

Opening remarks

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Research professor at HSE

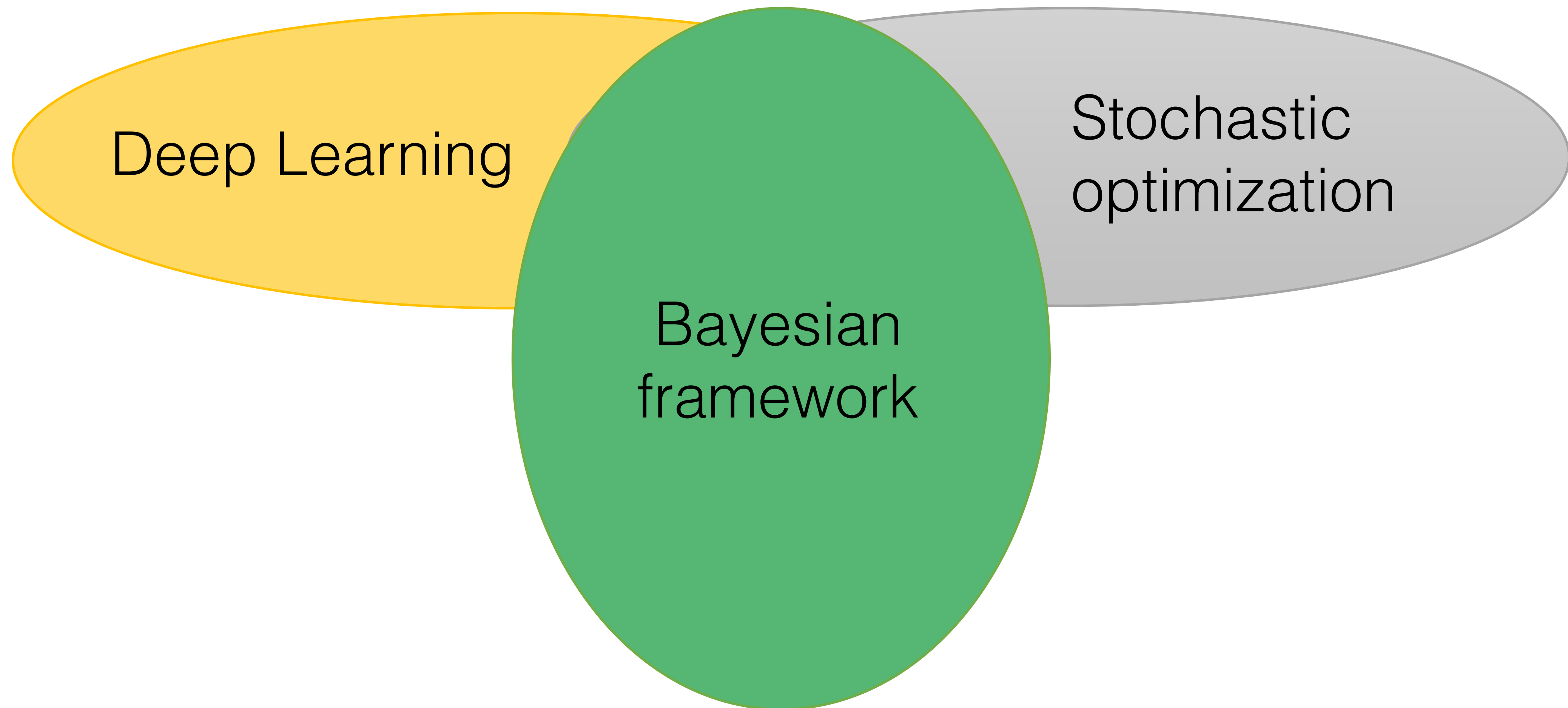
Head of ML lab in SAIC-Moscow



Selection

- 286 applications
- 86 candidates from 27 countries were selected
- Each application was reviewed by at least two reviewers
- Many strong applications were rejected 😞

Topic of the school



The charm of Bayes

of this work is a disturbing catalogue of inconsistencies in the frequentist point of view.

Nevertheless, everyone is not a Bayesian. The current era is the first century in which statistics has been widely used for scientific reporting, and in fact, 20th-century statistics is mainly non-Bayesian. [Lindley (1975) predicts a change for the 21st!] What has happened?

2. TWO POWERFUL COMPETITORS

The first and most obvious fact is the arrival of two powerful competitors: Fisherian theory and the Neyman–Pearson–Wald (NP) decision theory, whose constituents are also

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Bridging the gaps....

Bayesian framework establishes unified formalism and methodology for a variety of different ML problems:

- Learning representations (lecture 4)
- Regularization (lecture 15)
- Generative models (lecture 4, 7)
- Uncertainty estimation (lecture 16)
- Causality inference (lecture 6)

Many existing DL algorithms now get Bayesian interpretation that extends their abilities:

- Dropout (lecture 15)
- Generative adversarial networks (lecture 7)
- Auto-encoders (lecture 4, 5)

Mathematical tools

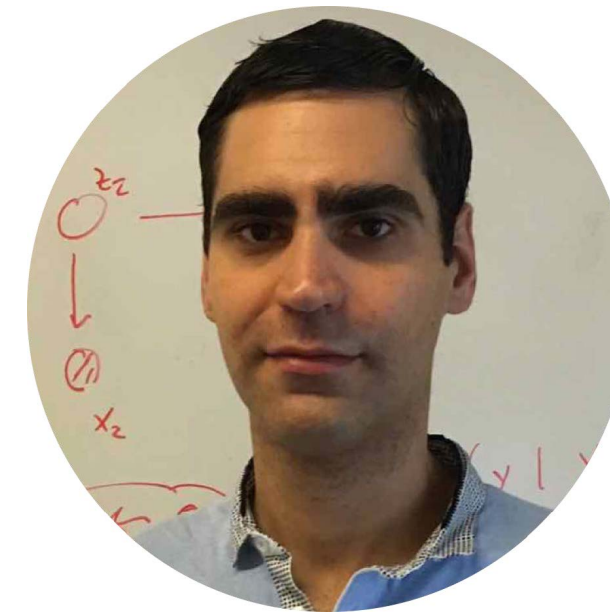
The key ingredient are tools that provide scalability:

- Doubly stochastic variational inference (lecture 4)
- Variance reduction (lecture 5)
- Normalizing flows (lecture 8)
- Gaussian processes (lecture 9, 10)
- Scalable MCMC algorithms (lecture 13)
- Semi-implicit variational inference (lecture 14)

Invited speakers



Dr. Novi Quadrianto
HSE, University of Sussex



Dr. Francisco Ruiz
Columbia University,
University of Cambridge



Dr. Maurizio Filippone
EURECOM



Andrey Malinin
University of Cambridge

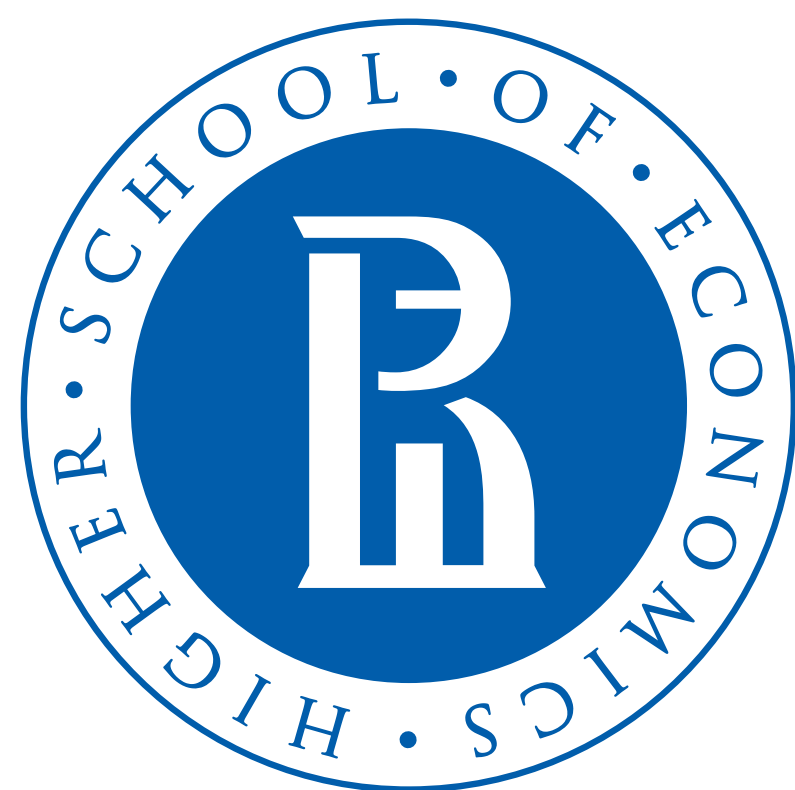


Sergey Bartunov
DeepMind

Goals

- To establish Bayesian background
- To gain ability to read and understand recent (and future) papers on deep Bayesian models
- To get some experience in using deep probabilistic models
- To understand the spirit of scalability
- To socialize ;-)

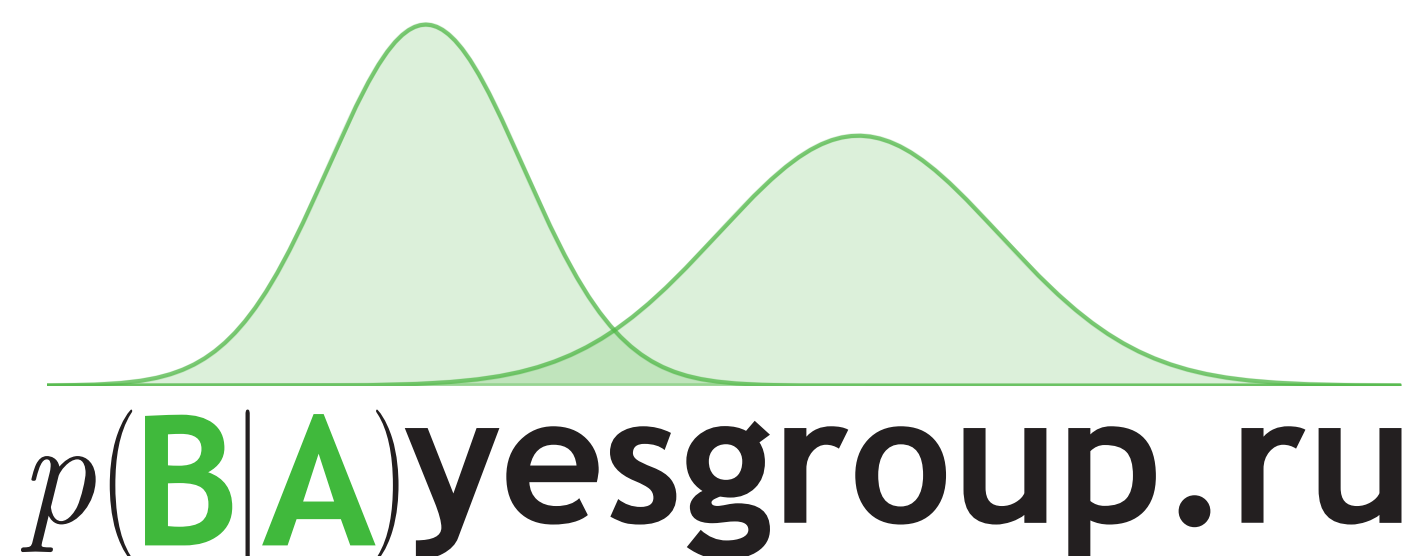
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Bayesian Methods Research Group