



## **Biomedical data acquisition and applications workshop (BDAA workshop)**

Organized with the support by IEEE Bulgarian Section, IEEE CAS/SSC Bulgarian Chapter, IEEE ED/SSC Varna Chapter, TU Varna and Metrysis.

Technical University of Varna, Conference Hall  
**13 – 14 October 2017, 9:00h**

E-mail: [BDAAworkshop@gmail.com](mailto:BDAAworkshop@gmail.com)

Facebook: <https://www.facebook.com/CAS-SSC-Bulgarian-Chapter-415720668813543/>

Scientific coordinator: Valentina Markova, PhD

Report submitted on 21.11.2017

## **Abstract**

The “Biomedical data acquisition and applications” (BDAA) workshop was organized by IEEE CAS/SSC Bulgarian Chapter and hosted by Telecommunications Department, Technical University of Varna. The event has been supported by the IEEE Circuits and Systems Society in the framework of the 2017 IEEE CASS Outreach Initiative (ID 751).

The BDAA workshop aimed: (i) to support the advance of students and young professionals involved in CASS-related research and technology development activities, (ii) to facilitate their career planning and development, and (iii) to improve the chances for their engagement with IEEE CASS activities. The event was held on 13-14 October 2017 at the Technical University of Varna.

*Keywords:* IEEE CASS; outreach event

## 1. Description of activities

The Outreach Event offered specific opportunities for young professionals: (i) to meet prominent scientists working in the CAS area; (ii) to implement practical training session focused on the deployment of CAS technology in biomedical data acquisition applications; (iii) to present results of their studies on an IEEE-supported event.

The BDAA workshop was part of the October Science Fest at Technical University, Varna. The workshop included plenary, poster and demo sessions, discussions and training activities (cf. section BDAA workshop agenda).

Plenary talks were given by:

- prof. Petia Koprinkova, Bulgarian Academia of Science
- prof. Ivan Ganchev, University of Limerick, Ireland
- assist. Prof. Rositsa Goleva, PhD, New Bulgarian University
- assist. Prof. Sonia Vachinska, PhD, Technical University of Varna

The Plenary sections were attended by 50 participants.

In total ten posters and four demonstrators were presented during the poster session.

Summary of the plenary talks and students' papers were published in BDAA workshop proceedings.

The best poster prizes were awarded to:

- 1) Firgan Ferodov, "Ranking of statistical features of negative emotional states from EEG signals"
- 2) Ivelin Lefterov, "Biomedical feature extraction for stress detection"
- 3) Kalin Kalinkov, "Mobile system for biomedical data acquisition"

The two training activities, involving 20 students, were carried out with the support of Mr. Pencho Hristov, National Instruments. The focus was on:

- *Emotions and data acquisition of biomedical signals (Temperature, Galvanic Skin Response (GSR), ECG, EEG etc.)*

During the training, participants were acquainted with the basic principles of the recognition of emotional states and learn how to estimate informative descriptors related to the skin conductivity, heart rate, and EEG signals.

- *Wireless monitoring systems for the acquisition of biomedical data*

During this activity attendees learned about Cloud-based data acquisition and the functionality offered by the Cloud computing services for the monitoring, analysis and detection of emotional states.

After the training sessions a Discussion took place – summarizing the main accents of training, and offering some conclusion of the results. Trainees were given the opportunity to ask questions, express opinions, and suggest recommendations. Information and advertising materials were spread among all participants.

## 2. Quantitative metrics

Metrics	Target	Results
Number of participants informed about IEEE CASS activities	50	60
Number of participants involved in the training activities	20	20
Number of demo projects	5	4
Number of the questions, suggestions, and comments (during the presentation and Discussion)	20	30

## 3. BDAA workshop agenda

<b>Friday 13.10.2017</b>	
9:30 – 10:00	Registration for the First day
10:00 – 12:00	Plenary session
	<ul style="list-style-type: none"> <li>• Prof. Petia Koprinkova, “Machine learning techniques for EEG data processing aimed at human emotion detection”</li> <li>• assist. Prof. Sonia Vachinska, PhD, “Физиологичните и биомедицинските данни необходима основа за ергономичен дизайн”</li> </ul>
12:00 – 13:00	Lunch break
13:00 – 15:00	Training activity 1
15:00 – 15:15	Coffee break
15:15 – 17:00	Training activity 2
<b>Saturday 14.10.2017</b>	
9:30 – 10:00	Registration for the Second day
10:00 – 12:00	Plenary session
	<ul style="list-style-type: none"> <li>• prof. Ivan Ganchev, University of Limerick, Ireland, “European Cooperation in Science and Technology”</li> <li>• assist. Prof. Rositsa Goleva, PhD, New Bulgaria University</li> </ul>
12:00 – 13:00	Lunch break
13:00 – 14:00	Poster session
14:00 – 14:15	Coffee break
14:15 – 15:00	Demo session
15:00 – 16:00	Discussion

### 3. Photo Gallery



Best poster award



Training activities



Demo session



Demo session



Plenary session



Poster session

#### **4. Financial report**

The support by the IEEE CASS (\$4,000 USD) was used: (i) to pay the travel expenses of three speakers; (ii) for catering services; (iii) to ensure the prizes for the best student's papers; (iv) for promotional materials and (v) for accessories and consumables during training activities.

The Faculty of Computing and Automation, Technical University of Varna provided: (i) all necessary rooms (The Conference hall for the plenary presentations and a catering room for the lunch, two laboratories for the trainings); (ii) Free Wi-Fi access to internet; (iii) Technical staff and volunteers in support of the organization and implementation of the Outreach Event .



## Footnotes

<sup>1</sup>[Add footnotes, if any, on their own page following references. For APA formatting requirements, it's easy to just type your own footnote references and notes. To format a footnote reference, select the number and then, on the Home tab, in the Styles gallery, click Footnote Reference. The body of a footnote, such as this example, uses the Normal text style. *(Note: If you delete this sample footnote, don't forget to delete its in-text reference as well. That's at the end of the sample Heading 2 paragraph on the first page of body content in this template.)*]

## Tables

Table 1

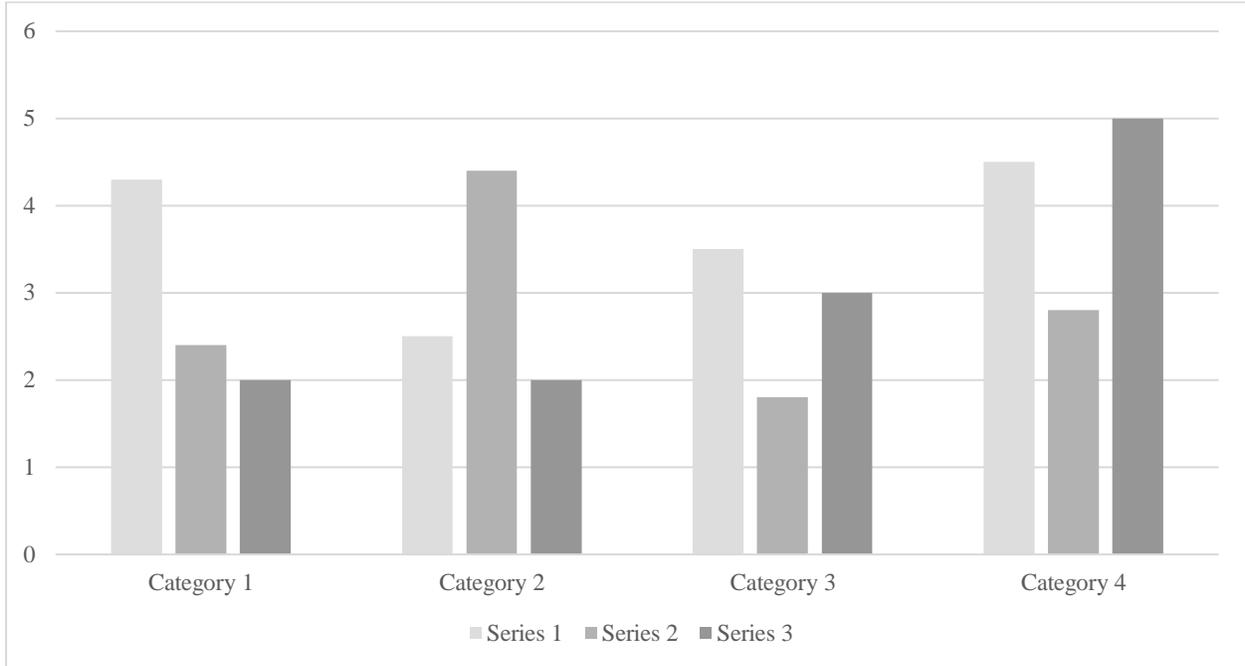
[Table Title]

| Column Head |
|-------------|-------------|-------------|-------------|-------------|
| Row Head    | 123         | 123         | 123         | 123         |
| Row Head    | 456         | 456         | 456         | 456         |
| Row Head    | 789         | 789         | 789         | 789         |
| Row Head    | 123         | 123         | 123         | 123         |
| Row Head    | 456         | 456         | 456         | 456         |
| Row Head    | 789         | 789         | 789         | 789         |

*Note:* [Place all tables for your paper in a tables section, following references (and, if applicable, footnotes). Start a new page for each table, include a table number and table title for each, as shown on this page. All explanatory text appears in a table note that follows the table, such as this one. Use the Table/Figure style, available on the Home tab, in the Styles gallery, to get the spacing between table and note. Tables in APA format can use single or 1.5 line spacing.

Include a heading for every row and column, even if the content seems obvious. A default table style has been setup for this template that fits APA guidelines. To insert a table, on the Insert tab, click Table.]

Figures title:



*Figure 1.* [Include all figures in their own section, following references (and footnotes and tables, if applicable). Include a numbered caption for each figure. Use the Table/Figure style for easy spacing between figure and caption.]

For more information about all elements of APA formatting, please consult the *APA Style Manual, 6th Edition*.