Front end real time data analysis: Fast and Furious Big Data

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CERN big data case

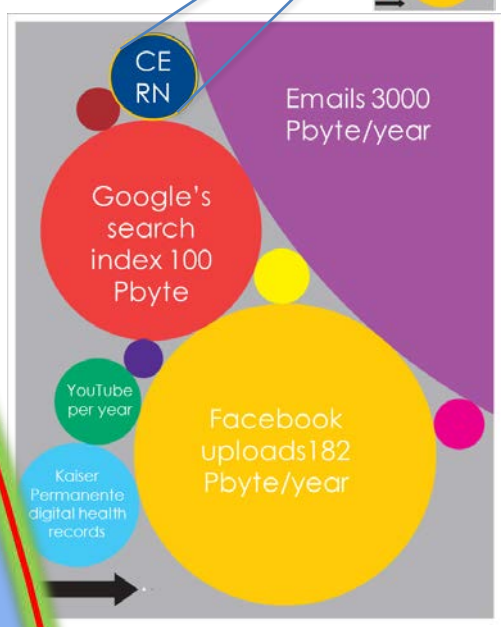
On disk 15 Pbyte/year

At the detectors 600 Ebyte/year

…19 Pbyte/s from a single source

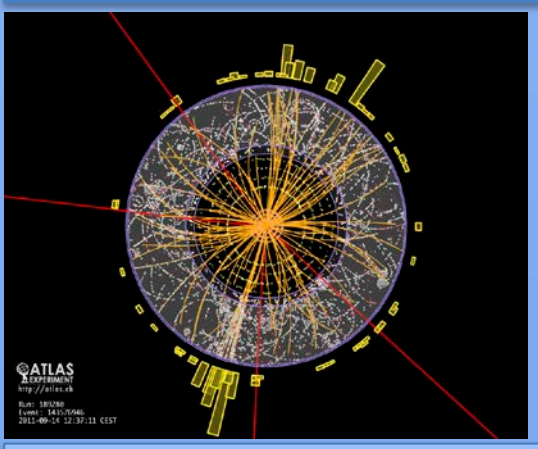
smart processing, ns scale decision on the data flow. Real time no storage possible→

fast and furious **Big Data**



From frontier science to frontier problems

Other problematic scenarios



Move the intelligence close to the sensor: fast correlation for fast decision is possible

Fast reconstruction

Zero suppression

Trigger

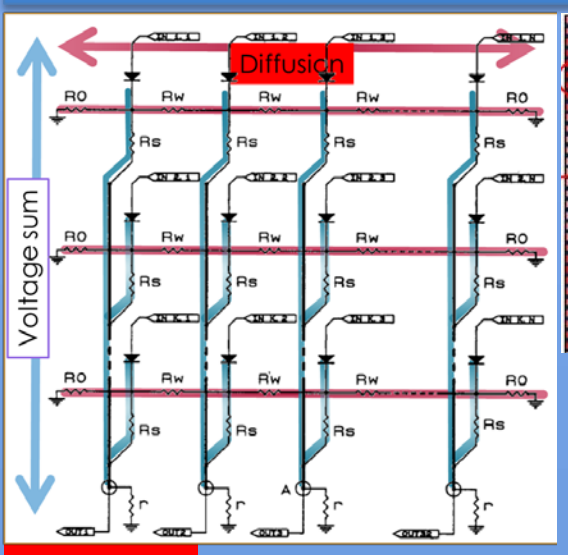
Saliency ↑ Data size ↓

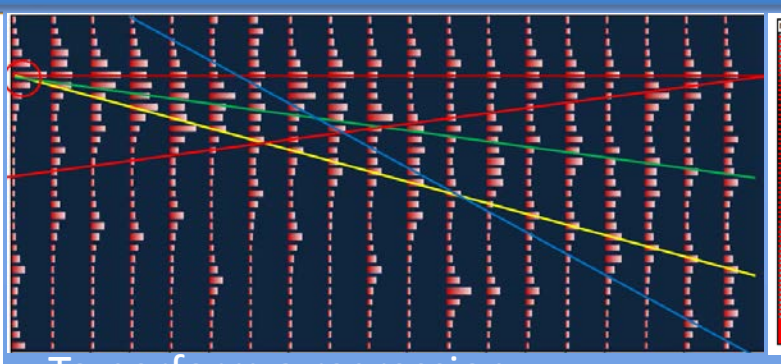
Data reduced by 4 orders of magnitude saliency increased accordingly

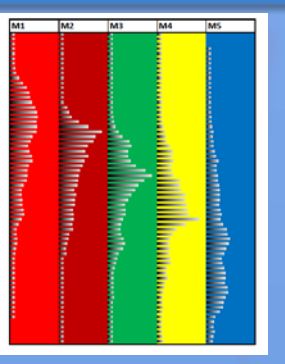
CERN data from sensors

Low power for mobile sensing

WRM: analog device for powerless ns scale inference on complex data







To perform a regression:

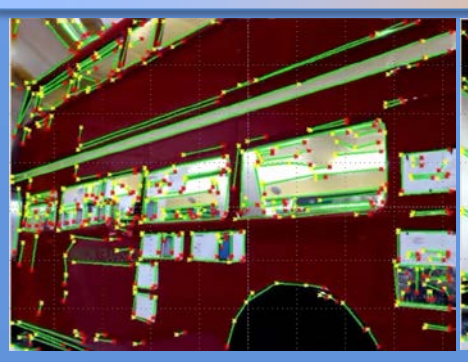
- Notion of distance given by diffusion
- Correlation given by the Voltage sum patterns

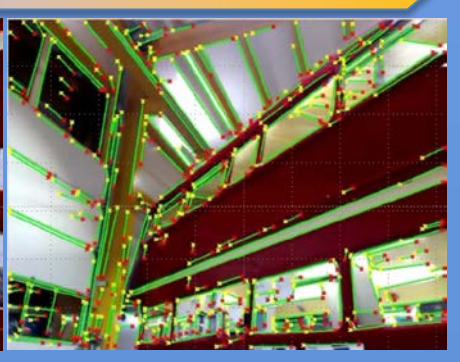
Present WRM limitations

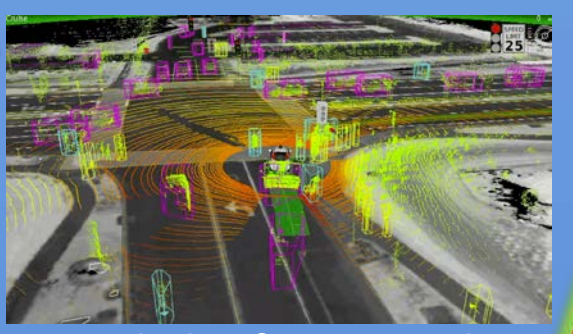
- Obsolete IC
- Digital input
- 1D diffusion
- 8x8 inputs only

- New tech→ faster speed
- Analog INPUT
- Symmetric
- Programmable size

Visual tracking for AR in EDUSAFE→ Self driving







WRM helps for car tracking and object detection

real time processing for medical applications self driving cars autonomous robots, smart prosthesis neuron systems readout

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