

Hands-On Session: Experiment Configuration with Hydra

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Who Am I? Carolin Benjamins



Since 2020 PhD student with Prof. Dr. Marius Lindauer at Leibniz University Hannover



Member of SMAC's dev team



Member of the automl.org supergroup



Collaborations with other research groups



Focus on AutoML, Dynamic Algorithm Configuration, Bayesian Optimization. Interested in robotics and Contextual Reinforcement Learning.



Background: Mechatronics & Robotics



I love automation and making complex algorithms more accessible!

What Hydra Can Do

- easy and clear experimental configuration
- no boilerplate regarding IO
- dynamic composition of configurations
- easy parallel running on local machine and on compute clusters
- easy optimization of your function



```
parser = argparse.ArgumentParser()
parser.add_argument('x', type=int, help='first value')
parser.add_argument('y', type=int, help='second value')
parser.add_argument('z', type=int, help='third value')
parser.add_argument('-f', type=float, help='value by which the sum is multiplied')
args = parser.parse_args()
```

source:
<https://the-examples-book.com/programming-languages/python/argparse>

How Hydra Works

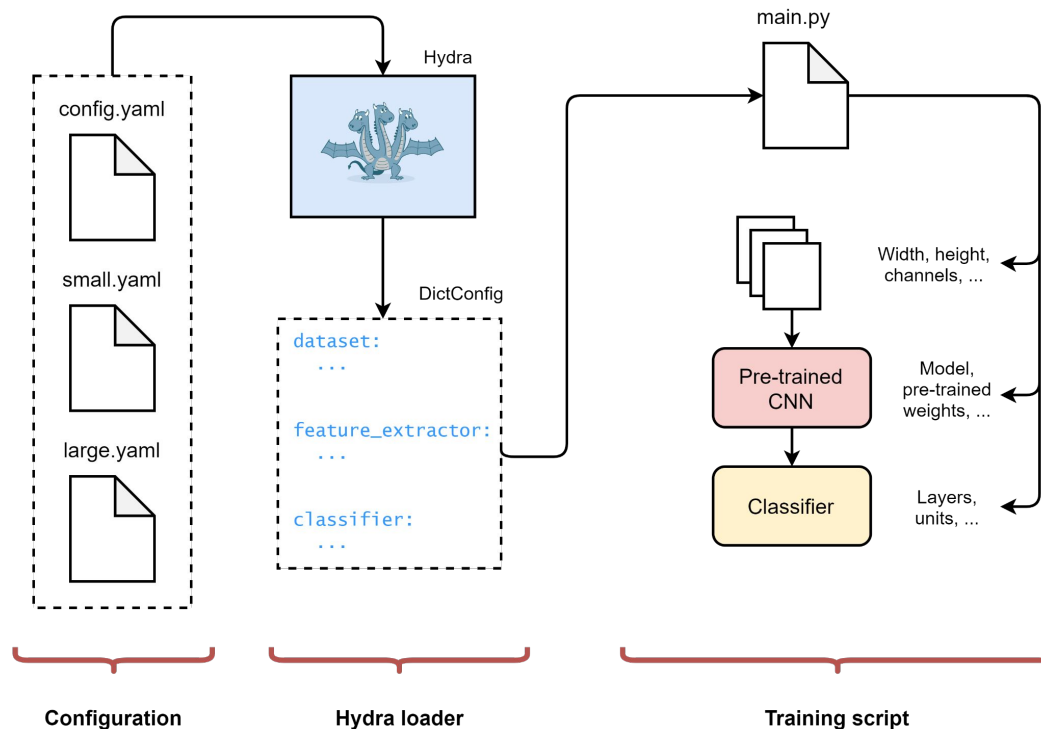


Image credit:

<https://www.sscardapane.it/tutorials/hydra-tutorial/#loading-and-manipulating-the-configuration-in-a-script>

Workflow With Hydra

1. Write your target function
 - a. Move every (hyper)parameter into a configuration file
2. Configure your experiments with different config files
3. Define your output directory structure
4. Define experiment sweeps and run
5. Gather data from your log files

What We Cover

1. parametrizable function, (hyper)parameters as DictConfig
2. hydra decorates, configuration file
3. override syntax commandline
4. sweeps (e.g. multiple seeds), sequential
5. launchers (local: joblib, but also slurm/submitit)
6. composition
7. instantiation
8. hyperparameter optimization

Let's Try! Hands On Session

Clone this repo: https://github.com/automl/hydra_tutorial

Run **bash install.sh** to create and activate a conda env and install the package.

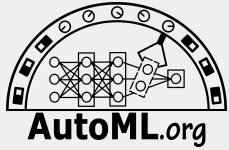


Wrap-Up: What Did We Learn?

- How to configure your experiments without losing track with hydra
- How to compose a configuration with different files
- How to run in parallel
- sneak peek into the Hydra-SMAC-Sweeper



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