

# The Classification of Skateboarding Trick Manoeuvres Through the Integration of Image Processing Techniques and Machine Learning

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## **Abstract:**

More often than not, the evaluation of skateboarding tricks executions are carried out subjectively based on the judges' experience and hence are susceptible to biasness in not inaccurate judgement. Therefore, an objective and means of evaluating skateboarding tricks particularly in big competitions are non-trivial. This study aims at classifying skateboarding flat ground tricks namely Ollie, Kickflip, Shove-it, Nollie and Frontside 180 through camera vision and machine learning models. An amateur skateboarder (23 years of age  $\pm$  5.0 years' experience) executed five tricks for each type of trick repeatedly on an ORY skateboard from camera distance at 1.26m on a cemented ground. From the images captures, a number of features were engineered via the Inception-V3 image embedder. A number of classification models were evaluated, namely, Support Vector Machine (SVM), k-Nearest Neighbour (kNN), Logistic Regression (LR), Random Forest (RF) and Naïve Bayes (NB) on their ability in classifying the tricks based on the engineered features. It was observed from the preliminary investigation that the SVM model attained the highest classification accuracy with a value of 99.5% followed by LR, k-NN, RF and NB with 98.6%, 95.8%, 82.4% and 78.7% respectively. It could be concluded that the proposed method is able to classify the skateboard tricks well and would eventually assist the judges in providing more objective based judgement.

**Keywords** : : Image Processing; Machine Learning; Skateboarding Tricks; Classification

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