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Research Article

Comparative Study of K-NN, Naive Bayes and SVM for Face Expression Classification Techniques

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Abstract

Classification is a data mining technique used to predict group membership for data instances within a given dataset. Classification is considered as an example of supervised learning as training data associated with class labels is given as input. This comparative study focuses on the application of K-Nearest Neighbors (K-NN), Naive Bayes, and Support Vector Machines (SVM) classification techniques in the context of face expression recognition. The study aims to evaluate and compare the performance of these techniques in accurately classifying facial expressions, their advantages and disadvantages.

Facial expression recognition is an important area in computer vision and emotion analysis. It involves identifying and classifying different facial expressions such as happiness, sadness, anger, fear, surprise and disgust. Accurate classification of facial expressions is crucial for various applications, including human-computer interaction, affective computing and psychological research.

K-NN is a non-parametric algorithm that classifies data based on the majority class of its K-nearest neighbors. Naive Bayes is a probabilistic algorithm that makes classification decisions based on the Bayes theorem and assumes independence between features. SVM is a machine learning algorithm that constructs a hyperplane to separate different classes of data.

Dataset such as Affectnet is used to conduct the study including labeled facial expression images. Three algorithms are tested on this dataset to evaluate their performance in correctly classifying facial expressions. Performance metrics such as accuracy, precision, recall, and F1-score are used to assess the classification performance of each technique. Software used for conducting the experiments is Python.

Keywords: Classification techniques, K-NN (K-Nearest Neighbors), Naive Bayes, Facial expression, SVM (Support Vector Machines), Machine learning algorithms.

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