I²: Interactive Real-Time Visualization for Streaming Data

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I² - Two Types of Interactivity

Interactive Development
Change your program and deploy your updates with just one click. Develop real-time data visualizations while operating on live data.

Interactive Visualization
Explore live data in visualizations. The underlying cluster job adapts at runtime to your settings and sends the required data to the dashboard.

Example Dashboard:
- Sensor data from a football match.
- Adaptive Flink job.
- Interactivity:
  - player selection.
  - different metrics.
  - range of the depicted history.

Architecture Overview
I² seamlessly connects live data visualization with the development of analysis pipelines for streaming data.

1. Develop stream analysis pipelines and visualizations.
2. Deploy your code with just one click.
3. Discover the incoming live data.

I² observes visualization properties and adapts the Flink job at runtime.

Efficient Real-Time Visualization of Time Series Data

1. There is a trade off between the length of the depicted history and visualization precision (pixel columns per time).
2. We need exactly four data points per pixel column to provide a loss-free plot of time series data. [M4, Jugel et al., VLDB’14]

Adaptive Flink Operators
We provide runtime adaptive operators.

Performance Evaluation
Without I²:
- Unresponsive dashboard shortly after start-up (CPU overload).
- Constant 60Hz frame rate.

With I²:
- Reduced and constant CPU load.
- Constant 60Hz frame rate.

Try it! - It’s all open source!
Apache Flink – flink.apache.org
Apache Zeppelin – zeppelin.apache.org

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