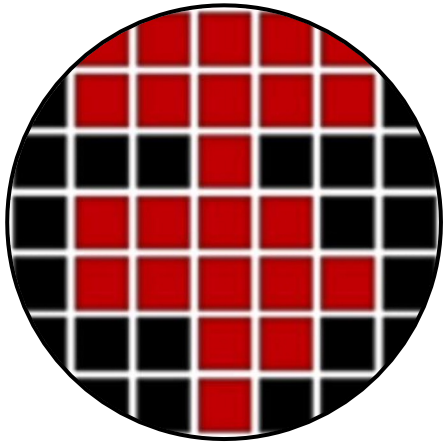
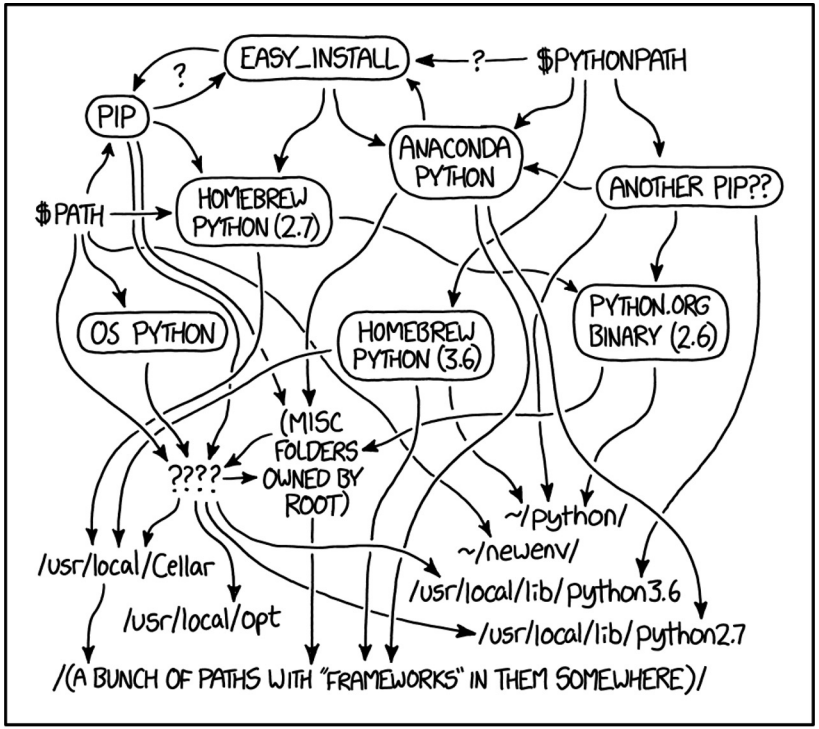
Develop ML applications inside the containers



- Maintainer of envd
- Author of mosec
- Software Engineer @tensorchord
- GitHub @kemingy
- Focus on the machine learning platform



MY PYTHON ENVIRONMENT HAS BECOME SO DEGRADED THAT MY LAPTOP HAS BEEN DECLARED A SUPERFUND SITE.

https://xkcd.com/1987/

`/usr/local/cuda`

`~/.local/bin`

`$PATH`

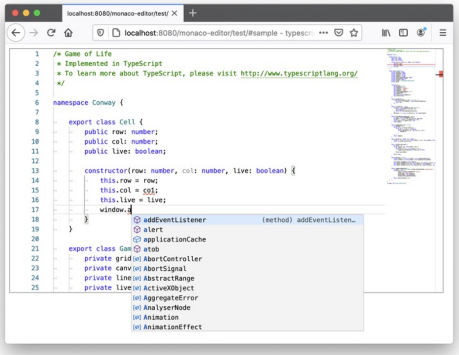
`~/.bashrc`

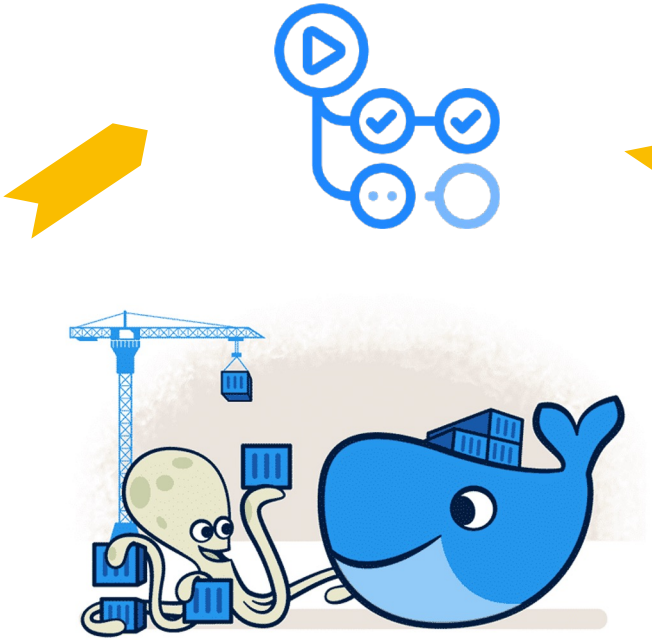
`~/.config`

`/var/lib/apt`

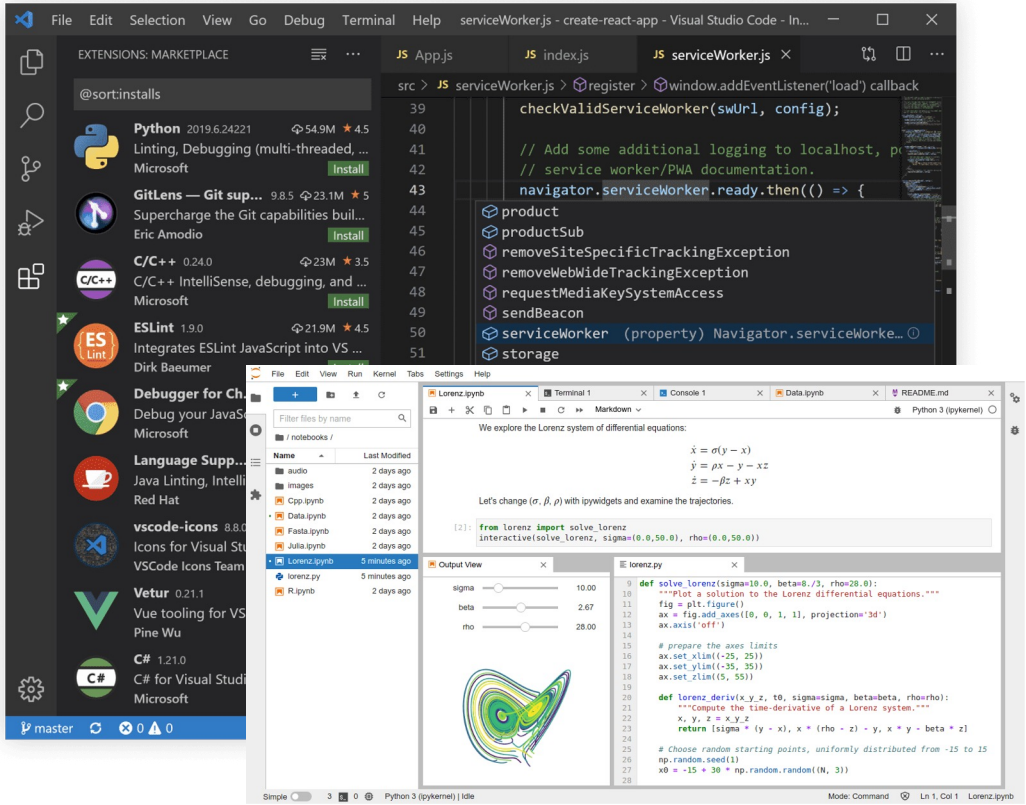
venv


LEFT
EXIT 12
venv
containers
developers





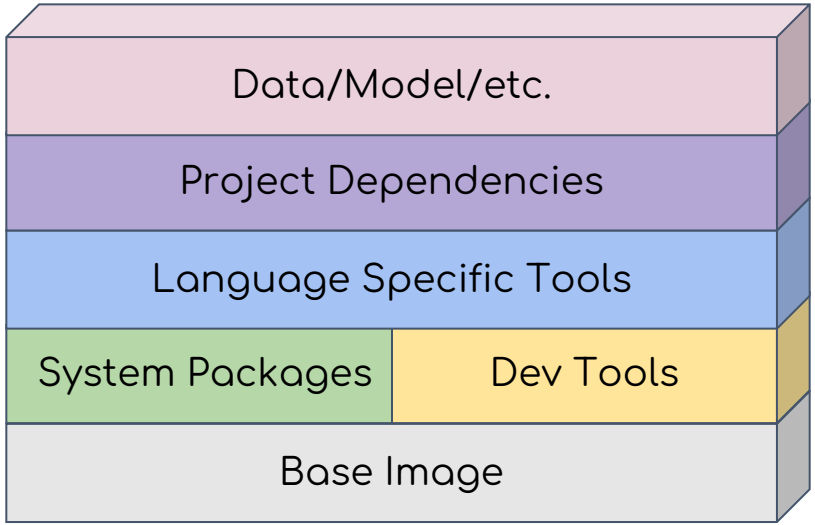
Dive Into Containers As Early As Possible

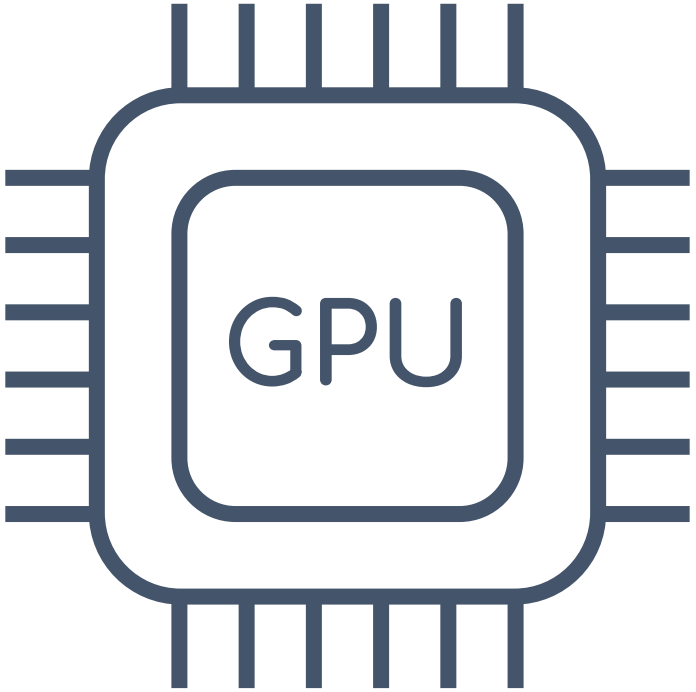


Do Not Sacrifice Dev Experience

- ❑ Code Editor
- ❑ Language Server
- ❑ Shell Prompt
- ❑ Extensions
- ❑ CLI Tools
- ❑ Themes
- ❑ etc.

Set Up Dev Env

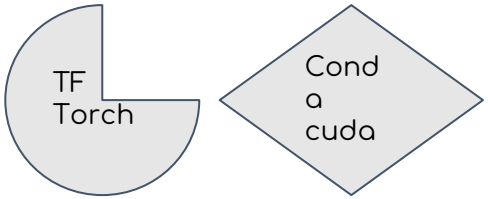


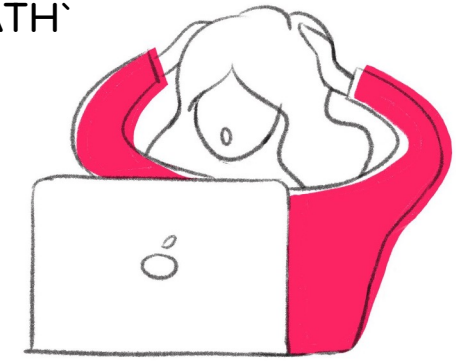


- ❑ Set up dev machines for teams
- ❑ Debug online services

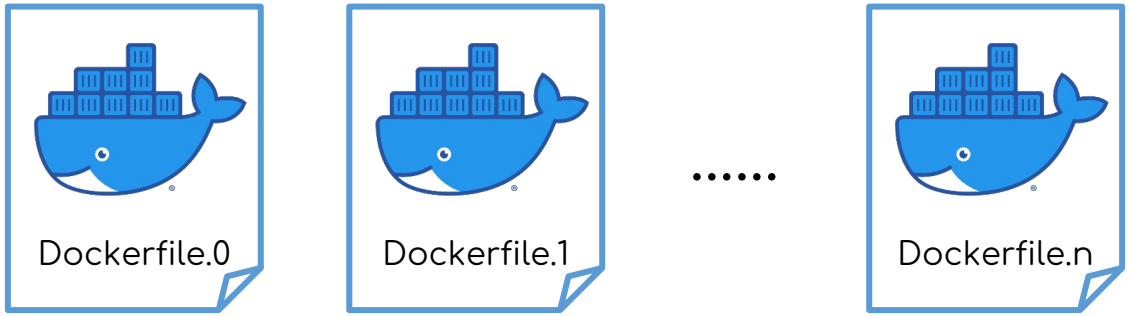
Could not load dynamic library 'libcudnn.so.7'; dlerror: libcudnn.so.7: cannot open shared object file: No such file or directory;

`export $LD_LIBRARY_PATH`





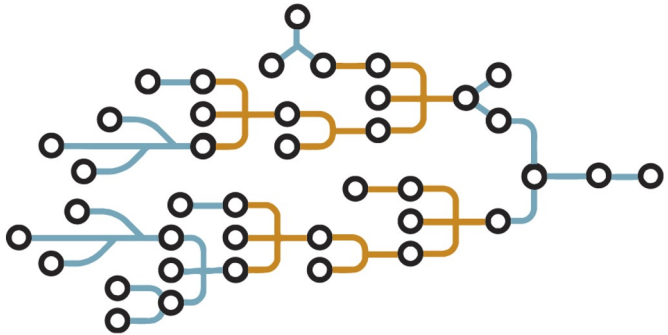
Don't Repeat Yourself (DRY)



Sadly, you cannot import part of others' Dockerfile

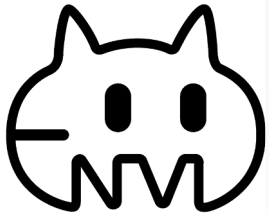
Buildkit looks promising

- ❏ Dockerfile-agnostic
- ❏ Concurrent
- ❏ Cache-efficient
- ❏ Default backend for Docker Desktop
- ❏ Hard to use directly

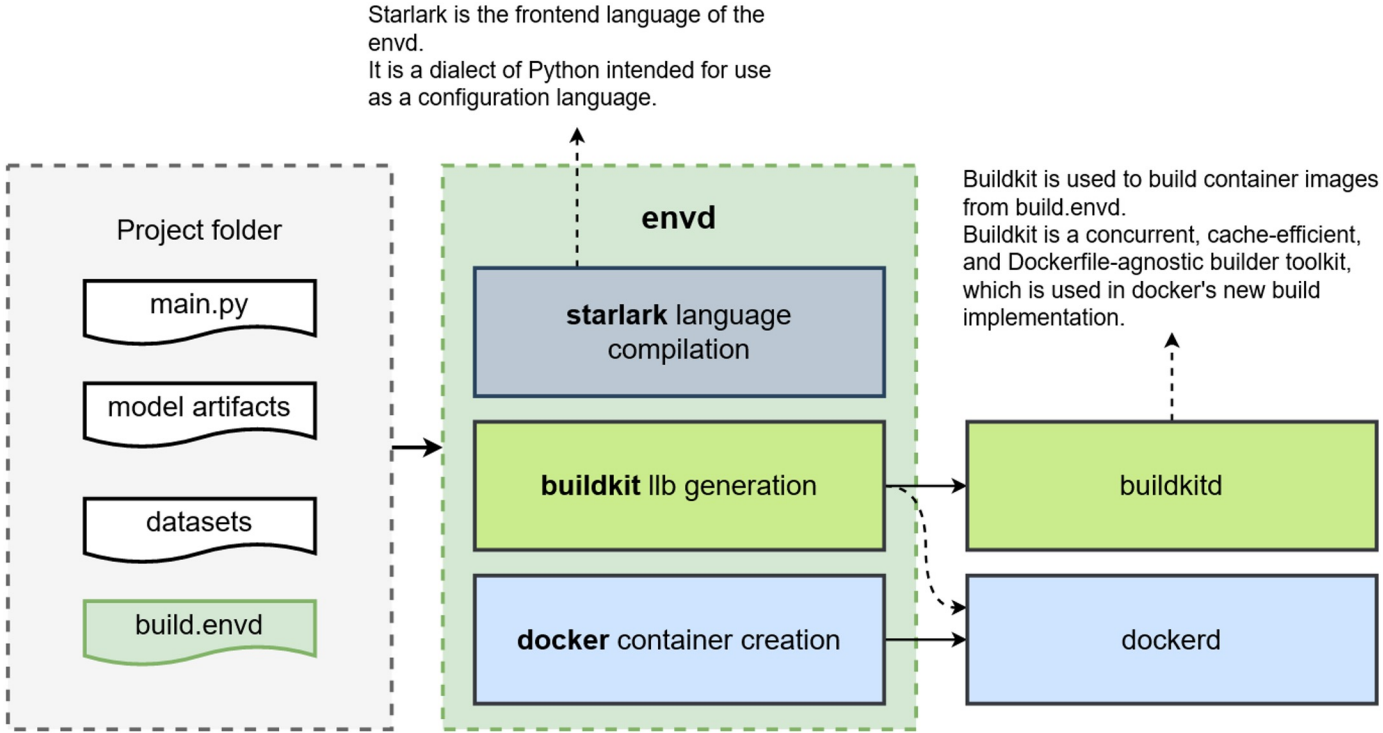


We need new tools

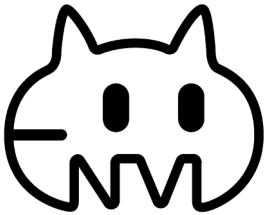
envd is a CLI that helps you create the container-based env for ML



```
def build():
    base(os="ubuntu20.04", language="python3")
    install.cuda(version="11.6.2")
    install.python_packages(name=[
        "torch --extra-index-url https://download.pytorch.org/whl/cu116",
    ])
```

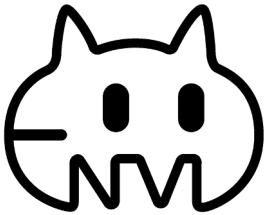

Starlark is the frontend language of the envd.
It is a dialect of Python intended for use as a configuration language.
Project folder
main.py
model artifacts
datasets
build.envd
envd
starlark language compilation
buildkit llb generation
docker container creation
Buildkit is used to build container images from build.envd.
Buildkit is a concurrent, cache-efficient, and Dockerfile-agnostic builder toolkit, which is used in docker's new build implementation.
buildkitd
dockerd

Now you're in the dev container!



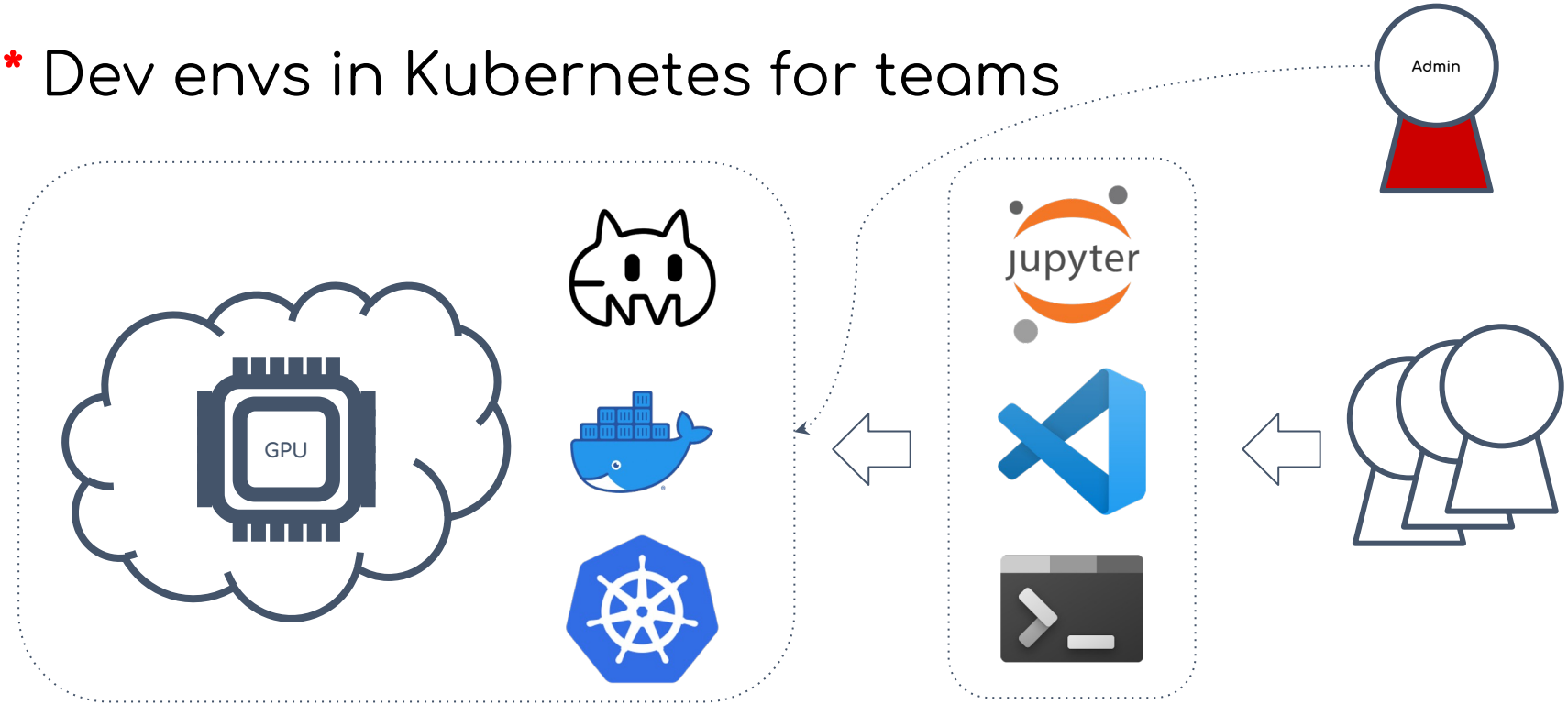
```
quick-start on  master [!] via Py v3.9.15 via ●  envd took 16s
● [envd]❯ python
Python 3.9.15 | packaged by conda-forge | (main, Nov 22 2022, 15:55:03)
[GCC 10.4.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import torch
>>> torch.cuda.is_available()
True
>>> exit()

quick-start on  master [!] via Py v3.9.15 via ●  envd took 15s
● [envd]❯
```

Share your libraries with others



```
envdlib = include("https://github.com/tensorchord/envdlib")

def build():
    base(os="ubuntu20.04", language="python")
    envdlib.tensorboard(host_port=8888)
```

* Dev envs in Kubernetes for teams



* Use in production

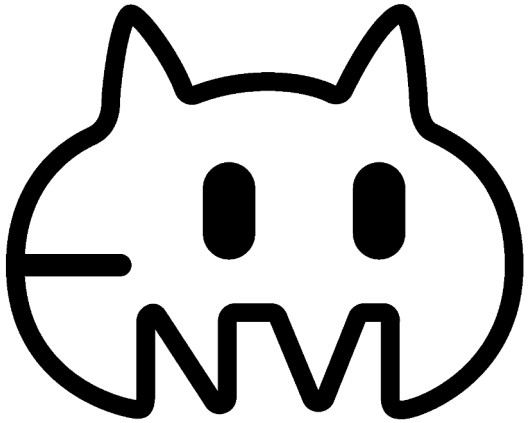
```
# syntax=v1


def serving():
    install.cuda(version="11.6.2")
    install.python()
    install.python_packages(
        name=[
            "torch --extra-index-url https://download.pytorch.org/whl/cu116",
            "torchvision",
            "numpy",
            "Pillow",
            "msgpack",
            "mosec",
        ]
    )
    io.copy(host_path="main.py", envd_path="/")
    config.entrypoint(["python", "main.py"])
```

Start using envd

```
pip install envd
```

- ❤️ envd GitHub repository
- 📖 envd document
- 🔌 envd API reference
- ⌨️ envd CLI reference
- 🌰 envd examples

@TensorChord



Q & A