



IML Slides

Procter & Gamble

Zenseact: Autonomous driving

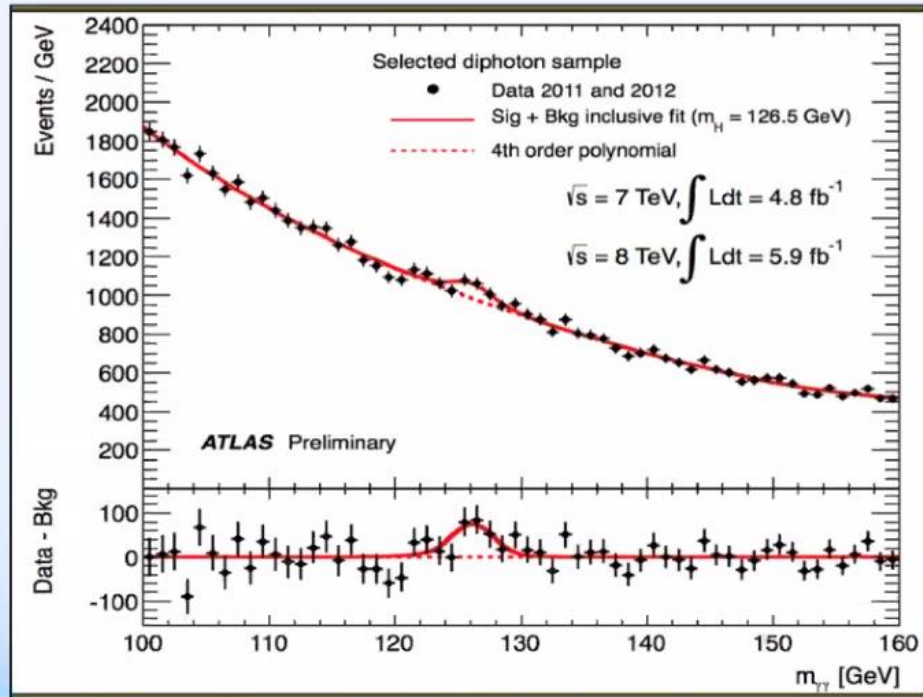
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Procter & Gamble

Difference between Research and Industries

Theory-driven approach



‘start with the system and work towards the data’

Data-driven approach

Your Amazon.co.uk

Kindle eBooks



The Knot
Mark Watson
★★★★☆ (50)
£4.99
Why recommended?



The Book Thief
Markus Zusak
★★★★☆ (3,035)
£2.49
Why recommended?



The Secret History
Donna Tartt
★★★★☆ (442)
£5.98
Why recommended?

‘start with the data and work towards the system’

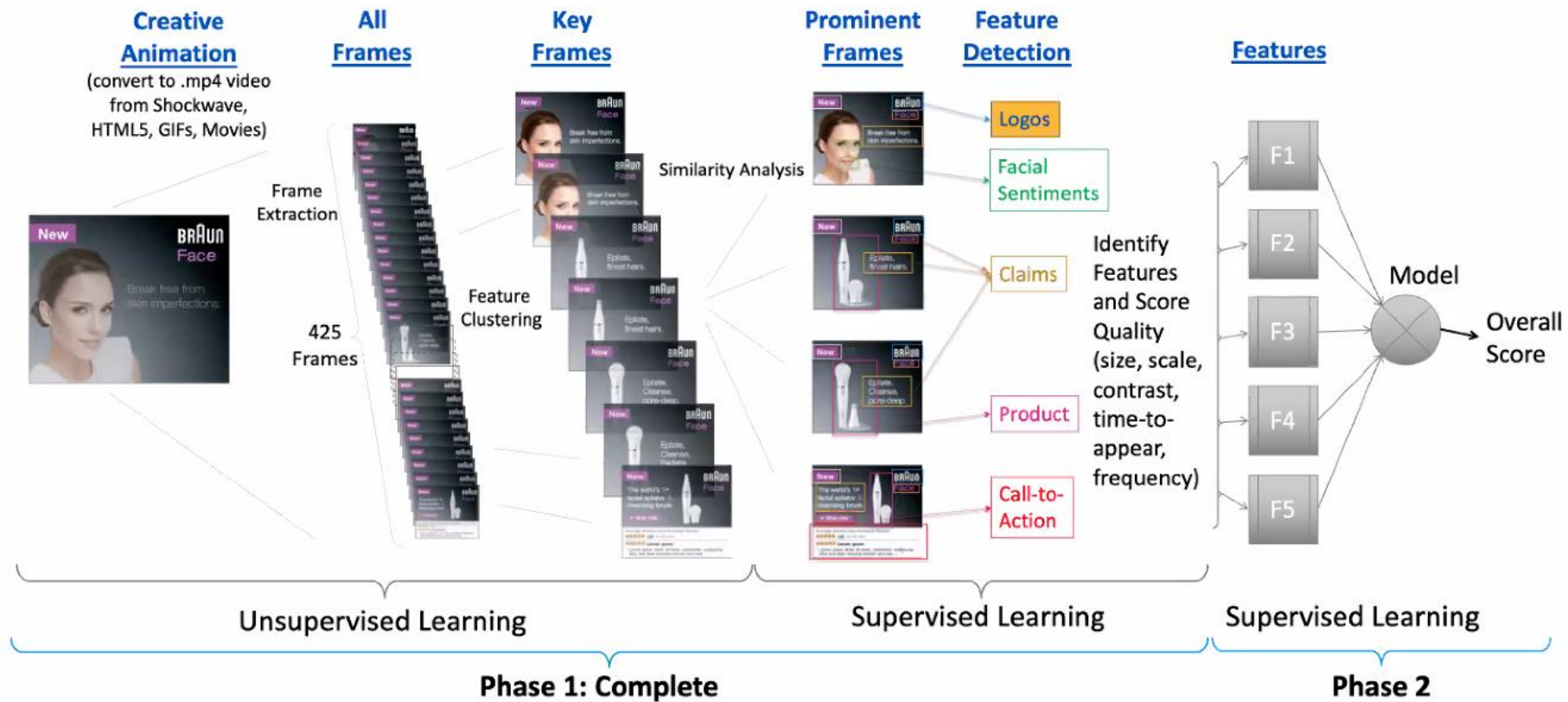
P&G uses ML in every Branche



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

Automated processes with ML

The Necessary Deep Learning Example



P&G use Cloud Computing

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

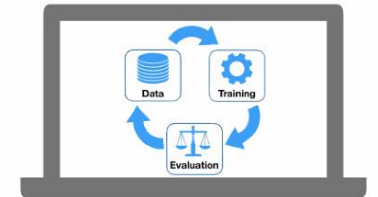
Computing Infrastructure



Big Data & Small Data
Needs vary over time



P&G is a consumers
good company



Model deployment &
UX are critical

Commercial clouds are the obvious choice

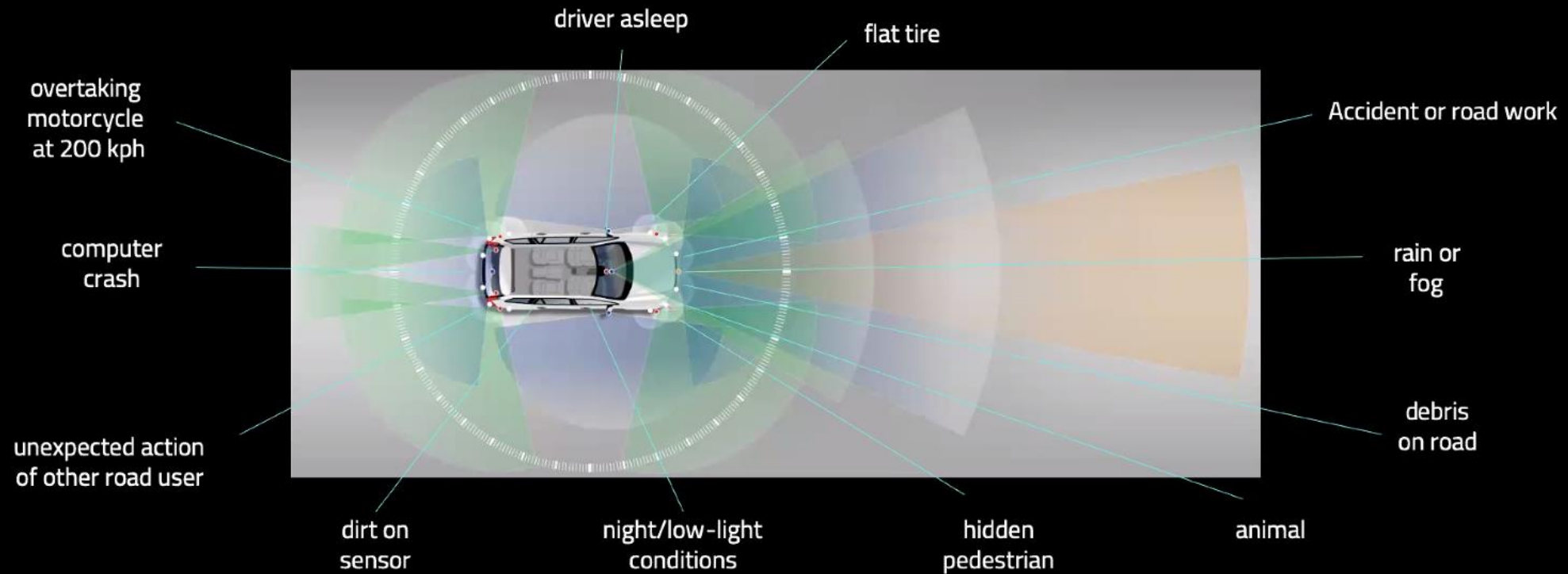


Zenseact: Automated Driving

The Car has to care all Time about Everything

Challenges of autonomous driving

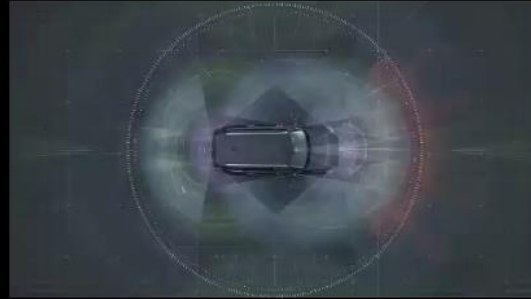
A self-driving car must ensure safety in **all** situations



Challenges

- Just small hardware for computing the model:
 - → Not too many models
 - → Not too 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 ⁷ h 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

