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E-NEWS LETTER

Master of Computer Applications

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Latest Update World

Researchers develop a self-supervised AI adaptation framework to enhance sensing accuracy of EMG devices

Surface electromyography (EMG) has been widely used to measure the electrical activity of muscles. However, the variability in EMG sensing signals due to biological differences of different users significantly degrades the performance and potential of EMG systems.



Recently, researchers from City University of Hong Kong (CityU) developed a deep learning-based framework called EMGSense, which can achieve high sensing performance for new users using AI self-training techniques.

This opens a new path for developing more advanced and accurate wearable EMG devices in areas like neurorehabilitation and virtual reality.

This latest invention won an award at The 21st International Conference on Pervasive Computing and Communications (PerCom 2023) held at Atlanta, U.S.. It helps overcome the bottleneck in existing approaches and supports the widespread adoption of EMG-based applications.

EMG measures the electrical activity of muscles using surface electrodes on the skin. EMG-based sensing has attracted considerable attention in recent years and has created a lot of intelligent applications, such as neurorehabilitation, activity recognition, gesture recognition and virtual reality.

But a fundamental challenge in existing EMG systems is how to tackle cross-user scenarios. EMG signals can be seriously influenced by various biological factors, such as body fat, skin conditions, age and fatigue. So significant performance degradation would be caused by time-varying biological heterogeneity when the EMG system is employed by different users.

To address this challenge, researchers from the Department of Computer Science at CityU recently proposed the first low-effort, AIempowered domain adaptation framework, called EMGSense, which provides high-accuracy EMG sensing for new users using AI-training techniques. EMGSense is a self-supervised system with a self-training AI strategy. It can cope with the performance degradation caused by inter-user biological heterogeneity.

The new framework integrates advanced selfsupervised techniques into a carefully designed deep neural network (DNN) structure. It uses small-scale unlabeled data from a new user and pre-collected data from several existing users to train a discriminative model to realize intelligent applications for new users. The pre-collected data is stored in the cloud and can serve all new users, reducing the burden of data collection and annotation.



EMGSense's DNN structure involves two training stages, which complement each other. It first eliminates user-specific features in the feature space for easy transferring, and then it employs AI techniques to re-learn new target's user-specific biological features in that space for high-performance EMG sensing. This allows EMGSense to adapt to new users with satisfactory performance in a low-effort, selfsupervised manner without wasting significant deployment overhead.

In addition, the researchers leveraged the unlabeled data collected during the usage to achieve long-term robust performance that can handle the time-varying nature of EMG signals.

A comprehensive evaluation of two sizable datasets collected from 13 participants indicated that EMGSense achieved an average accuracy of 91.9% and 81.2% in gesture recognition and activity recognition, respectively. EMGSense also outperformed state-of-the-art EMG-oriented domain adaptation approaches by 12.5% –17.4% and achieved comparable performance with one trained in a supervised-learning manner.

The novel EMGSense framework has the potential to revolutionize the field of EMG sensing by reducing the burden of data collection and annotation, while achieving high accuracy in a low-effort manner. It fills the research gap in

heterogeneity problems in EMG sensing and enables a variety of novel EMG-based cross-user applications, such as clinical practice, neurorehabilitation and human-machine interaction. It also makes a humble step towards the ubiquity of smart EMG wearable devices with higher performance in real-world scenarios.



Venue: SRMSCET Cricket Ground

On 4th May-2023, the MCA department organized a Cricket Match in the club activity hour. In which all the faculty members were present to motivate students.

All the players were holding a good time and giving their best performance.













MCA FAREWELL CELEBRATION

25th May-2023

Venue: SRMSCET, MBA Seminar Hall

दिनाँक 25th May-2023 को एमसीए प्रथम वर्ष के छात्रों द्वारा एमसीए अंतिम वर्ष के छात्रों के लिए एक विदाई समारोह का आयोजन किया गया।

इस आयोजन के अवसर पर ट्रस्ट सलाहकार इंजीनियर सुभाष मेहरा, डीन एकेडमिक्स एसआरएमएस सीईटी डॉ. प्रभाकर गुप्ता, प्रिंसिपल एसआरएमएस सीईटी आर डॉ. एल.एस. मौर्या और हेड ऑफ़ डिपार्टमेंट डॉ. अनुज कुमार उपस्थित थे। कार्यक्रम की शुरुआत सम्मानित गणमान्य लोगों द्वारा दीप प्रज्वलन समारोह और सरस्वती वंदना से की गई और स्टूडेंट्स द्वारा गणेश वंदना प्रस्तुत किया गया। इसके बाद एमसीए प्रथम वर्ष के छात्रों द्वारा ग्रुप डांस प्रस्तुत किया तथा एमसीए फाइनल ईयर के छात्रों ने केक कटिंग सेरेमनी का आयोजन किया। तत्पश्चात कुछ सीनियर्स ने अपना हुनर दिखाया, इसी के आधार पर मिस फेयरवेल आंचल सिंह और मिस्टर फेयरवेल अभिनव उपाध्याय को चुना गया।

अंत में फ़ाइनल ईयर के छात्रों का यादगार वीडियो क्लिप चलाया गया। फिर कार्यक्रम का समापन आदित्य सारस्वत और पूजा सिंह ने किया।



















COLLEGE UPDATE

TECHVYOM 13th May-2023

Venue: SRMSCET, Centennial Auditorium SRMS CET, Bareilly along with Tyro Club organized their annual Tech Festival "TECHVYOM 2023" on 13th May, 2023. In the Inaugural ceremony Chairman-SRMS Trust Shri Dev Murti, Secretary of the Trust Shri Aditya Murti, Dean Academics Dr. Prabhakar Gupta, Director of TDP & Head of MBA-MCA Dr. Anuj Kumar, Chief Proctor Dr. Sovan Mohanty and Dean Student Welfare Er Kapil Bhushan ware present.

This event was a promising platform for students, innovators and technicians to showcase and witness the latest technological advancements and innovations.

The event started with an electrifying Robotics UV dance followed by an inspirational speech by Shri Dev Murti highlighting Techvyom, igniting a wave of innovation and highlighting the inclusion of robotics in the field of medicine and food technology.

Tyro Club shed light on the theme of the festival and more than 40 engaging events in which students from various colleges of Bareilly participated.

The event featured a Robo Race, Maze Solver and the highly anticipated Robotrax Club Robo War. Equinox Club brought exciting events like C-Experts, Bug War and E-Treasure Hunt. Pharmquimica Club boosted the brain power of students with Aavishkarak, Pharma-Desk and Pharma-Minds, while Literary Club presented Shabd-E-Shayrana, Jam: Just a Minute and Who Am I? The Aeronautical Club demonstrated exciting gliders and CAD tricks. Ad-Mad Show, Business Quiz, Lan Games were added as attractions, while the alumni meet was an additional highlight of Techvyom where alumni from far & wide interacted with students. The festival ended with exciting one-on-one robot battles that excited and delighted the audience.













CHAIRMAN'S DINNER (Farewell Party for Final Year Students) 20th May, 2023

Venue: Alakhnanda Resort

A pleasant dinner to the outgoing batch of MCA-2021 with the chairman sir was organized on 20th May, 2023. It marked the perfect end to their farewell to college and gave them insight into their future endeavors.

As always, the Chairman Sir guided the students and gave them the best life instructions. The students were amazed by the enlightening discussions that took place during the dinner. The evening was delightful and ended with hearts full of joy.









