



University POLITEHNICA of Bucharest  
Faculty of Automatic Control and Computers

Splaiul Independenței nr.313, sector 6, cod 060042,  
Bucharest, ROMANIA



**Prof. PhD. Eng. Costin-Anton BOIANGIU**

PhD coordination in “Computers and Information Technology”

**Contact:** University Politehnica of Bucharest, Faculty of Automatic Control and Computers, Computer Science Department, 313 Spl. Independentei, room EG405B, sector 6, 060042, Bucharest, Romania

**Tel:** +40762609111

**E-mail:** costin.boiangiu@cs.pub.ro

**Web:** [UPB] [https://cs.pub.ro/index.php/people/userprofile/costin\\_boiangiu](https://cs.pub.ro/index.php/people/userprofile/costin_boiangiu);  
[GoogleScholar] <http://scholar.google.ro/citations?user=z46E57EAAAAJ&hl=ro>;  
[ResearchGate] <https://www.researchgate.net/profile/Costin-Anton-Boiangiu>

**Research Profile:**

- Analysis and processing of images and signals: signal locality, super-resolution, deblur, unsupervised processing;
- Multimedia: efficient storage and processing of multimedia data;
- Virtual Reality: Sense Substitution, Sound-to-Image and Image-to-Sound Conversions;
- Software Project Management: educational approaches to teach the practical side of project management skills in software development;
- Computer Vision: detection and interpretation of gestures and emotions, OCR systems;
- Machine Learning: prediction of the evolution of markets (financial, energy, etc.);
- Computational Geometry: designing new object bounding volumes, efficiently from both computationally and volumetric point-of-view;
- Analysis of document images: detection of document layout and hierarchy, at both intra- and inter-pages level, design of an unsupervised document retro conversion system.

**PhD Coordinator since 2017**

**Academic Publications:**

- 49 articles published in international journals, including 5 in ISI-rated journals, 26 as the first author;
- 57 articles presented at international conferences, of which 37 ISI-indexed (or during ISI indexing process) 32 as the first author;
- 10 published books, 4 as the first author;
- 3 published chapters, all as first author;

**Research and development Projects**

- 9 international projects, 7 as director of the “CCS Content Conversion Specialists Research Center” in UPB; 10 national projects, 2 as Director of the “CCS Content Conversion Specialists” Research Center at UPB
- Selection:
  - EU-NPO, The European Newspapers Project, aggregation and refinement of newspapers through The European Library ([http:// www.theeuropeanlibrary.org/](http://www.theeuropeanlibrary.org/)). Website: [http:// www.europeana-newspapers.eu/](http://www.europeana-newspapers.eu/); Program Cadru: Competitiveness and Innovation Framework Programme (CIP 2007-2013, [http:// europa.eu/ legislation\\_summaries/ information\\_society/ strategies/ n26104\\_en.htm](http://europa.eu/legislation_summaries/information_society/strategies/n26104_en.htm)). Time period: 02/ 2012-01/ 2015.
  - METAE, The METADATA Engine, Ref: IST-1999-20021 ([http:// meta-e.aib.unilinz.ac.at/](http://meta-e.aib.unilinz.ac.at/)); 5th Framework, IST Programme (FP5), "Digital Heritage and Cultural Content" Section ([http:// cordis.europa.eu/ fp5/](http://cordis.europa.eu/fp5/)), Time Period: 09/ 2000–10/ 2003.
  - SIARP, “Self-instructing information system for on-line assistance to participants in urban road traffic - routing and prediction” (In original: "Sistem informatic autoinstruibil de asistenta on-line a participanților la traficul rutier urban - rutare si predicție"). Contract 11-065/ 14.09.2007, PNCDI2, Time Period: 09/ 2007 - 07/ 2010.

**Research areas proposed for PhD students:** Image Analysis and Processing, Multimedia, Virtual Reality, Artificial Intelligence, Machine Learning, Computer Vision, Software Project Management, Computational Geometry, Document Image Analysis.

**Examples of proposed PhD research topics for 2018:**

| <b>Title</b>   | <b>Description</b>  |
|--|---|
| <i>Locality and globality in signal, image, video processing</i> | This research topic proposes the development of a mathematical model through which local and / or global processes can determine the best "localities" and "globalities" and the most efficient way for combining and weighting out the results.  |
| <i>The representation of signals using “Elemental Dust”</i>      | The idea of this research topic is to replace the representation of a signal using the standard sampling technique by employing a cloud of particles called EDP ("Elemental Dust Particles") in which the signal local value is given by the local density of EDPs.   |
| <i>Voting-Based Intelligent Processing</i>                       | There are many areas of research for which 100% accuracy results cannot be produced: super-resolution, OCR, deblur, image segmentation, etc. This research aims to develop an intelligent voting mechanism or combination of results from distinct approaches that approximate the solution of the same problem.  |
| <i>Automatic video surveillance using drones</i>                 | Manage a number of drones: adaptive placement, video acquisition, generating controlled overlaps between video streams to efficiently perform super-resolution and build 3D models.   |
| <i>Electricity market prices prediction</i>                      | The goal is to develop an expert system that predicts the extremely volatile prices in the electricity market, having direct application on the Romanian market. This information system will contribute to the price and volume risk management, by providing trading strategies for energy market participants. |

| <b>Title</b>   | <b>Description</b>  |
|--|---|
| <i>Educational approaches for teaching the practical side of software project management</i> | Project management in software development is difficult to teach and experiment. The goal is to build an effective educational approach by combining collaborative, competitive, independent, synchronized learning tactics and team component management using clustering techniques.  |
| <i>Design using fractals</i>   | The theme proposes a new approach to designing buildings, surrounding objects, etc. Considering as the source of inspiration the "organic" vision of Antoni Gaudi, the renowned Catalan architect, the theme aims at identifying models for growth and filling of space with organic origin: shells, leaves, stems, trees, flowers and their subsequent use to approximate the volume of three-dimensional or two-dimensional scenes, giving them a natural design.   |
| <i>The Electronic Art</i>  | <p>The research main objective is to find answers to the following questions:</p> <ul style="list-style-type: none"> <li>▪ What are the most appropriate methods to computationally evaluate a work of art?</li> <li>▪ How could one computationally define a style / artistic current (cubism, impressionism, etc.)?</li> <li>▪ How can one translate a photo or a spatial volume into an artistic work of a particular style / current?</li> <li>▪ How can one "translate" an artistic work from one style into another?</li> </ul> |
| <i>Similar words determination without OCR</i>   | <p>Optimizing results and speed of OCR process by quickly recognizing similar words in a document scan and placing them in wordlists. The words in the lists can therefore be combined to generate a clear word from several "blurred" versions. The processing is similar to super-resolution from multiple input images.</p> <p>The result of the OCR applied to this clear word can be replaced in all the regions from where the original words were detected.</p>  |
| <i>Academic Arena Journal</i>  | <p>The idea behind this research is to develop a new type of journal that only accepts articles from a range of research themes for which results can be demonstrated in comparison with existing or competing approaches.</p> <p>It is necessary to define an open competition framework in which the journal accepts proposals only for certain technological approaches for which a measure of accuracy can be found and which can be compared with the existing results.</p>  |
| <i>Detection and interpretations of emotions and gestures</i>                                | The goal of the proposed research is to "periodically" measure the emotional state expressed by a person who is observed through a webcam. Measurement will be performed during some psychological counseling sessions between a therapist and a subject. We are interested in automatically assessing the progress made by each session and the status of the subject across sessions.   |

| <b>Title</b>  | <b>Description</b>  |
|---|---|
| <i>Reinterpretation of color in images and videos</i> | The theme aims to develop a method of compressing an input range of colors into a narrower domain with minimal loss of information. For example, starting from a color image or video sequence, some may want to generate an output in a specified color palette (e.g. gray, sepia ...) or imposing certain constraints (avoid colors that cause some perception difficulties for people with chromatic vision deficiencies) so as to preserve as much as possible the relative differences between the original colors.    |
| <i>Unsupervised enhancements of images and videos</i> | The theme is to find a sequence of unsupervised processing and new approaches to image procession stages like noise-reduction, local-global adaptive amplification of contrast, edge reconstruction. The goal is to get fully-automated improvements to images and video sequences damaged by ageing processes, captured in adverse conditions (low illumination), etc. Both subjective evaluations (based on average scores) and objectives (for example, correct character recognition following OCR) will be considered. |