CERN openlab

IML Slides

Procter & Gamble

Zenseact: Autonomous driving

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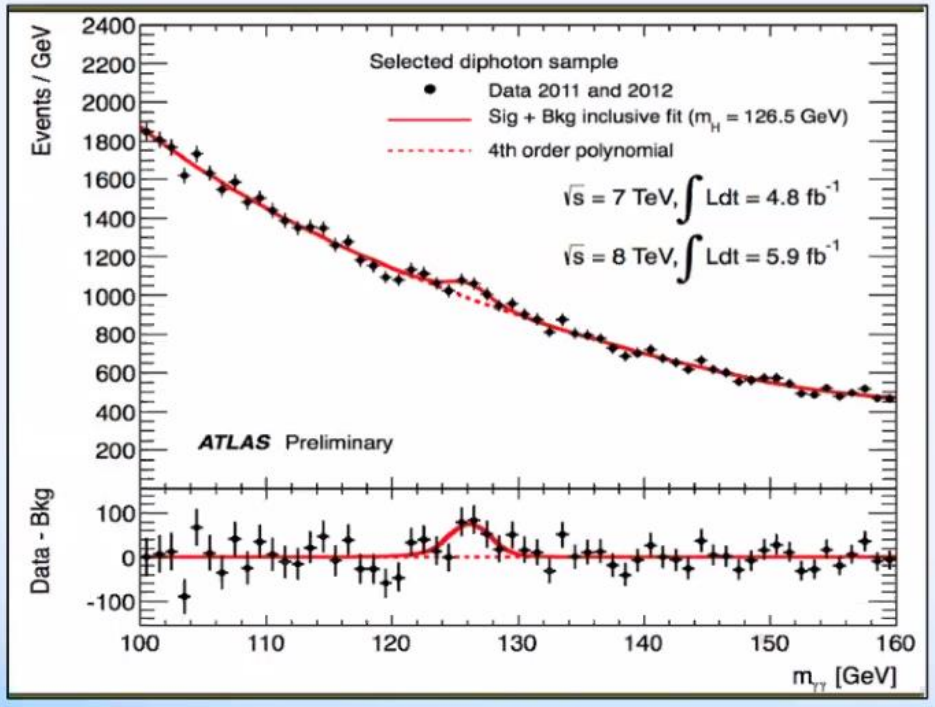
Procter & Gamble

Difference between Research and Industries

Theory-driven approach



'start with the system and work towards the data'

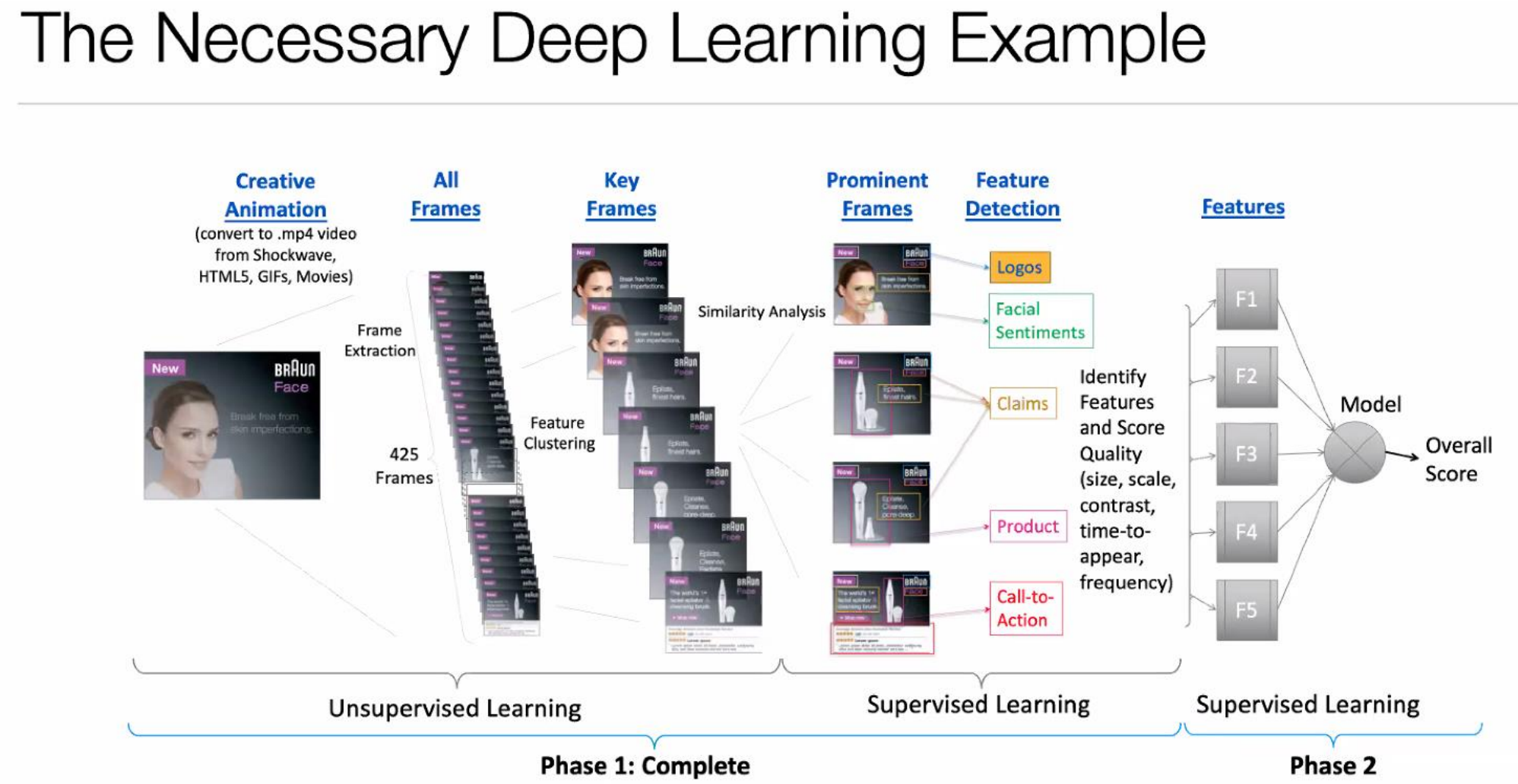
Data-driven approach

'start with the data and work towards the system'

P&G uses ML in every Branche

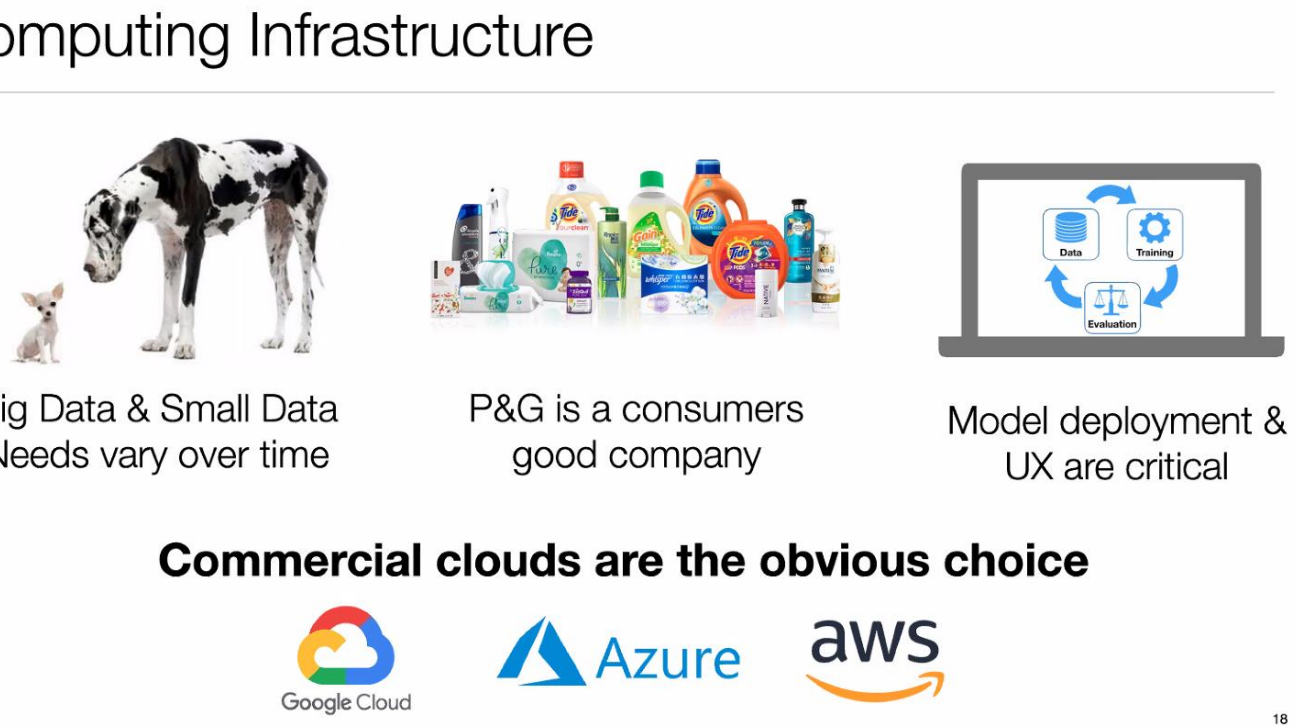
https://www.pgcareers.com/us-datascience

Automated processes with ML



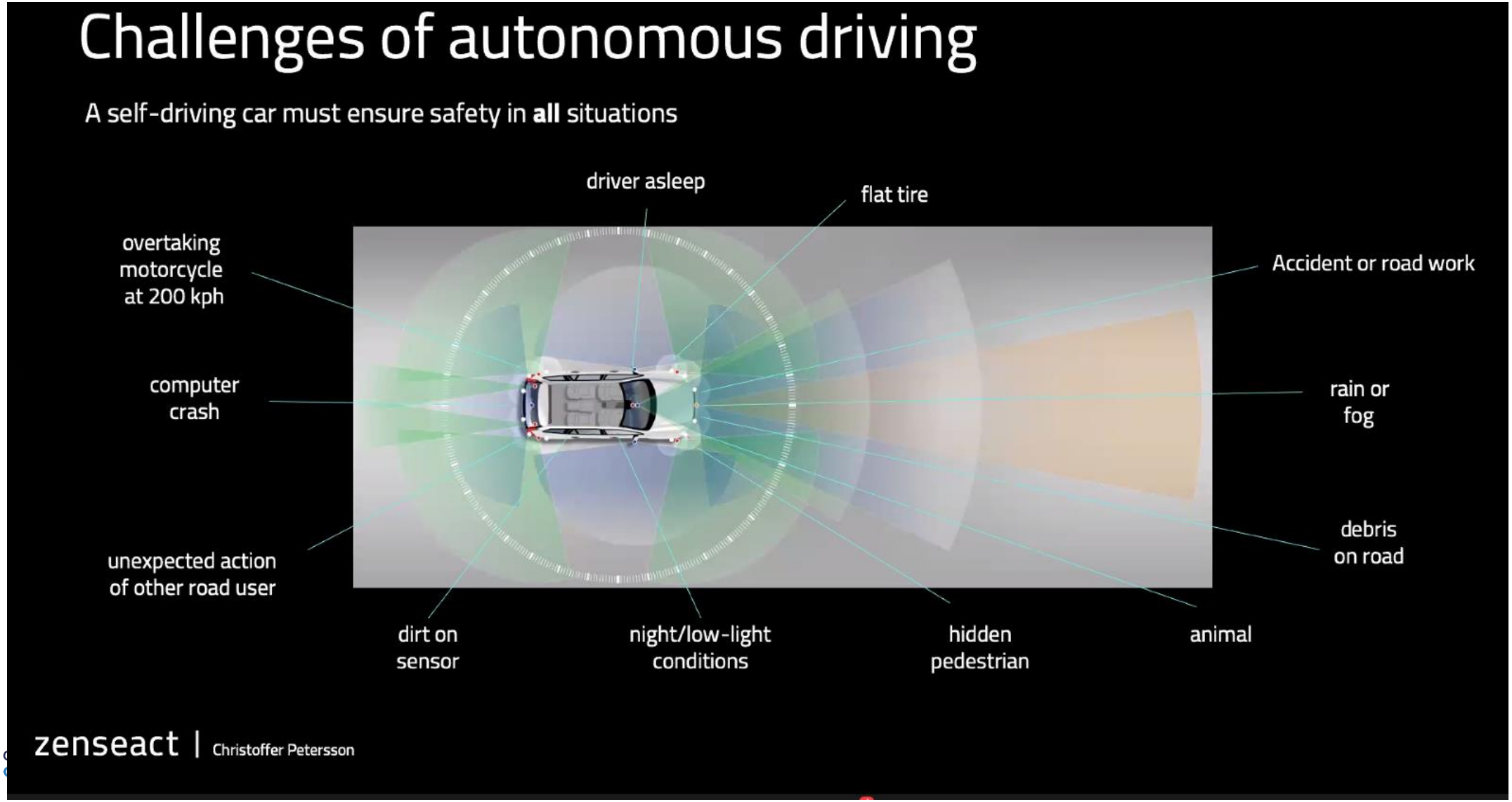
P&G use Cloud Computing

- Easiest for them:
  - “With just a few clicks you have a machine with the set up you want”



Zenseact: Automated Driving

The Car has to care all Time about Everything

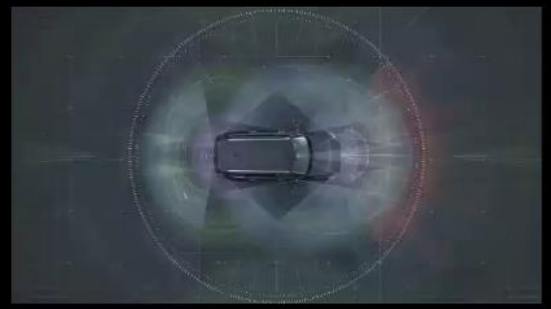


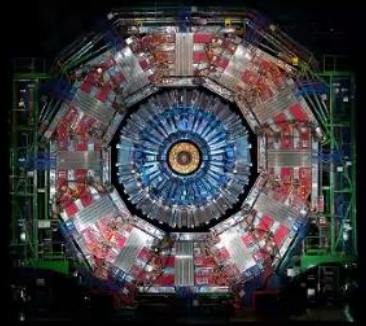
Challenges

- Just small hardware for computing the model:
  - → Not too many models
  - → Not to big/deep models

- Multiclass learning: A single network should solve many different tasks

Similarities, Differences?





	Zenseact	CMS
Goal	Revolutionize traffic safety and transportation	Identify most basic constituents and interactions of nature
Sensors	cameras, radars, lidar	tracker, EM calo, Had calo, muon chamber
Data rates	Single typical 30Hz camera: O(10-100MB/s) Typical lidar: O(10-100MB/s) In total: O(GB/s)	Collisions at 40MHz, O(40TB/s) L1 trigger: 40MHz→100kHz, O(100GB/s) HL Trigger: 100kHz→1kHz, O(GB/s)
Latency requirement	O(1-10ms)	L1 trigger: O(1-10μs) HL Trigger: O(100ms)
Search strategy	Find and handle rare events E.g. 1 corner case in 10^7h driving	Find and handle rare events E.g. Prob(only jets) ≈ 10^5 Prob(Higgs)
Data processing need	Fast and accurate	Fast and accurate

→ CERN Zenseact research collaboration

Results: Pruning and Quantization

- Benchmark on House Number dataset

- Pruning: reduce 75% of the nodes
- Reduction from 16 to 6 bit

→ without loss reduction