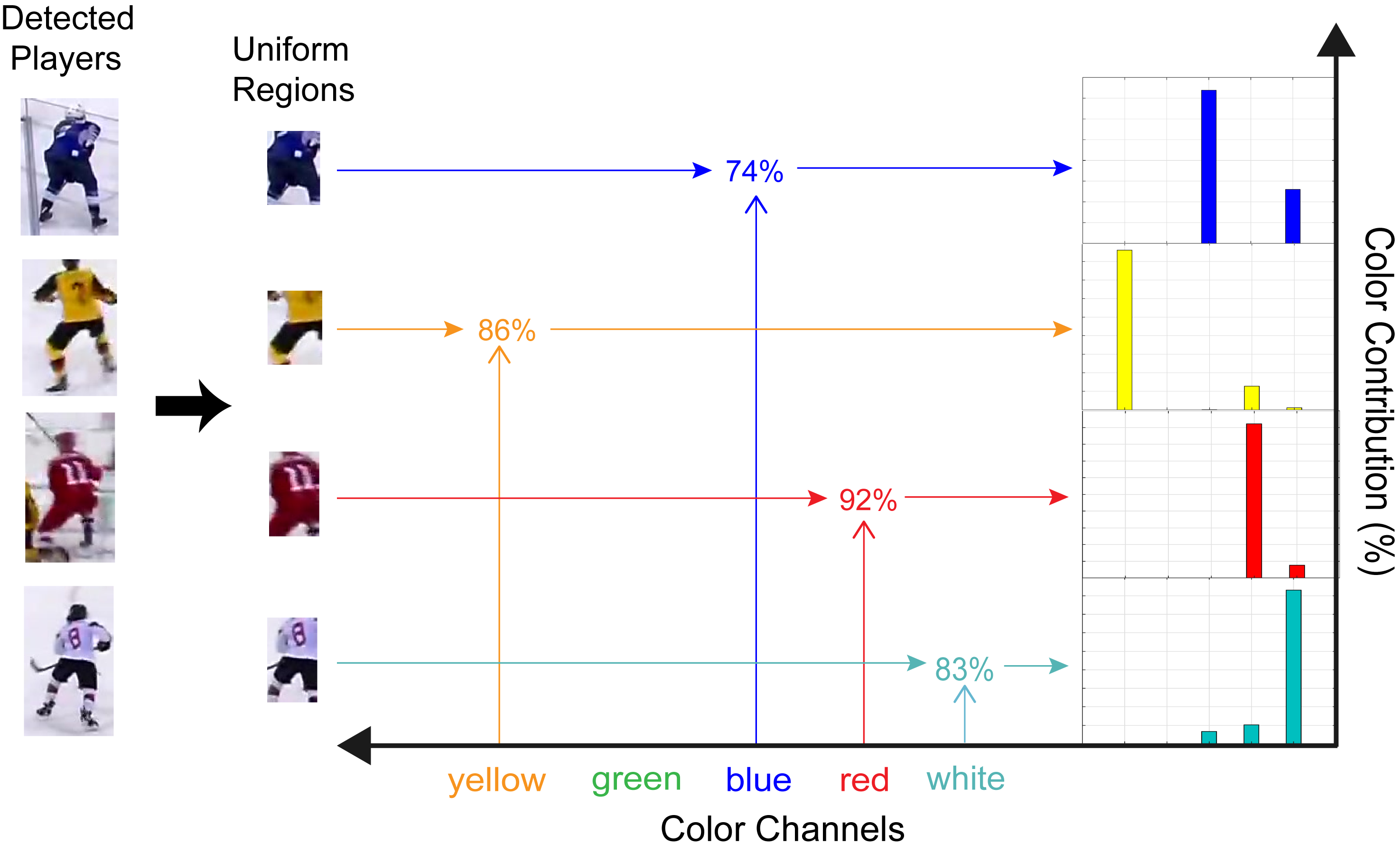
Supplementary Materials

**Text S1 Weighted mechanism on customized color space of team classification**

The objective of our team classification method is to classify the team belongings of players adaptively, without requiring any additional annotations on dataset. The main feature of team classification is the uniform color which is different according to home and away teams.

Here, we introduced a weighted mechanism on customized color space to describe the color features of ice hockey uniforms. After the detection of targeted players, images with detected players are cropped to extract the color distribution features. SM Figure 1 shows the procedure of team classification. Firstly, graphic operations are applied to process the areas of detected players in order to obtain more discriminatory uniforms regions. Secondly, the color distribution of the processed areas is represented on the proposed color space, consisting of five channels for the description of yellow, green, blue, red, white of the detected players (SM Figure 1), respectively. Let denote the intervals of the color distribution of a processed area. is the color of the channel. And is the quantity of the pixel of channel. Pixels are classified to the corresponding channels and the final results depend on the channel that include the maximum number of color pixels. For the sake of reducing the influence of different designs on white uniforms, we proposed a weighted mechanism to increase the weight of the white channel. The final result of team membership is defined as:

where is the number of pixels in the white channel, is the maximum number of pixels in the five channels, is the corresponding color of the channel with , is the weighted term of the pixels of the white channel. If is equal to or greater than , the final result will be white, otherwise it will be the .



**SM Figure 1 Procedures of team classification.** The customized color space and weighted mechanism are introduced to describe the uniform regions of detected players. The color channels determine the major component of uniform colors from different teams.

**SM Movie 1 Real-time detection of players and teams from Pittsburgh Penguins vs Anaheim Ducks.**