UNIVERSITI TEKNOLOGI MARA

CROWD COUNTING USING CONVOLUTIONAL NEURAL NETWORK (CNN)

NUR SYAZWINA BINTI A KADIR

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ABSTRACT

Crowd counting refers to estimating the number of people in a location or photograph. Accurate hand counting is made more difficult in highly crowded locations where people may overlap or obscure one another. Crowd counting is essential for numerous applications, such as urban planning, crowd management, safety and security, event management, and retail analytics. It supports decision-making by organizations and authorities on infrastructure planning, emergency response, and resource allocation. Crowd counting in these circumstances poses a variety of challenges, given the intricate spatial arrangements and fluctuating densities that characterize metropolitan areas. Because human counting becomes problematic in heavily populated places, traditional approaches frequently fail to accurately estimate crowd sizes. Convolutional Neural Networks (CNNs) have consequently gained popularity as a potential solution to this problem. The complex patterns found in urban crowd scenes are well-suited for CNNs to capture because they are excellent at extracting hierarchical features from photos. CNNs are capable of learning to estimate crowd counts with remarkably high accuracy by training on massive datasets labelled with densities. This method provides efficiency and scalability while also addressing the shortcomings of traditional approaches. A thorough evaluation was used to figure out the performance of the CNN model. The model produced a Mean Absolute Error (MAE) of 68 during the training phase when it was used with an 80:20 dataset split, wherein 80% of the data was put aside for training and the remaining 20% for testing. The model subsequently demonstrated an MAE of 77 during the testing phase. This evaluation process provides valuable insights into the model's performance across both training and testing datasets, highlighting its predictive capabilities and potential areas for improvement. In tasks involving crowd counting, CNNs have proven to be remarkably accurate. Metrics like Mean Absolute Error (MAE) and Mean Squared Error (MSE), which quantify the difference between predicted count and actual crowd counts, are used to measure accuracy.

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