations.

The heterogeneous topics of the papers submitted to the General Track confirm Acta IMEKO is the natural platform for disseminating measurement information and stimulating collaboration among researchers of many different fields but united by their common interest in measurement science and technologies.

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Editor in Chief