Both academia and organizations show great interest in streaming big data analytics - the process of extracting knowledge structures from continuous, high volume and high velocity continuous flow of data in a myriad of formats from a variety of real-time data sources. The challenge for organizations lies in being able to transform this deluge of data into instantaneously intelligent that can enable faster and better decisions. This mini-track contains three papers relevant to streaming data analytics and applications.

Fatigue monitoring systems can be developed in many areas, for example, in the management and technology sectors. In the first paper titled Real-Time Driving Monitor System: Combined Cloud Database with GPS, Hsu et al. propose the system for analyzing EEG brainwaves collected in real-time from drivers to determine driver's fatigue. The system categorizes the brainwave data into light, medium, and severe fatigue and provides the green, yellow, and red light warning message, respectively. It also alerts a driver via the mobile device of a dangerous situation and records the information in the database. The system proposed is collocated with GPS positioning system. The driver's brainwaves and GPS data will be integrated and analyzed after uploading to the cloud server to remind drivers if there are dangerous drivers, they should be aware of, within a radius of 20 meters. The fatigue warning system reported drivers' fatigue with an average accuracy of 66.3% and minimized false alarms. It was implemented with a NeuroSky MindWave headset.

Data stream mining is challenging task because streaming data is evolving in time in many aspects including the number of classes, the distribution of the data, or continuous changes in data models. Recent research has been focused on designing adaptive stream mining models which support concept drift detection and handling in streaming environments. In real world applications, dynamically preprocessed data stream can increase significantly the performances of the learning models. The approach proposed in the second article titled Smart Preprocessing Improves Data Stream Mining by Hu and Kantardzic demonstrates preprocessing methodology that can maintain comparable accuracy of stream mining framework under concept drift, without the need of retraining with new models. In approximately 30% of streaming data chunks the proposed smart renormalization eliminates requirements for training of new models in these chunks, and reduces the overall complexity of streaming data modeling framework.

Streaming data is always changing. Incremental results are incomplete, but often useful in their own right. Data analysis and rendering compete with each other for computational resources and access to core data structures because they are executing concurrently. The third paper titled Epoch Persistence: Safe, Efficient, On-demand Rendering for Streaming Data by Cottam and Lumsdaine presents a set of data structures that ensures a visualization is internally consistent, and therefore interpretable. The data structures are based on persistent data structures, as commonly found in functional programming, but made more efficient by incorporating computational epochs. The paper also provides a definition for "consistency" that can be applied to visualizations. These data structures are used in the Stencil visualization system, which is used to benchmark the impact of epoch consistency. The net result of employing these data structures is that internally consistent incremental results are displayed as often as hardware allows without significantly impeding data loading.