Automated Machine Learning
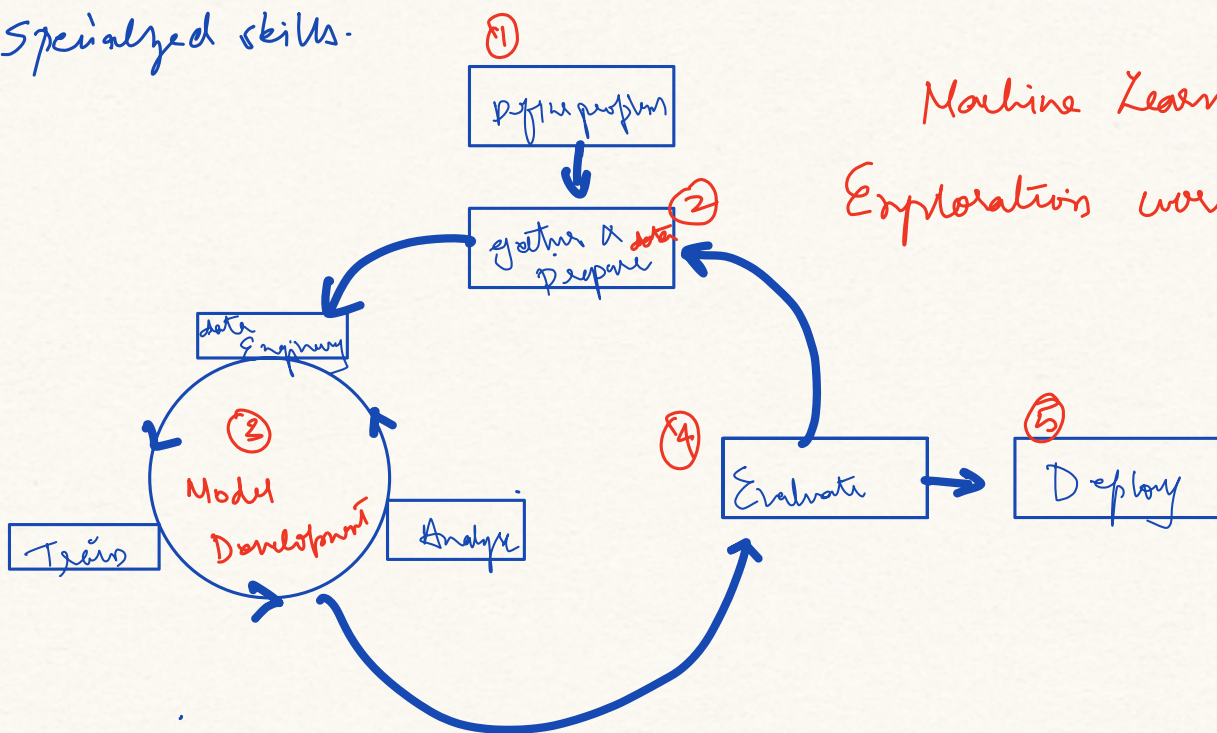
When we chose machine learning project and we felt manual training is your only option to build a machine learning Model. With manual training you write code using an ML framework to create a model, you choose which algorithm & iteratively tune hyperparameter to find the right model.

In practice building a machine learning model from prototype to production involves repetitive tasks & specialized skills.

Machine Learning Exploration workflow.

① Define problem
② gather & prepare data
③ Model Development — data Engineering, Train, Analyze
④ Evaluate
⑤ Deploy

==Repetitive Tasks==

ML workflow involve repetitive work & experimentation During Model development you typically need to explore diffent

Combinations of algorithm & hyperparameters to identify the most appropriate model.

⊗ Steps like below

① Different combinations of algorithm & hyperparameters.

② Write specialized code to train the model & then adjust the code to run experiments with different ML
&

⟹ All this works fine for small exploratory Model.

==Specialized Skills== -> Manually developing an ML model involves Specialized Skills. It needs data scientist to make this work. Then there is need to automate this task using

Auto ml

AUTO ML

It is the process of automating certain tasks in a machine learning workflow.

It's one set of tools & technologies that building machine learning models foster & more accessible to a wider group of users. Though automation can help throughout the ML workflow. The tasks that are often associated

with Automl are the ones included to the model development cycle

① Data Engineering

    → Feature Engineering

    → Feature Selection

② Training

    → Identifying an appropriate ML algo

    → Selecting the best hyperparameters

③ Analysis

    → Evaluating metrics generated during training based on Test & validation datasets.

Benefits & Limitations

Benefits

① To Save time

② Improve quality of ML

③ To build an ML model without needing specialized Skills.

④ To smoke test a dataset.

⑤ To evaluate a dataset.

⑥ To enforce best practices.

Limitations

① Model quality may not be as good as manual training.

② Model search & complexity can be opaque

③ Multiple AutoML runs may show more variance.

④ Models can't be customized during training

Data requirements

① For any model we need, hence using autoML you can ignore the architecture & hyperparameters. and focus primarily on quality of your data.

② There are also specialized AutoML can train models with significantly less data because they use <mark>transfer learning.</mark> → Transfering information from one machine learning task to another. Instead of requiring hundreds of thousands of examples do build an image classification model.

If AUTOML is right for you?

→ Good with limited experience building ML models. or experienced teams that are looking for productivity gains and don't have customization requirements.

→ Custom training is more appropriate when model quality is important & the team needs to be able to customize this Model. Manual training may require more time for experimentation & building a solution,

Getting Started!

AutoML tools

     1) Tools that requires no coding

     2) API & CLI tools.

Work flow AutoML

1) Problem definition
     → Machine learning problem framing.

2) Data gathering

3) Data preparation
     → label your data
     → Clean & format data

→ Perform feature transformation

⑦ Model development (no-code AutoML)

    → Import data

    → Analyze data

    → Refine data

          → Sematic Checkng

          → Transformations.

    → Configura AutoML run parameters.

③ Evaluate Model.

③ Productionization → help & deploy your Model via AutoML

④ Retain Model.