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Swimming Stroke Analysis and Feedback System: A Comprehensive Review

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Abstract

Swimming is a sport that relies heavily on technique and continuous improvement. Swimmers face challenges such as inability to analyse techniques during training alone, the need for immediate feedback during competitive events, and the risk of physical injuries due to poor technique. The research introduces a cutting-edge technology that uses machine learning to analyse various swimming strokes, providing objective assessments and feedback to improve techniques. The system, based on primary and secondary data gathering, aims to revolutionize swimming practice, competition, and injury prevention, with future work focusing on practical implementation. This study focuses on future works including practical implementation, refining machine learning models, and exploring a multi-model approach. The system integrates a variety of data sources for enhanced accuracy and attempts to generalise across swimming strokes. This approach differs from other alternatives in that it addresses all four major swimming strokes. The system will be developed based on the insights gathered from user perceptions who are swimmers and coaches which they emphasize a user-friendly interface, precise data gathering, and real-time feedback.

Keywords: *Swimming, Stroke analysis, Feedback system, Machine learning, Convolutional neural networks*