

## ACADTUM SCIENTIFIC REPORT

TE 156/2022; Project code PN-III-P1-1.1-TE-2021-1293

### **Stage 2. Implementation of the software system for the automatic and computer-assisted diagnosis of abdominal tumors**

**Reporting period:** 01.01.2023 – 31.12.2023

#### **Summary**

Within the 2<sup>nd</sup> stage of the ACADTUM project, corresponding to the period 01.01.2023-31.12.2023, the steps regarding the design of the software system for automatic and computer-assisted diagnosis of abdominal tumors continued, and its implementation was also carried out. Corresponding to these efforts, a complete set of medical imaging data was collected, the design, implementation and evaluation of advanced methods performing the segmentation and recognition of abdominal tumors being performed as well. The complete set of medical imaging data collected in the current stage included contrast-enhanced computed tomography (CT) images, as well as magnetic resonance images (MRI) of liver, pancreatic and kidney tumors, including early stages of their evolution, as well as preneoplastic stages. Regarding the segmentation and recognition methods, the comparison and sometimes the combination of deep learning methods with the conventional ones was carried out, for maximizing the accuracy of the automatic and computer-assisted diagnosis of abdominal tumors, respectively of their evolution stages. The obtained results were disseminated at international specialized conferences, in prestigious scientific journals, respectively in a book chapter published by an international publishing house (Intech Open). These steps were carried out in accordance with the project implementation plan and with the activities specified for the 2<sup>nd</sup> stage, corresponding both to the main objective of the project (O), that of Development of a software system for the automatic and computer-assisted diagnosis of abdominal tumors, based on medical images of different types, involving both conventional and deep learning techniques, as well as with the secondary objectives: O1. The development of advanced methods of image analysis and classification, in order to achieve a maximum performance in terms of the recognition of abdominal tumors from medical images of different types; O2. Comparing the performance of the conventional methods, respectively of the deep learning techniques, in multiple situations, in the case of various types of medical images; O3. Recognition of tumors in early stages, respectively of pre-neoplastic states, by appropriate methods; O4. Supporting research activities for young researchers.

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