

Smart TeamBoard: a Knowledge Sharing Progressive Web Application Supported by Efficient Convolutional Neural Networks

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Abstract

Progressive web applications (PWAs) are websites that look and feel like an app which means that users can access all information and capabilities without downloading a mobile app. Instead, progressive web applications use modern web technology to deliver app-like experiences to users, right in their browsers. Our PWA allows registered users to share their resources (photos, videos, sound files, URLs, etc.) by theme adding them to different sheets that are located on the user's board. Users can also search for shared images that are tagged by a pre-trained EfficientNet that is the basic Convolutional Neural Network of the application. The application allows users to train new CNN models by uploading tagged images and using transfer learning, therefore our PWA can also recognise images that belong not to an ImageNet but a new, user created class. The training process is parameterized: users can choose a base model and can change the number of layers, activation functions, training methods, loss functions, etc. These neural networks pretrained by users are organised in different tree structures, for example, a sport car classifier model gets into a tree structure that is rooted in a car recognition model. During the recognition, first, the base EfficientNet CNN gets the uploaded image, then the root models of the other CNN tree structures. If a root model recognizes the image, the additional CNNs in the tree will receive the image. Our PWA provides optimizing CNN models for deployment and execution by reducing the number of parameters and operations involved in the computation by removing connections, and thus parameters, in between neural network layers.

Keywords: progressive web application, convolutional neural network, transfer learning, model scaling

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