Fog Computing-based Real-Time Emotion Recognition using Physiological Signals

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***Abstract*— Emotion recognition based on physiological signals has become a crucial area of research in affective computing and human-computer interaction, with applications in smart homes, workplaces, educational institutions, healthcare, and entertainment. In this study, a real-time emotion recognition system utilizing fog computing architecture was developed by considering the challenges of latency, total response time, resource usage, and security in IoT environments. The random forest machine learning model was trained with time-based statistical features by using the DREAMER dataset. Even though the model achieved an accuracy of 84.21 % with 104 features, to meet real-time performance requirements, the system was optimized to calculate 24 features, maintaining a commendable accuracy of 79.70 %. Extensive experiments demonstrated the superior performance of fog computing compared to edge and cloud computing in terms of latency, queuing delay, jitter, and most importantly total response time. The results highlight the proposed system's ability to support multiple users simultaneously.**

***Keyword*— Emotion recognition, fog computing, machine learning, signal processing, electrocardiogram, electroencephalogram**

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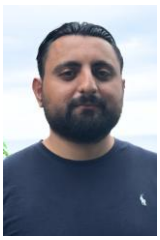

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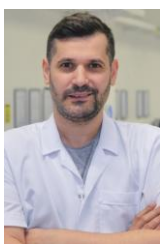

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