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REAL-TIME STREAMING DATA PROCESSING FROM DIGITAL TV SIGNAL CAPTURE USING APACHE FLINK FOR BROADCAST MONITORING IN INDONESIA

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Abstract:
The switch from analog to digital terrestrial television (DVB-T2) in Indonesia presents a new opportunity to enhance broadcast signal monitoring and management. Automated systems that can process metadata from digital TV signals in real time for broadcast evaluation, quality assurance, or content analytics are currently lacking. This research proposes a real-time data streaming system that captures and processes metadata from DVB-T2 signals using Apache Flink, a distributed stream processing framework. The system is designed to extract metadata such as channel name, program title, broadcast time, and signal strength using a DVB-T2 receiver (USB dongle or set-top box) and stream the data through Apache Kafka. After that, Apache Flink uses real-time processing to find problems with the signal, create live program schedules, and find active broadcasts. The processed data is stored in a database and visualized through a dashboard interface for use by broadcasters, media regulators, or monitoring institutions. A prototype system was developed and tested using simulated signal data from five different regions in Indonesia, with an input frequency of every 5 seconds. The results demonstrate that the system can deliver insights with sub-second latency and over 90% detection accuracy for signal disruptions or schedule mismatches. This study shows how stream processing technologies can make digital broadcast monitoring in Indonesia more transparent, reliable, and responsive.

Keywords: real-time streaming, digital TV broadcasting, apache flink, broadcast monitoring, DVB-T2 Metadata

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