APPAVO
Augmented tools for Particle Physics Analysis, Visualisation and Outreach

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How will we be doing analysis in 10-15 years from now?! 

- I’m not here (overly) interested in adiabatic evolution
- Rather thinking out loud about what could be the quantum leap

Remember, just to set the scene:

(Not quite) a long time ago ... we did not

- have laptops till the 80s
- have wireless 802.11 protocol till the late 90s
- work (actively) with laptops till mid 2000s
- have CERN-wide WLAN till a few years later
- work “anywhere” (includes meetings ;-!) before ~2010
- work with VMs, clouds, ... before 2010s

Retrospectively, could we have imagined such a timeline?
The future has its unknowns (great!) ... ... but we can shape it!
A Particle Physicist’s wish-list – APPAVO

- The landscape, very broadly (sic!) speaking:
  - Real/MC Data analysis
  - Outreach & education
  - Visualisation

- Daily work builds on adequate & complex software frameworks & stacks – a huge enterprise!

- Touching the 3 topics above, can we somehow
  
  *Enhance the analysis experience with very contemporary technologies?*
  
  *While making also a large impact on the way we deliver in outreach & education?*

Augmented tools for Particle Physics Analysis, Visualisation and Outreach!
Augmented tools for Outreach & Education

- **Obvious application of Augmented Reality (AR) techniques**

- Imagine an “App” on a device with a camera viewing a cavern and detector underground, exhibits of for example subdetector parts, maquettes at experiment halls …

- AR can considerably enhance the experience, providing interactive menus, with, e.g.
  - Relevant information on cavern/experiment/detector
  - Animation of particles traversing subdetector, even using real data
  - …

- The visit could even be made virtual (if recorded?), so with the visitor not physically down a pit
  - Great when no other way is possible

- **AR opens a new world here !**
Augmented tools for Visualisation

- Somewhat related to Outreach & Education tools to some extent

- AR works on images and movies
- These can be reality or products of simulation
- Indeed, in the end, it’s all images/videos and one can superpose info on predefined “pieces”!
- Not quite AR so rather a kind of Augmented Virtuality (AV)? (Let’s focus on ideas for now.)

- Interactive and custom-tailored visualisation could be very useful for an analyst’s work too
  - The possibilities are probably “infinite”
  - Not just event display type of visualisation. Data visualisation/manipulation is central …
Augmented tools for data Analysis

- Augmented tools are intelligent tools

- The analysis framework would hint at what can be done with some (part) of the data, which algorithms can be applied, what info can be accessed/retrieved, …

- Augmented tools seem to tag along well with the idea of specifying what one wants to/can do rather than how one wants to do it, so with a declarative analysis/programming model

- Crazy and/or unrealistic ideas?

- Remember how we were doing analysis in 1998 …

- Worth a shot in my opinion!

- Do I know precisely where all this would take us?

- Nope … But fine, it’s an R&D proposal after all!
Thank you for your attention