

# Thermal Images Expert Evaluation

Valentina Bozhenko, Petro Kondratov, Jaroslav Tebenko

**Abstract** - As a result of the Thermal Images processing with the methods and algorithms implementation, developed for the digital Television images, the loss of the crucial important part of useful information is possible. Consequently the software-processed Thermal Images information capability evaluation methods and ways development is necessary for the Thermal Monitoring effectiveness analysis and control. This article is devoted to the problems of the Thermal Images program procession and their results Expert evaluation.

**Keywords** - Thermal Image, Thermal System, image Expert evaluation.

## I. INTRODUCTION

In the number of cases of technical exploitation objects condition the Complex investigation of the images, obtained from the infrared radiation spectral range, which is invisible for a human eye [1], are the most operative and effective mode to obtain the necessary data.

The digitization and the followed software image processing usually assist to their quality properties substantial improvement. However, in some particular cases (e.g. processing of the images from the Thermal Camera) the loss of information crucial important part is possible. Consequently the software proceeded Thermal Images (TI) effectiveness evaluation methods and ways development is necessary.

## II. THE ANALYSIS OF THE THERMAL IMAGES SOFTWARE PROCESSION WAYS

The experience of the Thermal Systems exploitation have confirmed the necessity of the followed possibilities existence, realized by the special software creation: for the some specific Input Image features detection – the brightness and contrast Adjustment; for the whole object identification – the Inversed Image creation; for some specific high-contrast thermal areas detection – the Pseudo-Colored version of an object Image creation [2].

As a result the Software Complex, developed by the Delphi language sources under the MS Windows operational system, is offered by authors. It provides with the possibility to create three input TI version – Grayscale, Pseudo-Colored and Inversed grayscale in order to facilitate the followed Image Analysis.

In order to evaluate the TI information capability the subjective-statistic methods were implemented. Despite it is generally agreed that they are complicated both on the Experimental and resulting data Procession stages, they provide with the possibility to precise quantitative evaluation of the images qualitative indicators.

Valentina Bozhenko, Petro Kondratov, Jaroslav Tebenko, Polytechnic National University, S. Bandery Str., 12, Lviv, 79013, UKRAINE,  
E-mail: shkliarskyi @ polynet. lviv.ua

For the purpose to collate the quantitative and the qualitative TI observed characteristics the 5-score band scale was used for the Evaluation [3]

Since during the Subjective Expertise conduction in the number of cases were noticed that the resulted boundary values and the band score boundaries often mismatch, in order to snap the scores to the top and the bottom band scales the Images Set was supplement with the auxiliary images with the relatively high and the very low quality, for the 5,0 and the 1,5 points relatively. Those images were displayed and evaluated together with the rest of the Set. Such affixment implementation allows avoiding the Expert Group adaptation to the influence of the average band score.

For the purpose of the every particular Observer scores stability inspection, each of the Basic Images was displayed two times drying the Set demonstration. The same Image assessed couples, marked by the same observer, with the difference more than for 1 point, were later excluded from the enumeration.

On the one hand, this prevention undoubtedly has made the experiment more complicated, but on the other hand it substantially increased the output result veracity (see fig).

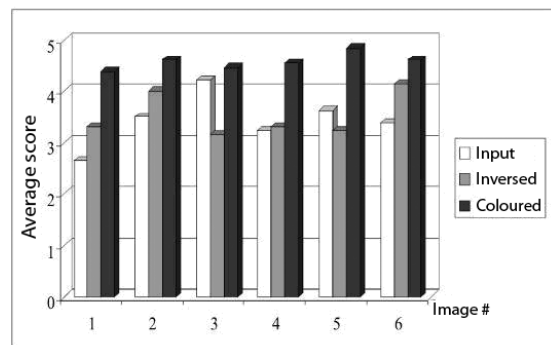


Fig. 1. The graph of the software-proceeded Thermal Images average score

## IV. CONCLUSION

The Experiment described above, allows to make the conclusion that the output result of the conducted Evaluation is valid, the received Images of the detected object are acceptable for the Thermal System operator, and the Software Complex installation for their processing allows to increase the Thermal Monitoring effectiveness in 1.03 times with the Inversed Image creation and in 1.33 times – with the Pseudo-Colored Image version creation.

## REFERENCES

- [1] G.Gaussorgues, "La thermographie infrarouge. Principes - Technologie – Applications", Paris: 1984, 416 pp.