Physics Prize Flavours of Physics Challange

Marcin Chrząszcz
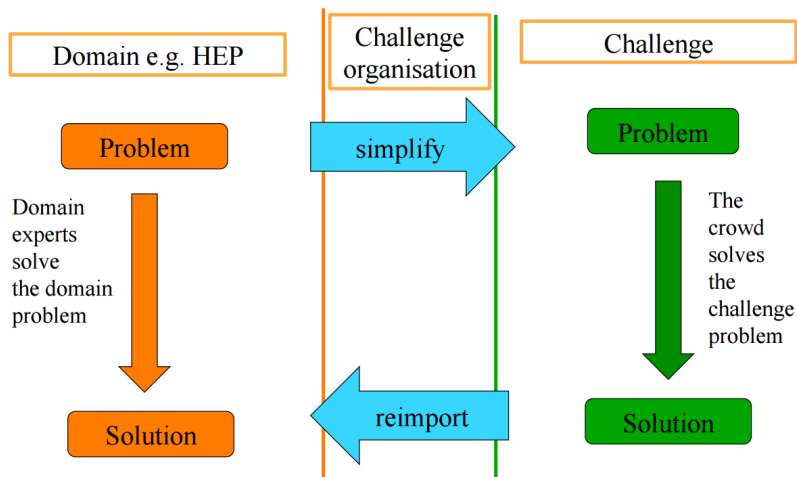mchrzasz@cern.ch

University of Zurichᵁᶻᴴ

Universität Zürich,
Institute of Nuclear Physics, Polish Academy of Science

NIPS conference, Montreal
December 11, 2015

From domain to challenge and back

⇒ Not all solutions can be reimported back to HEP ⟩→ Physics prize for the ones that can!

Physics Prize

⇛ HEP meets ML Award

An award will be given to the team that, as judged by the LHCb collaboration members on the organizing committee, creates a model that is the most useful for the LHCb experiment. The selection criteria include:

- The simplicity/straightforwardness/originality of the approach.
- The computing requirements (CPU and memory demands).
- The suitability for use in production.
- The robustness with respect to lack of training statistics.

The winning team will be awarded $2000\ \$$ and invited to meet the LHCb collaboration physicists at dedicated workshop held by University of Zurich on Feb. 18-20, 2016.

We thank Intel for supporting this prize.

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Upgrade:

Due to high level of submitted solutions we decided to increase award

Marcin Chrząszcz (Universität Zürich, IFJ PAN)   *Physics Prize; Flavour of Physics Challange*

Other members of the physics prize committee

P. Koppenburg

T. Blake

M. Bettler

F. Dettori

A. Ustyuzhanin

T. Likhomanenko

And the winners are:

Vincens Gaitan, R&D director in the Grupo AIA. Studied physics and got a PhD in Machine Learning in 1993 with the ALEPH.
Very good physics understanding of the problem and the tests!

⇒ Derived a number of very different approaches (some being hacks) that are well documented in this blog
⇒ Interesting ideas of doping the background training sample with simulated events from other channel, thus forcing the classifier to be less dependent on data-MC differences.

This technique might help in the every analysis where DATA/MC differences are problematic.

And the winners are:
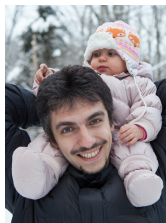
Alexander Rakhlin, Associate Professor, Department of Statistics University of Pennsylvania.
In 2016 will be a visiting professor at MIT.

⇒ "In Machine Learning the problem of different data sets is well known, and solution is called Transfer learning. It aims at transferring knowledge from a model created on the train set to the test set, assuming they differ in some aspects, e.g. in distribution."

⇒ This solutions really makes us optimistic as it solves problem that we are usually facing in rare decays:

- Small statistics
- Imperfect MC
- Translating information from control to signal channel.

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⟹ The physics winners are invited to the "Heavy Flavour Data mining" workshop at Zurich.

⟹ You are ALL INVITED! Please come and help us discover NP.

⟹ Register: LINK .