

The human loop in machine learning

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Agenda

- The era of [AutoML](#): Automating the automation
- Machine learning: From a software engineer's keystrokes
- Demystifying the human involvement in machine learning projects
- A primer to [active learning](#)
- [Machine Learning-Assisted Humans](#) vs [Human-Assisted Machine Learning](#)
- Guiding lights

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- Guiding lights
- No NeurIPS papers today!

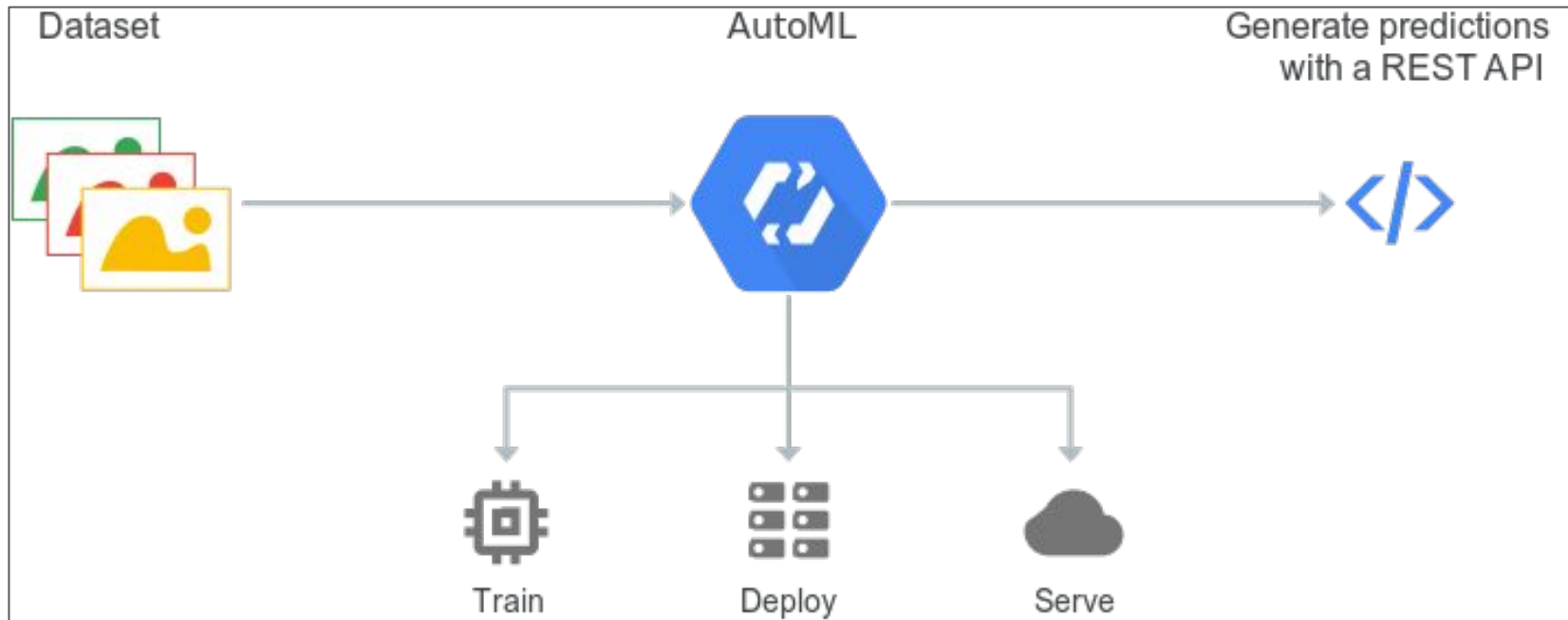
A for AutoML

- “The automation of automating automation” - [Sebastian Raschka](#)
 - Automating the hyperparameter tuning process

A for AutoML

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 - Automating the hyperparameter tuning process
 - Given a dataset find the most suitable machine learning architecture ([NAS](#))

A for AutoML



Source: <https://cloud.google.com/automl/>



Where do the humans
stand then?

Life-cycle of a machine learning project

- Problem [understanding](#)
- Data collection, wrangling and so on
- [Understanding](#) of the data
- Beginning the modeling process
- Evaluate, tune, repeat
- Model in production

Note that the above steps are *typical*

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Tableau, Facet, TensorBoard
Projector ...

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Keras-tuner, HPARAMS
...

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But how do we know if a problem is *suitable* for machine learning?

Demystifying the human
involvement in machine learning
projects

Problem framing is a scientific process

1. Frame the problem: What will traffic be like tomorrow?
2. Make a hypothesis: Weather forecast could be informative
3. Collect the data: Collect historical traffic and weather data
4. Test hypothesis: Test a model with the data
5. Analyze results: Is this model better than existing systems?
6. Reach a conclusion: I should (not) use this model, because of X, Y, and Z.
7. Refine and repeat: Time of year could be a helpful signal



Can a machine automate
this process?

Using heuristics

- Is it possible to solve the problem without machine learning?

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- Why deploy a model if it cannot beat a heuristic?

Using heuristics

- Is it possible to solve the problem without machine learning?
- Why deploy a model if it cannot beat a heuristic?
- Non-ML solutions can sometimes be *simpler* to maintain than ML solutions.

An intro to Active Learning

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It helps improving the overall **speed** and **cost** of training data!

Machine Learning-Assisted

Humans **vs** Human-Assisted

Machine Learning

Machine learning & human involvement

- Making a Machine Learning application more accurate with human input

Machine learning & human involvement

- Making a Machine Learning application more accurate with human input
- Improving a human task with the aid of Machine Learning

Wrapping up

- Automated machine learning
- More human involvement in machine learning
- The sweet rivalry

Some departing thoughts

- Can a machine perform machine learning research?

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- ...

This list is long!

See you next time



Find me here:

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Thank you very much :)



Experts

