Research class, 26.11.2021.

U petak 26.11.2021 održat će se Research class predavanja povezana s istraživanjima u sklopu HRZZ projekta **RAASS: Automatsko raspoznavanje akcija i aktivnosti u multimedijalnom sadržaju iz domene sporta**, voditeljice izv. prof. Marine Ivašić-Kos.

Suradnici na projektu i doktorski studenti predstavit će trenutne istraživačke aktivnosti i rezultate.
Research class će biti organizirati online putem portala Teams/ Doktorski studij (pristupni kod **w98ahy9**).

Predviđen raspored:

10:00 - 10:30 **Ingrid Hrga**: Effect of Data Augmentation Methods on Image Classification Results
10:30 - 11:00 **Romeo Šajina**: Pose estimation, tracking and comparison

Sažetak predavanja 21.11.2021, virtualno Teams/Doktorski (pristupni kod **w98ahy9**):

1. **Effect of Data Augmentation Methods on Image Classification Results**

Speaker: Ingrid Hrga, PhD student**,** Fakultet Informatike, Sveučilište J. Dobrile Pula

Abstract: Data augmentation encompasses a set of techniques to artificially increase the size of a dataset. Insufficient training data means that the network will be susceptible to the problem of overfitting, leading to a poor generalization capability of the network. Therefore, research efforts are focused on developing various augmentation strategies. Simple affine transformations are commonly used to expand a set, however, more advanced methods, such as information dropping or random mixing, are becoming increasingly popular. In this talk, we analyse different data augmentation techniques suitable for the image classification task. We investigate how the choice of a particular technique affects the classification results depending on the size of the training dataset, the type of transfer learning applied, as well as the difficulty of the task. Our results show that the choice of augmentation method becomes crucial in the case of smaller datasets, especially when using a pre-trained model as a feature extractor.

2. **Skeleton-based Human Action Scoring and Comparison using Monocular camera**

Speaker: Romeo Šajina, PhD student, Fakultet Informatike, Sveučilište J. Dobrile Pula

Abstract: We focus on action evaluation, i.e., comparison of poses while the player is executing certain action (e.g., handball shot) against the template sequence performed by a professional. By comparing player poses to the template poses we can provide them with the information of the needed corrections to improve their action execution. This application can be especially useful to beginners in the sport or in rehabilitation exercises purposes.
Comparison of poses is the final step in action evaluation which requires that we have collected players' poses in 3D space. Previous research on action evaluation mostly used markers and sensors to capture players' poses that provide accurate poses but require a controlled environment that is often expensive and time-consuming. For that reason, our system is based on a monocular camera, making it simple and fast to use, but obtaining accurate players' poses becomes a challenging task. To tackle this task, we use a *2D pose-estimation* method like MaskRCNN or UDP-Pose, that produces 2D points forming a pose. We then feed obtained 2D poses in a *3D pose-estimation* method like EvoSkeleton or VideoPose3D, which finally produces poses in 3D space.
Since the distance of the player from the camera can vary, we need to standardize the sequence of poses before the comparison, so we need to normalize the skeletons and align them in space and time.
In presentation comparison of different normalization techniques and poses alignment will be presented together with the visualization of the difference in performance with respect to the action template. Additionally, an algorithm developed to find keyframes based on the overall movement of the pose will be presented since we can estimate the sequence of actions based on several keyframes within the sequence.