# ML Deployment – Sports News Headlines Classifier

* Build Package:
  + Project folder path: C:\Users\Aiden\Documents\Data\_Science\_Stuff\sf\_Data\_Science\_Stuff\Projects\06\_ML\_Deployment\01\_Build\_Package
  + I have taken a copy of the code from the actual project’s folder path:
  + C:\Users\Aiden\Documents\Data\_Science\_Stuff\sf\_Data\_Science\_Stuff\Projects\01\_SportsNewsClassifier\final\_code
  + I have changed some of the code:
    - Code to process data and build model is saved in logistic\_regression\_model folder.
    - instead of scraping data, we load CSVs – **this is to ensure the best practice of reproducibility in our ML pipeline**
    - I have created requirements.txt and test\_requirements.txt for installing dependencies via Tox (we are not using conda!!)
    - I have created validation.py and predict.py that makes a prediction on a batch of data
    - I have used pytest instead of unittest. Tests are saved in the folder tests. The conftest.py loads the testing dataset which is used on the pytests.
    - After deploying to Heroku it seemed that using OS didn’t work for project parameters, so I changed the code base back to using pathlib.
  + Training data = Sports\_News\_09\_09\_2021.csv
  + Testing data = Sports\_News\_03\_06\_2021.csv
  + As mentioned above, I am using tox to run the pipeline:
  + tox.ini file contains commands to run the pipeline
  + most of the code was copied from Udemy course section 5 tox.ini
  + I also copied over the mypy.ini file as these remove warnings when running commands in tox.ini.
  + pytest was producing deprecation warnings so I added another file called pytest.ini to remove these warnings when running tox
  + At this point the package is ready to be built
  + I copied over the pyproject.toml file from Udemy and at the bottom I changed the line\_length to 135
  + I also copied over setup.py and made changes:
    - Package meta-data
    - Instead of pathlib, I have used os to locate directories
  + I created a file called VERSION that specifies the version of the model.
  + Lastly, I built the python package for the model (tid-logistic-regression-model)
    - I added init.py file to the folder logistic\_regression\_model. Without this file, the package will not work in the next section
* **FastAPI**
  + FastAPI loads after running tox -e run
    - Ensure correct version of model is in requirements.txt
  + localhost:8001 to view app
  + /docs to execute test prediction
  + Can also use requests module in Python to make a prediction:
* **Deploy to Heroku**
  + Create Heroku app from cli: floating-anchorage-18633
  + At this point we will need a git repository (create development branch in git and push all code there!)
  + git subtree push --prefix 02\_Deploy\_REST\_API main
  + this should deploy the app – go back to Heroku and open app. Can check out /docs and execute prediction.
  + Can test API using requests in Python – similar url to localhost above, replace localhost with Heroku url
* **CI/CD** 
  + Using CircleCI we need to automate the following process:
    - Train and test new model, then publish to Gemfury
    - Deploy app to Heroku
  + I have taken a copy of the model package and saved into 03\_CircleCI, in the subfolder model-package:
    - We have the code to train, test and save the model (logistic\_regression\_model folder).
    - requirements, test, MANIFEST, mypy.ini, setup.py files etc.
    - We now have a new file called publish\_model.sh
      * This will be used in the tox file to upload our model package to Gemfury.
      * I have copied this file from the Udemy course without any changes
    - We add new jobs to the tox.ini file
    - [testenv:publish\_model] – this runs the main.py file and then publishes models to Gemfury
    - We also add in the passenv GEMFURY\_PUSH\_URL (line 17)
  + We copy over our FastAPI code and save to the folder sports-classifier-api
    - We add the passenv to the tox.ini file PIP\_EXTRA\_INDEX\_URL so that we can get our published model from Gemfury.
    - We also add an extra line at the top for the requirements.txt file so that the model package is fetched from Gemfury.
  + We can now create our config.yml file that will automate the process of our entire pipeline.
    - Copy config.yml from Udemy course – I only kept the jobs that train, test and publishes model, as well as push to Heroku
    - For the app to be deployed to Heroku, the Udemy course required branch for master only (line 99-105). I have added dev\_aiden and development so any changes on these branches will run the CI/CD process.
  + I added the env variables for Heroku and CircleCI (note that we need to set project up in CircleCI at this point)
  + Commit these changes to dev\_aiden and push to origin which should automatically start the CI/CD pipeline. Note that if style checks etc. fail, then run locally on terminal and then re-commit and push to origin. Only then will the tests pass.