

# The Advantages Of Implementation At Multimedia Techniques In Instrumentation Area

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**Abstract** - The new implementation tendencies of multimedia techniques in all areas that involve the communication and data transfer as and the interface man-engine found applications in instrumentations area also. The orientation of techniques, methods and measurement devices toward digital equipments does the multimedia methods utilisation to be easy and allows a facile and efficacious using of equipments along with the appearance of virtual instruments with specialised functions.

## I. Introduction

There are two distinct areas in instrumentation: physical world that contains the matter and energy and mathematical world (imaginative, intuitive) used to decode the schemes founded in real world. Figure 1 presents a scheme of way in that mathematics interacts with physical world of events. In each presented group exists a cause-effect process and paths by dint of which physical events and mathematics (where it can do the deductions) change the data.

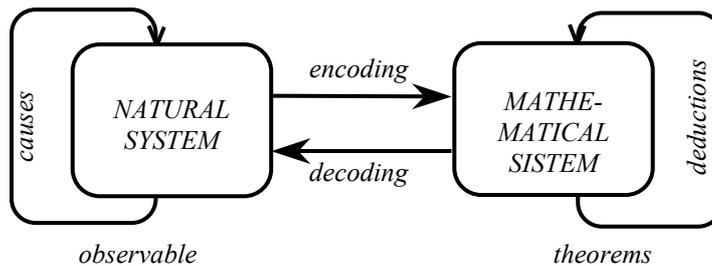


Figure 1. Mathematically modeling process of Robert Rosen

From informational point of view, the functions accomplished by man in the relation with the device or with the environment are following:

- The supervising function – depending on the choice of reference systems. From de informational point of view, the only reference system is dependent by the experiment but not by the used device.

The supervision function is not identified with the perception function because this involves besides this and another aspects keeping on the dynamic of process how plough be the attention, the rating, acknowledge, the mental model of experiments, s.o.

- The diagnose function is that permit to operator to intervene directly about experiment through the informational system. The resolving conditions of these actions are the existence of a mental model of entire conducted process and the sequential formation of some operative models based upon the received information.
- The decisional function is only that is able to establish continuity in the activity of the operator, this being required by the informational nature of man and by his function in the energy-informational system.
- The adjustment function that intervene in order to maintain the parameters' value in natural limits.
- The control function that appears as an equivalent of supervising function if we look it by dint of acts interposed by the operator.

But then, the measurement process doesn't finish at the same time with data acquisition and receiving. The information can exercise an effective influence about the systems that received it. The process is named *effect of communication*, generating a voluntary process stimulus-reaction (because not any process stimulus-reaction represents a communicative situation; for example the closing reaction of eyes to a photograph camera flash-light). In this context, communication becomes a process by dint of which a transmitter transmits an encoded data to a receiver through of a channel on purpose to produce certain effects about receiver [3].

## II. Measurement as informational instrument

This is a trine interchangeable path between time, energy and information, which is controlled by limits about data quantity that can be obtained with a given budget of energy (if we do a slow determination, use else little energy than if we do it fast). It issued form here that reversible process are more efficient (spend else little heat) than irreversible ones. There is using betimes exorbitantly many energy for the technological or informational progress. Used-up resources in these aims should to arrive in consensus with limits that nature requires its regarding on the accuracy of time measurement, how many energy must spent for acquire the data, how near the criticality state are the complex system that we see and how much accuracy is our technology to errors and to the chaotically amplification of uncertainties [2]. In measurement area, an elemental component is *communication*. The impossibility to use data is obvious just at the average level of measurement – measurement device without this communication. Departing from the definition of dictionary, bring to knowledge, notice, presentation, communication is a process that disposes of some fundamental component from the angle of communication sciences: transmitter, encoder, datum, channel, noise, receiver, ideal be to exist a bi-directional communication even if it is not uses the same channel or the same encoder. From this point of view, the measurement can be seen as a complex system, the metrological features being not the only ones that can characterize it.

In metrology we are confront with a complex interspersation of not less than four general theories: a theory of system formation and differentiation, a theory of evolution of these systems and of the concepts, a theory of sense and aims constituting, a theory of the communication wais. The object of these theories are considerate interdependence to the formation level of globally metrological system in the sense that the technological evolution adjourns to the extensive systems, more complex and more different, and systems develop the specialised communication ways, characterized in the same time through a higher level of generalization, in the aim to exceed the level of differentiation already touched. Consecutively it's achieving a coordinate of different subsystems with the communication ways arriving to a delocalisation in time and space.

One of elemental exactingness of modern theory of metrological systems wants to represented these openly to environment and in imbalance, thing what changed the fundamentally problem of classic metrologies which imagined the system as an whole composed from parts with the risk to define ontological its identity. The elder difficulty appeared when it was observed the fact that entire represented besides than sum of constituent parts. Just when the concept of device was substituted of the notion of system, it wasn't going from the determined systems model that could accept now and again just a certain type of measurement operation. To the environmental changes in which there was placed, the system could answer in only one way, always predictable as such.

## III. Multimedia models

The advantages offered in multiple areas by the digital method for propagating the signals drove to the using of this inside of measurement systems also. The increasing of computers' performances and the expanding of the using of these did that the measurement systems what include this type of components to form don't merely a distinct category but to be used-up with preponderance beside exclusive analogical measurement systems.

The implementation of a software instrument for analysis of electric signals presupposes the use of a computer as software nucleus and of a data acquisition system together with the software support what is evidenced through a mobile programmable scripting, able to project on monitor any measured parameter, chart, tuning, button, s.o., converting thus the host into a measurement system. So it is guaranteed a series of advantages and facilitations such as: administration of data acquisition process and the possibility to perform an automatic measurement, the calculus of characteristic parameters of electric signals, the representation of state parameters of analysed signals, the multi-tasking work, work facilitations in background, graphic interface, the possibility to transfer the datum between various applications and the correlation of applications, use of high-level and advanced programming language, etc.

Now, the data management in communication, business, education, entertainment, represents most successful application of multimedia techniques, but also the multimedia represents a provocation at the same time with the growth of the processing speed and accuracies what does it employable on wide scale in industry and research, obtaining spectacular results. As the digitisation and coding of speech, image, video applications, text, and chart become accessible on modest adding system with

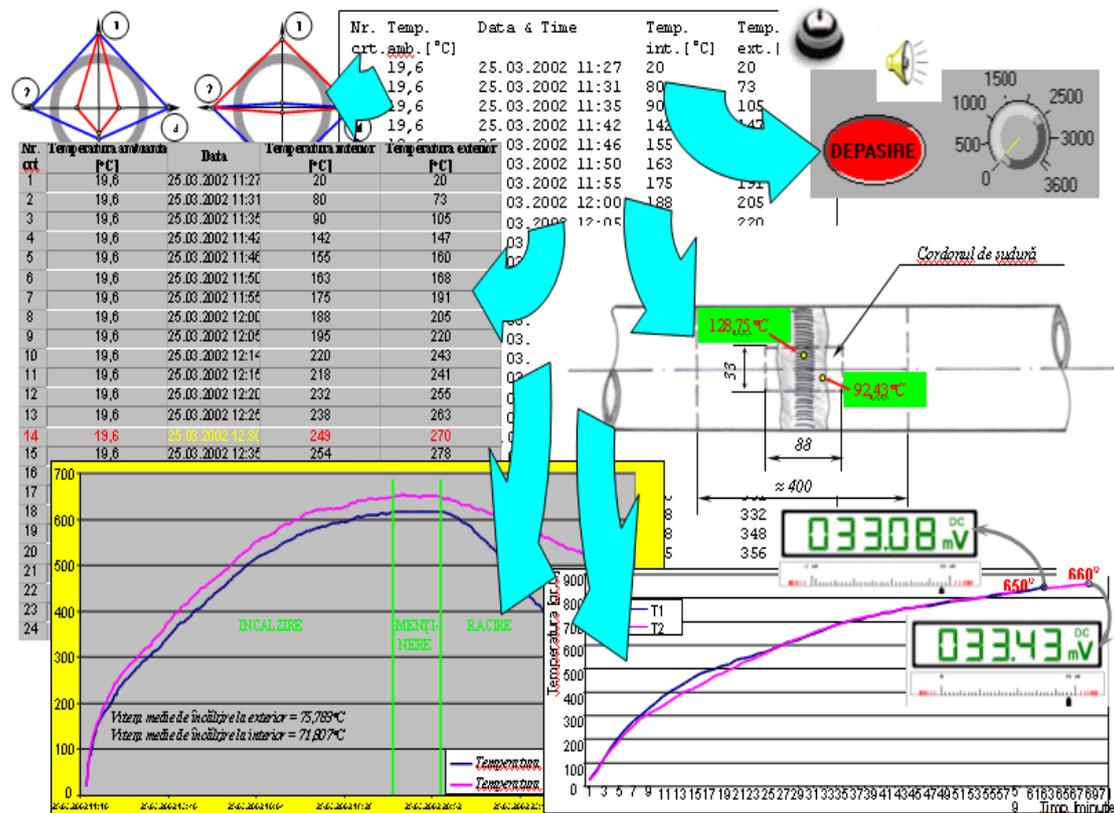


Figure 2. Multimedia models

development of WEB structures, massive amounts of visual datum can be accessed online. This pledges a growth of storage data level.

The introducing of digital adding systems in the measurement area doesn't drove just to advantage. The big number of obtained values abaft automatic determinations, the big databases constitute from sequences of digits, drive to a difficult analysis and to difficulties in observation of some abnormal values, of some threshold values or of some situations that require the immediate intercession. The used-up multimedia techniques permit the fast access to datum, with a fast answer from human users and fast observation of values that are wanted to be emphasized. In the next figure there are presented some different ways for representation of displayed values by an adding, each of these with own advantages and disadvantages.

The purpose of this paper is using of certain way of representation and its particularization for a certain application, the fast access of human camera-man to the desirable datum, the optimum transfer of datum so that it to drive to a cerebral fast remaking and comfortable.

The technologies appeared at the same time with the computer networks are essential for development of multimedia databases which to bear with the dynamic interactive interfaces. To develop the index and recuperation technologies of visual datum in the big archives it was developed algorithms for contextual search. Multimedia is one of the most important aspects of the informational age. It delivers multiple possibility to present the information how much intuitive and optimum from the point of view of human acquisitiveness and regarding the information that follows to be embossed. It refers to the processing of image, chart, video, sound and has to base standards regarding the multimedia architecture for processed image, techniques for intelligent data processing, methodology and techniques of coding, storage, transmitting and recuperating of information in most various format (from simple chart and sound to video, videoconference, distance education, system for data acquisition and processing, s.o.). The designing of multimedia architecture is based on standards that assure a maximum efficiency and an optimum usage of computing system's configuration (the optimum usage

of operative memory of system when don't exist enough video memory or of microprocessor's tasks when the display adapter doesn't contains the specialised coprocessors) [1].

The processing of multimedia signal becomes difficult because the information can come from multiple sources, containing the multiple formats and the multiple methods of presentation. The superior processing involves the usage of hardware structures that include the programmable digital signal processors (PDSPs) and the application specific integrated circuits (ASICs) that, besides the low cost, permit the performance of complex operations in a limited time due to the implemented algorithms.

The usage of multimedia techniques in the instrumentation area must to use fast algorithms, which to process the information as often as not real-time or in a limited time after the input signal is available on system memory. The real time processing is a characteristic of interactive characters of multimedia applications, the number of necessary calculus in the unit time being dependent on the type of input signals, configuration of computing system and the way to data displaying. In this case the obtained jobs' quality results abaft of a compromise in according to the time disposal for processing, in the first instance, taking into account the main resources which must allocated to the basis instrumental function (for example the video images, animations or even the three-dimensional representations require a high speed for processing). To achieve the real-time data processing below the given constraint, we must to search an optimum between the processing algorithm of multimedia signal and the micro architecture that implements this algorithm. But then, the alternative algorithms must to optimum exploit the system resources in order to obtain the useful parallelism for an interactive application.

The hardware can be customized to execute the algorithm through the most efficient method. The solution corresponds to the minimal costs, its specialization caning be achieved at different levels depending on the integration degree – for example the special functional blocks how could be a matrix multiplier or multiply-and-accumulator (MAC) used in programmable DSPs. Another examples could be the inclusion of a system for inversion of bit for fast Fourier transformer or usage of special algorithms (for example CORDIC), the arithmetic unit being an efficient alternative to calculate, for example, circular trigonometrically and exponential functions. Another example is the replacement of the arithmetic functions implemented through Boolean functions with operation of data extracting from memorised tables. The parallelism of operations is the key to achieve a material processing in short time.

Because speech, image, and video shot play the dominant functions in multimedia data processing, the usage of an enough number of applications is important. The next multimedia technologies will need to use the information appealing to the techniques of artificial intelligence (recognition, interpretation, and interactions of multimode signals). The technological frontier of data processing goes from codification (MPEG, MPEG-2 and MPEG-4) to automatic recognition (MPEG-7) that is focused on description of multimedia content. The next investigation area will cover the segmentation techniques, detection of model and recognition. For the neuronal network, betimes in combination with computational intelligence structures and fuzzy systems is prefigured a promising horizon. An efficient data representation can facilitate much multimedia functionality, such as indexes and accesses. For many multimedia applications, the pre-processing of input data (image 2D or 3D segmentation, representation in MPEG context, s.o.) is compulsorily to be able then facile classified.

As the bigger data archives in digital text, audio and video format appear on various servers in all world, data localization and accessing becomes difficult. These actions require some automatic searching tools for indexes and accesses. In model detection (paternal) the object is of a big importance for computer. The task involves the specific discovery of model or image. This can have important economic implications for example in the automatic banking fitting-out (ATM).

The multimedia signal processors are more than structures that put together the textual, video, and audio information. The correlation between audio and video can be used-up for the obtaining of a more efficient recognitions and codifications. Human performances regarding the recognition and perception of informational structures have state on the base of the performances of new systems that permit the multimode data processing.

The success of multimedia techniques implementation in the engineering area is come on uniformalization of the techniques and data structures. For efficacious usage of computer to images reconstruction there are two models: that which requests that image analysis system to capture the intrinsic character of image therefore to understand the nature of process image (image analysis to include the model selection, parameter appreciation, physical image, and the relation of the image with the type of processing) and the stochastic model based on the image analysis (most used-up).

#### IV. Conclusions

Through the physical nature of many measured phenomenon enforces that the used-up transducers to generate the analogical signals. First processing (conditionings) of these signals (amplifications, linearization, and certain types of filtering) still remains the appanage of electronic circuits working in the analogical area. From this point, opening with a series of types of signal conditioners (some filtering and linearization, multiplexations) getting on with its transmission, data processing, its storage and up to data transmitting to the user system, all the operations from a computerized measurement system are effectuated by the digital electronic digital components, independence or find out below the control of a computer.

The modern method of data transmission below different appearance, data modelling and its encoding so that to be used the variously transfer channels (text, sonorous, chart, animate, etc.) drive to the exciding of some stress and tiredness factors (due to concentration about data come from an only one organ of sense and cerebral remaking in order to observe some crisis situations) trough its distribution between more organ of data perception and remakes.

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