Démarche Travail pratique

Objectif:

Partie-3 : Faire des prédictions avec le modèle et tester la méthode predict

Partie-4 : Validation des données dans le modèle

Partie-5 : Ajout d'ingénierie des fonctionnalités dans le pipeline

Partie-6 : Gestion des versions et journalisation

Partie-7 : Créer un package

Partie 8 : Préparation de Rest-API de service de modèle

Partie-9 Ajout de la configuration et de la journalisation et tests à l'API Flask

Partie-10 : Ajout du point de prédiction à l'API Flask

Partie-11 : Ajout de version a l'application flask.

Partie-12 : Ajout de Schéma de validation à l'API Flask

Démarche :

Partie-3 : Faire des prédictions avec le modèle et tester la méthode predict

Après avoir modifié le code de pipeline, vérifiez le staus :

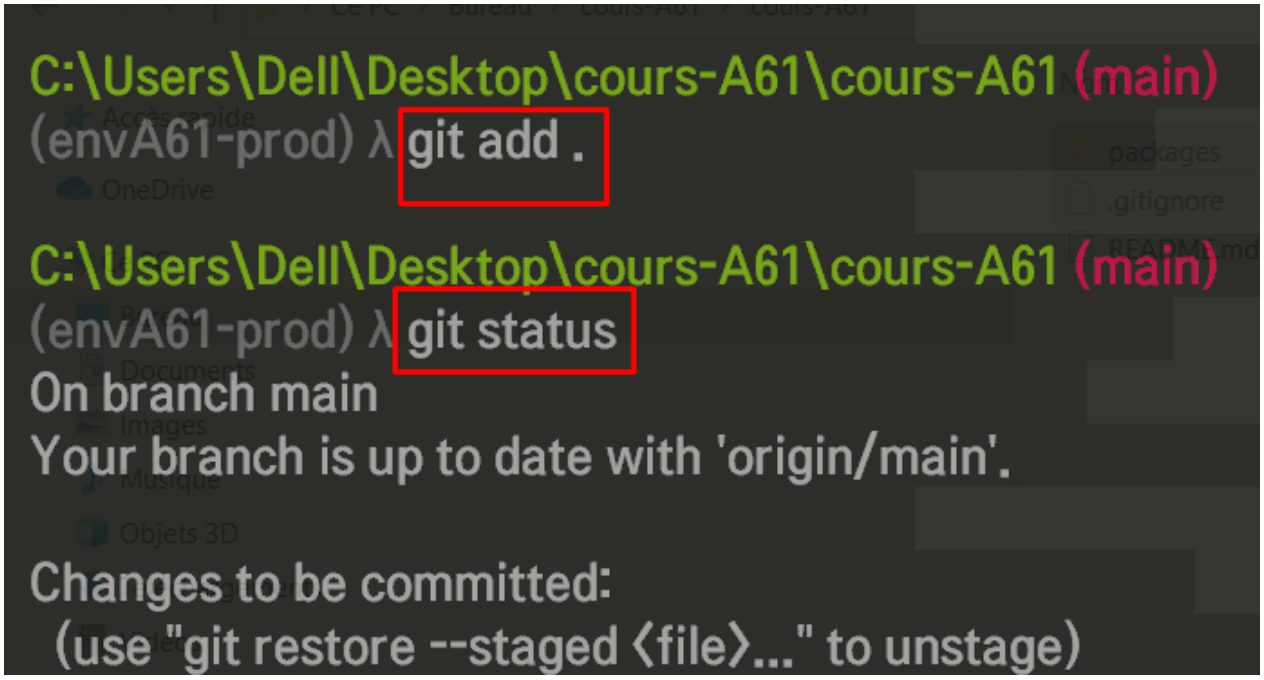
Git status

Git log

Git log -p

Tapez les commandes suivantes, comme les montrent les captures d'écrans ci-dessous :

```
git add .

git status

git commit -m 'Partie-3-Ajout prédictions et test'

git push -u origin main
```



Ajoutez;

git commit -m 'Partie-3-Ajout prédictions et test'

```
C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ git commit -m " Partie-3- Ajout predictions et tests"
[main d6fc4d6]  Partie-3- Ajout predictions et tests
```

puis

```
C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ git push -u origin main
Enumerating objects: 20, done.
Counting objects: 100% (20/20), done.
Delta compression using up to 8 threads
Compressing objects: 100% (12/12), done.
Writing objects: 100% (13/13), 2.11 KiB | 1.05 MiB/s, done.
Total 13 (delta 4), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (4/4), completed with 4 local objects.
To https://github.com/cegep2020/cours-A61.git
   bbe8649..d6fc4d6  main -> main
Branch 'main' set up to track remote branch 'main' from 'origin'.
```

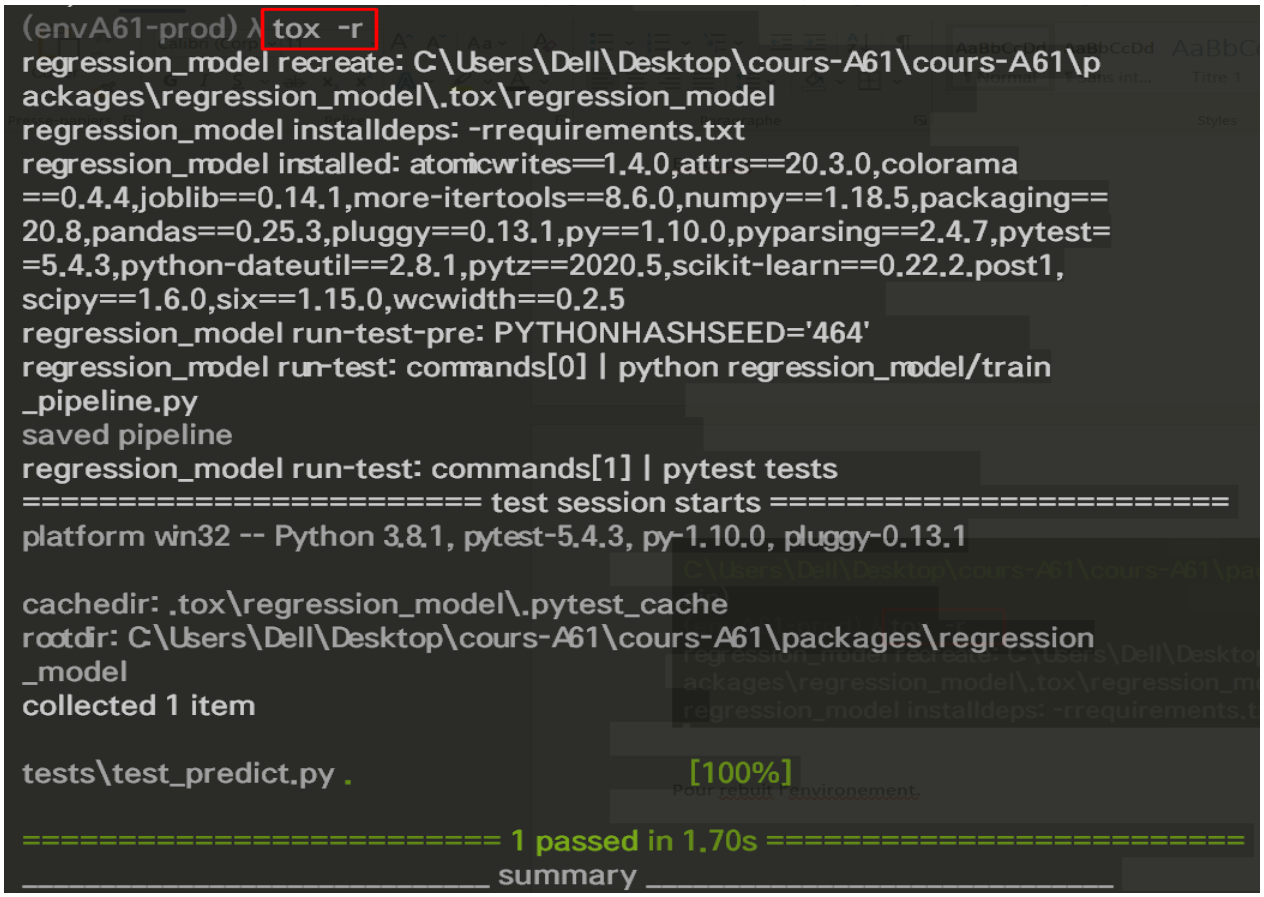
Pour faire de prediction et test la methode predict

On a ajouté une ligne à la fin de fichier **Tox** pour faire des tests

Exécutez

```
C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\regression_model (m
ain)
(envA61-prod) λ tox  -r
regression_model recreate: C:\Users\Dell\Desktop\cours-A61\cours-A61\p
ackages\regression_model\.tox\regression_model
regression_model installdeps: -rrequirements.txt
```

Pour recréer l'environnement, tapez la commande ci-dessous :



Partie-4- Validation des données dans le modèle

- Valider les données avant la prediction
- Ajout d'un module de validation et l'appelé au niveau du module **predict**
- Mettre à jour nos tests pour tester le nouveau module validation

```
(envA61-prod) λ git status
On branch main
Your branch is up to date with 'origin/main'.

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory
)
        modified:   packages/regression_model/regression_model/predict
.py
        modified:   packages/regression_model/tests/test_predict.py

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        packages/regression_model/regression_model/processing/validati
on.py

no changes added to commit (use "git add" and/or "git commit -a")
```

```
C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ git status
On branch main
Your branch is up to date with 'origin/main'.

Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        modified:   packages/regression_model/regression_model/predict
.py
        new file:   packages/regression_model/regression_model/process
ing/validation.py
        modified:   packages/regression_model/tests/test_predict.py
```

```
C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ git commit -m "Partie-4- Ajout bvalidation de données"

[main f18e49b] Partie-4- Ajout bvalidation de données
 3 files changed, 50 insertions(+), 1 deletion(-)
 create mode 100644 packages/regression_model/regression_model/process
ing/validation.py
```

```
C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ git push -u origin main
Enumerating objects: 17, done.
Counting objects: 100% (17/17), done.
Delta compression using up to 8 threads
Compressing objects: 100% (9/9), done.
Writing objects: 100% (10/10), 1.59 KiB | 816.00 KiB/s, done.
Total 10 (delta 4), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (4/4), completed with 4 local objects.
To https://github.com/cegep2020/cours-A61.git
   d6fc4d6..f18e49b  main -> main
Branch 'main' set up to track remote branch 'main' from 'origin'.
```

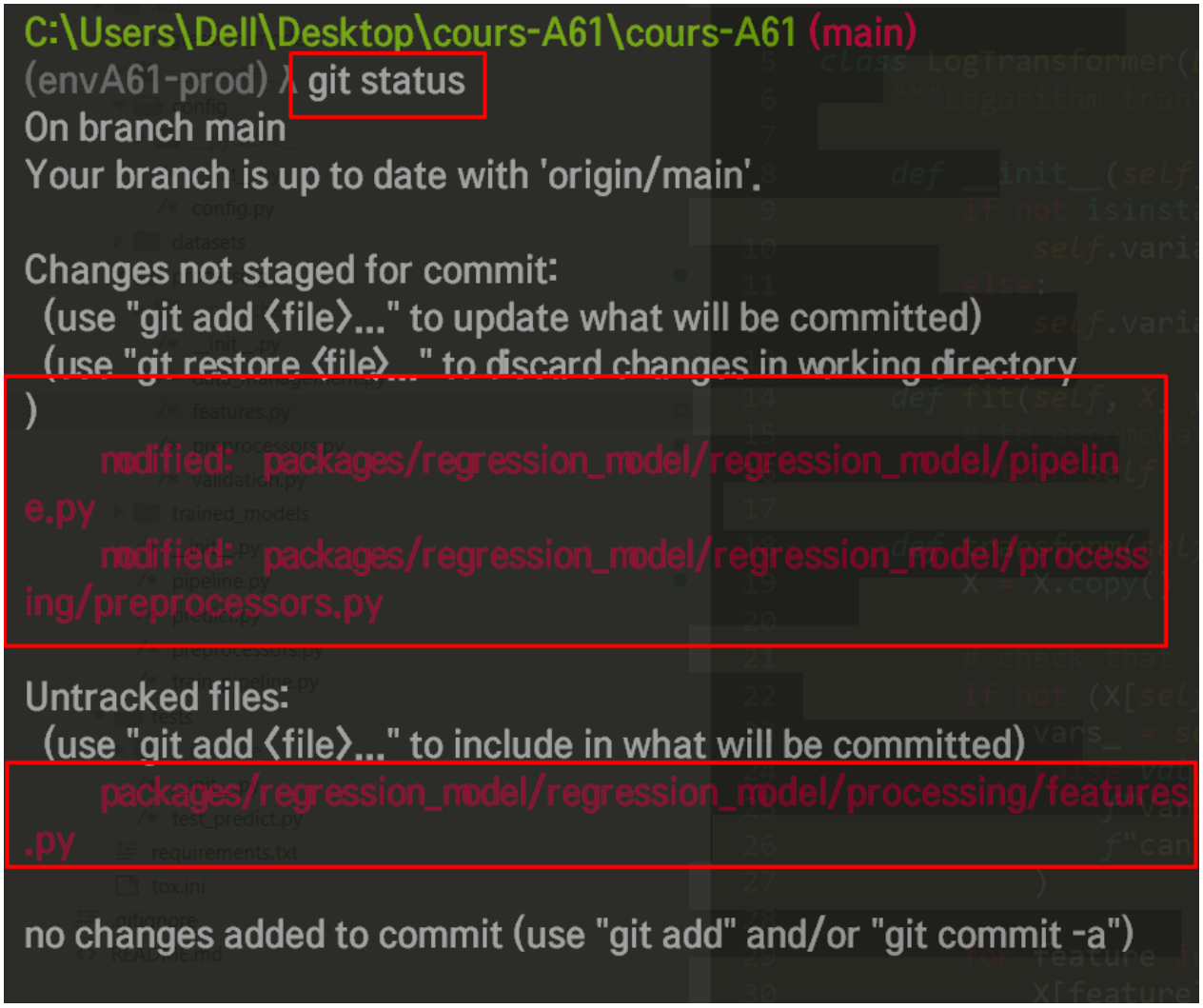
```
ain)
(envA61-prod) λ tox
regression_model installed: atomicwrites==1.4.0,attrs==20.3.0,colorama
==0.4.4,joblib==0.14.1,more-itertools==8.6.0,numpy==1.18.5,packaging==
20.8,pandas==0.25.3,pluggy==0.13.1,py==1.10.0,pyparsing==2.4.7,pytest=
=5.4.3,python-dateutil==2.8.1,pytz==2020.5,scikit-learn==0.22.2.post1,
scipy==1.6.0,six==1.15.0,wcwidth==0.2.5
regression_model run-test-pre: PYTHONHASHSEED='884'
regression_model run-test: commands[0] | python regression_model/train
_pipeline.py
saved pipeline
regression_model run-test: commands[1] | pytest tests
```

```
========================= test session starts ==========================
platform win32 -- Python 3.8.1, pytest-5.4.3, py-1.10.0, pluggy-0.13.1

cachedir: .tox\regression_model\.pytest_cache
rootdir: C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\regression
_model
collected 2 items

tests\test_predict.py ..                                  [100%]

============================== 2 passed in 1.63s ===============================
_____________________________ summary _____________________________
  regression_model: commands succeeded
  congratulations :)
```

Partie-5 Ajout d'ingénierie des fonctionnalités dans le pipeline

- Ajouter un module feature et l'appeler au niveau du module pilene
- Diviser preprocessinfg et feautre pour simplifier le test et la compresnetion du code.

Note : on peut créer un package tout entier pour l'ingénierie de données et l'importer dedans ou même on peut appeler api tout entière pour nous faire le travail….



```
C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ git add .

C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ git commit -m " Partie-5- Ajout ingénierie des fonctio
nnalités dans le pipeline"
[main 43a0a4b] Partie-5- Ajout ingénierie des fonctionnalités dans le
 pipeline
 3 files changed, 37 insertions(+), 31 deletions(-)
 create mode 100644 packages/regression_model/regression_model/process
ing/features.py
```

```
C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ git push -u origin main
Enumerating objects: 15, done.
Counting objects: 100% (15/15), done.
Delta compression using up to 8 threads
Compressing objects: 100% (8/8), done.
Writing objects: 100% (9/9), 1.05 KiB | 1.05 MiB/s, done.
Total 9 (delta 5), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (5/5), completed with 4 local objects.
To https://github.com/cegep2020/cours-A61.git
   f18e49b..43a0a4b  main -> main
Branch 'main' set up to track remote branch 'main' from 'origin'.
```

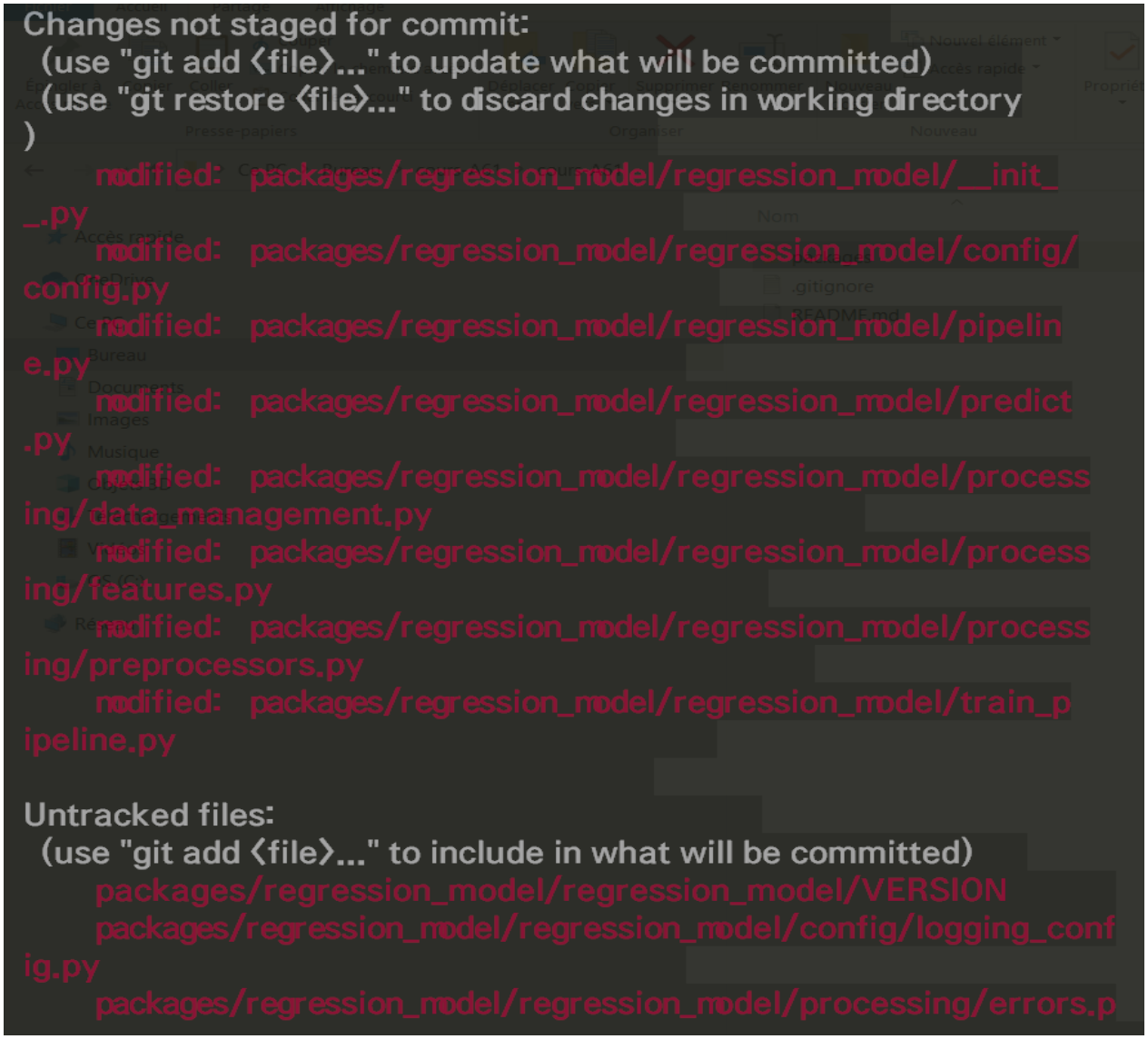
```
(envA61-prod) λ tox
regression_model installed: atomicwrites==1.4.0,attrs==20.3.0,colorama
==0.4.4,joblib==0.14.1,more-itertools==8.6.0,numpy==1.18.5,packaging==
20.8,pandas==0.25.3,pluggy==0.13.1,py==1.10.0,pyparsing==2.4.7,pytest=
=5.4.3,python-dateutil==2.8.1,pytz==2020.5,scikit-learn==0.22.2.post1,
scipy==1.6.0,six==1.15.0,wcwidth==0.2.5
regression_model run-test-pre: PYTHONHASHSEED='482'
regression_model run-test: commands[0] | python regression_model/train
_pipeline.py
saved pipeline
regression_model run-test: commands[1] | pytest tests
============================= test session starts =============================
platform win32 -- Python 3.8.1, pytest-5.4.3, py-1.10.0, pluggy-0.13.1

cachedir: .tox\regression_model\.pytest_cache
rootdir: C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\regression
_model
```

```
============================= test session starts =============================
platform win32 -- Python 3.8.1, pytest-5.4.3, py-1.10.0, pluggy-0.13.1

cachedir: .tox\regression_model\.pytest_cache
rootdir: C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\regression
_model
collected 2 items

tests\test_predict.py ..                                 [100%]

============================== 2 passed in 1.59s ==============================
_____________________________________ summary _____________________________________
  regression_model: commands succeeded
  congratulations :)
```

Partie-6- Gestion des versions et journalisation

- Gestion des versions est crédible pour la reproductibilité
- Les logs on peut les formatter et les afficher directement dans la console ou bien les rediriger vers un fichier ou bien une base de données, on peut même alimenter avec des rapports…
- Lors d'execution tox, on va voir plus logs compréhensibles.

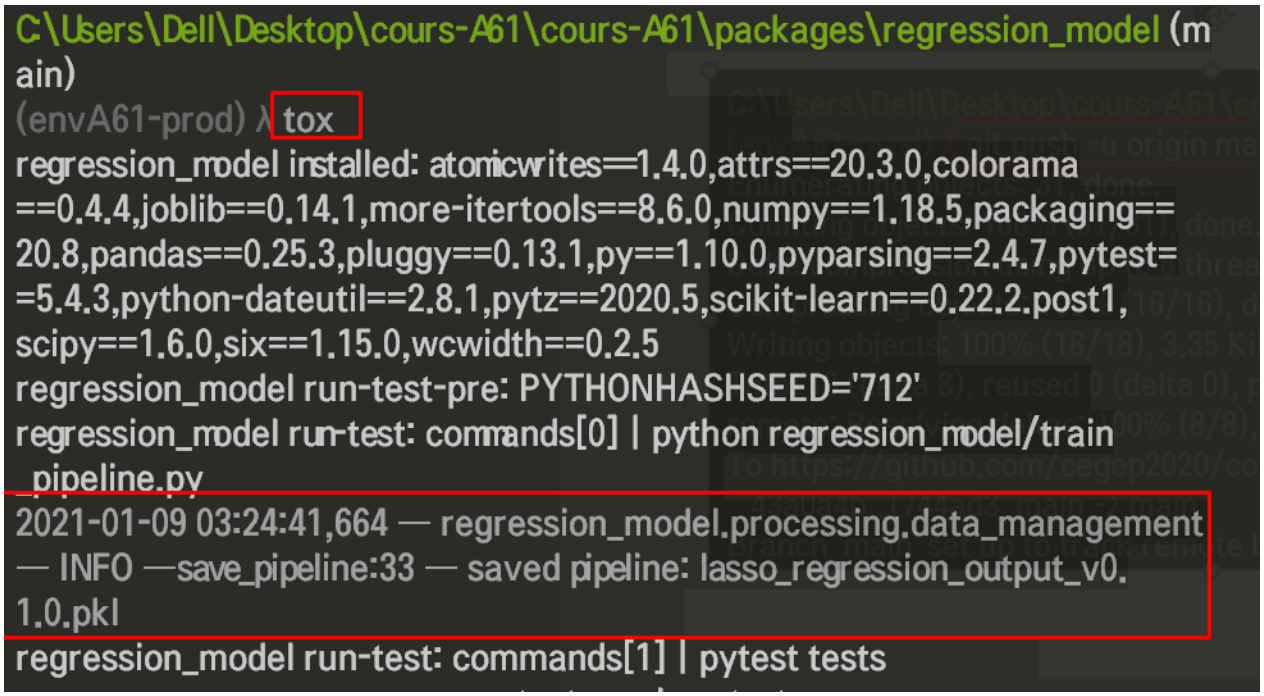
Git status



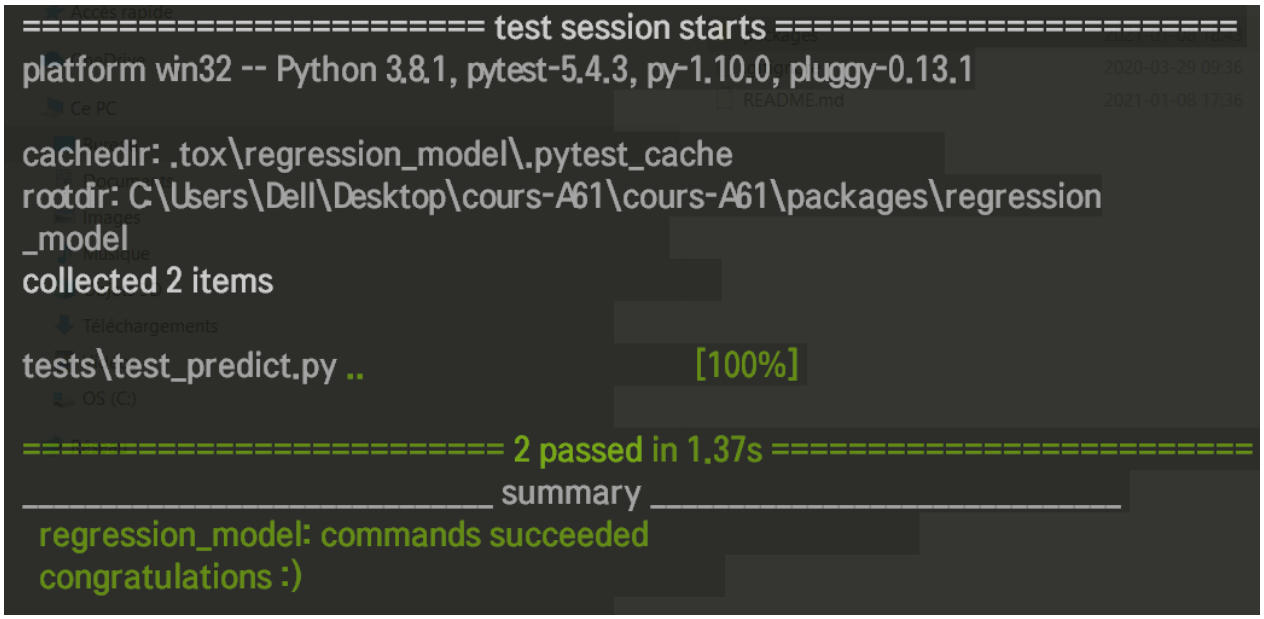
```
C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ git add .

C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ git commit -m " Partie-6-Gestion des versions et journ
alisation"
[main 1744ad3] Partie-6-Gestion des versions et journalisation
 11 files changed, 121 insertions(+), 12 deletions(-)
 create mode 100644 packages/regression_model/regression_model/VERSION

 create mode 100644 packages/regression_model/regression_model/config/
logging_config.py
 create mode 100644 packages/regression_model/regression_model/process
ing/errors.py
```

```
C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ git push -u origin main
Enumerating objects: 31, done.
Counting objects: 100% (31/31), done.
Delta compression using up to 8 threads
Compressing objects: 100% (16/16), done.
Writing objects: 100% (18/18), 3.35 KiB | 1.12 MiB/s, done.
Total 18 (delta 8), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (8/8), completed with 8 local objects.
To https://github.com/cegep2020/cours-A61.git
   43a0a4b..1744ad3  main -> main
Branch 'main' set up to track remote branch 'main' from 'origin'.
```

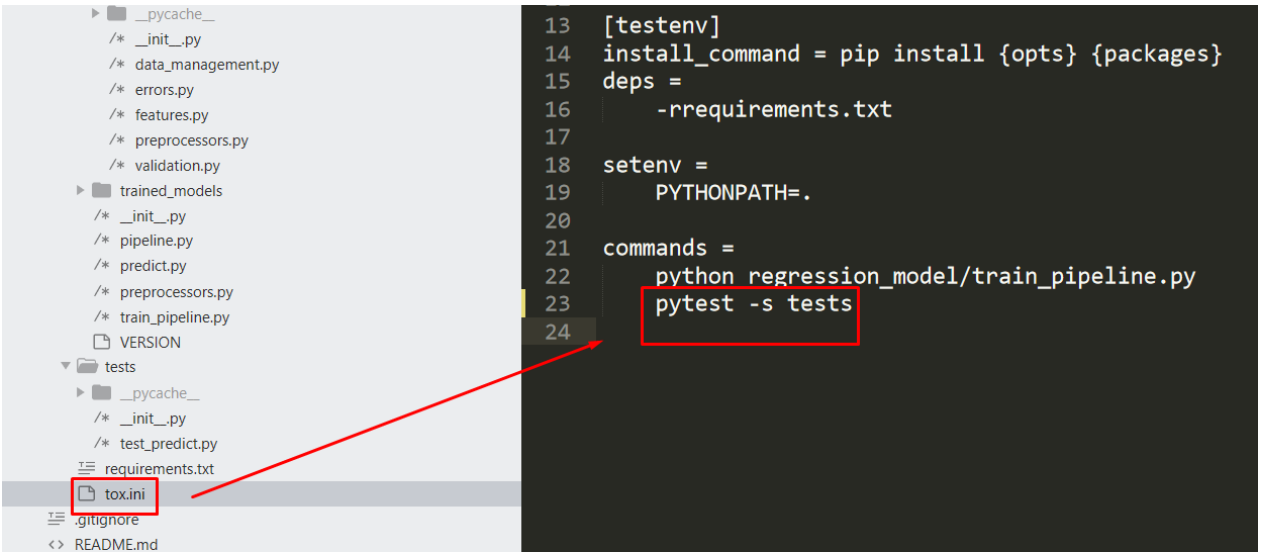
Comme vous remarquez il y a plus infos logs



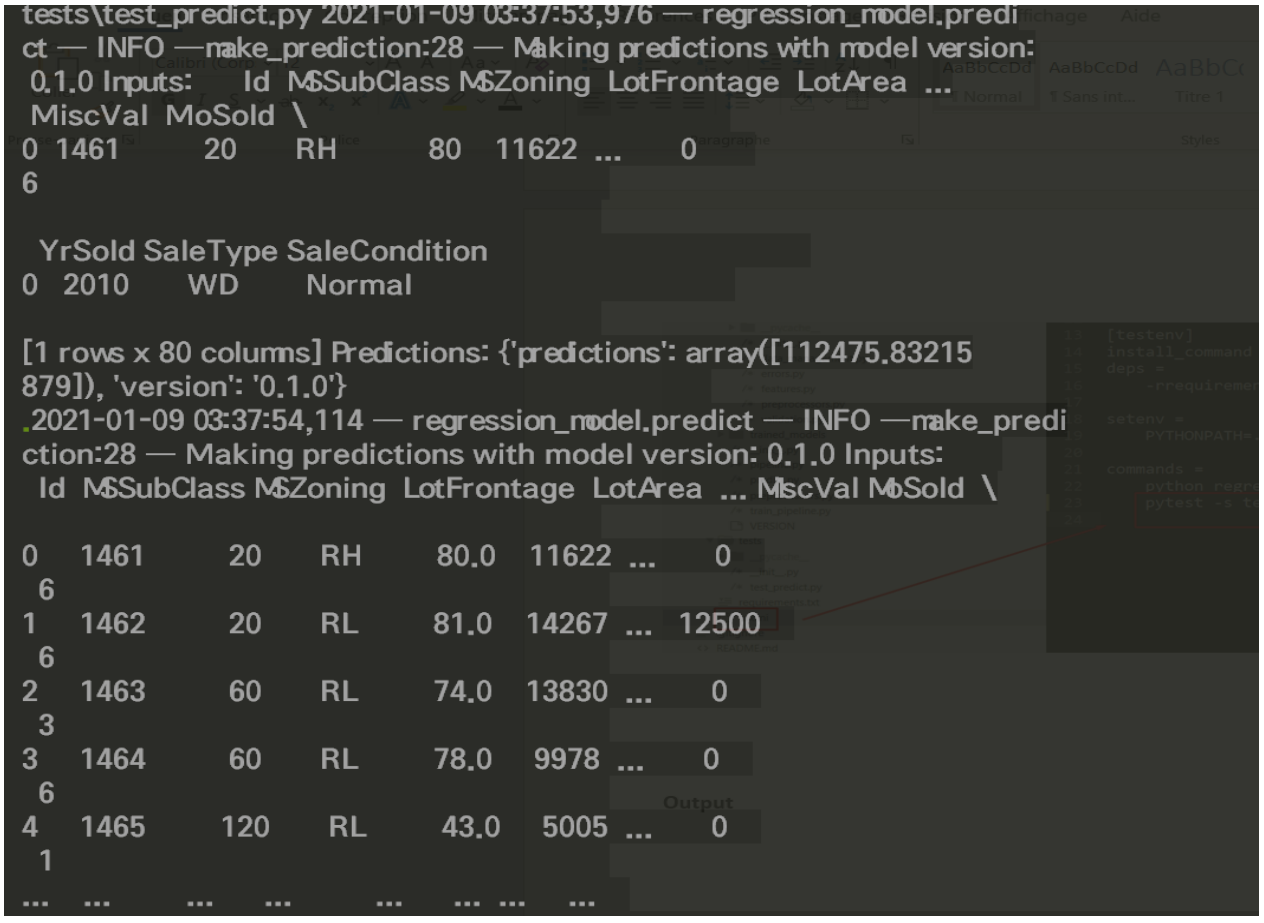
Suite



Comme vous avez remarquez quand vous exécutez **tox** vous ne voyez pas les logs, pour les ajouter, modifier le fichier**.tox.ini** comme suit :

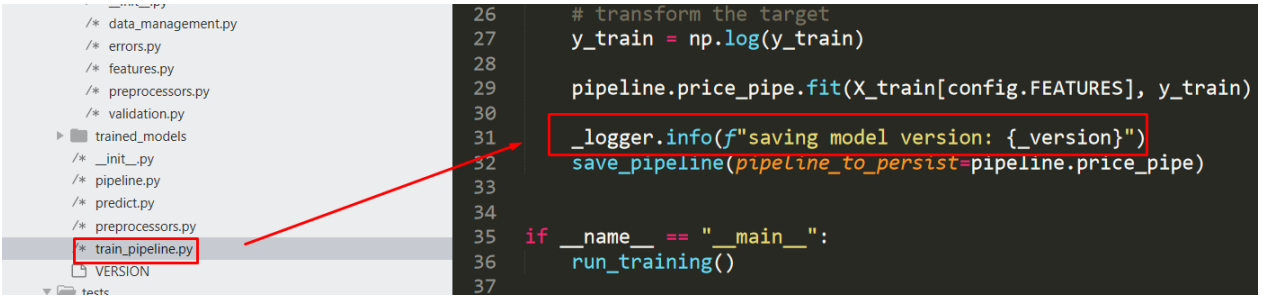

__pycache__
__init__.py
data_management.py
errors.py
features.py
preprocessors.py
validation.py
trained_models
__init__.py
pipeline.py
predict.py
preprocessors.py
train_pipeline.py
VERSION
tests
__pycache__
__init__.py
test_predict.py
requirements.txt
tox.ini
.gitignore
README.md
[testenv]
install_command = pip install {opts} {packages}
deps =
-rrequirements.txt
setenv =
PYTHONPATH=.
commands =
python regression_model/train_pipeline.py
pytest -s tests

Sortie :

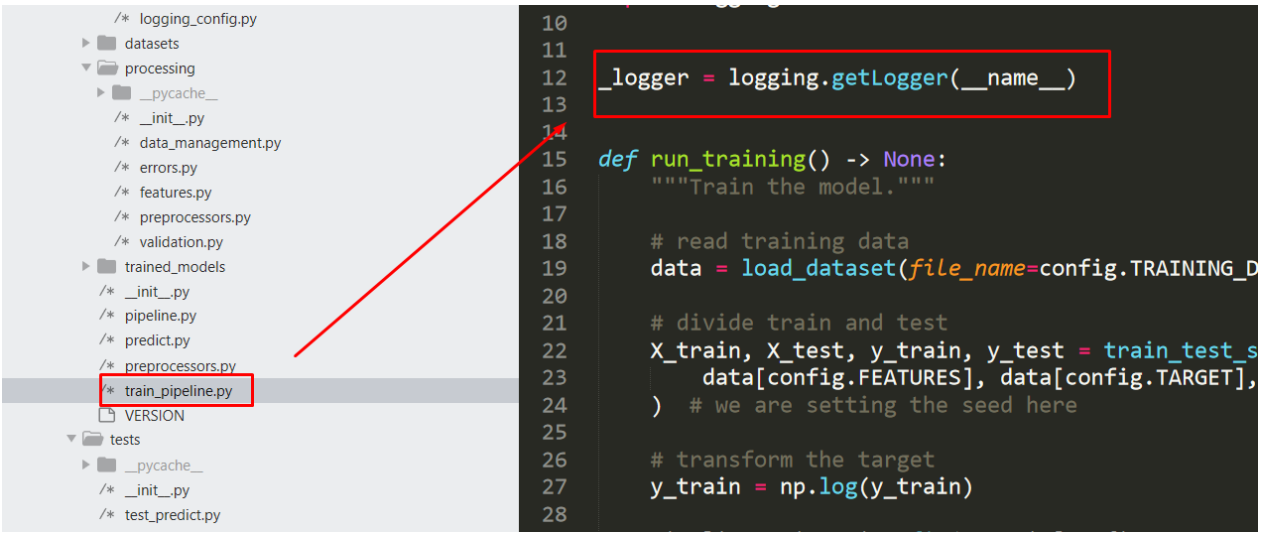

tests\test_predict.py 2021-01-09 03:37:53,976 — regression_model.predi
ct — INFO —make_prediction:28 — Making predictions with model version:
0.1.0 Inputs: Id MSSubClass MSZoning LotFrontage LotArea ...
MiscVal MoSold \
0 1461 20 RH 80 11622 ... 0
6
YrSold SaleType SaleCondition
0 2010 WD Normal
[1 rows x 80 columns] Predictions: {'predictions': array([112475.83215
879]), 'version': '0.1.0'}
.2021-01-09 03:37:54,114 — regression_model.predict — INFO —make_predi
ction:28 — Making predictions with model version: 0.1.0 Inputs:
Id MSSubClass MSZoning LotFrontage LotArea ... MiscVal MoSold \
0 1461 20 RH 80.0 11622 ... 0
6
1 1462 20 RL 81.0 14267 ... 12500
6
2 1463 60 RL 74.0 13830 ... 0
3
3 1464 60 RL 78.0 9978 ... 0
6
4 1465 120 RL 43.0 5005 ... 0
1
... ...

On peut voir input et output logs

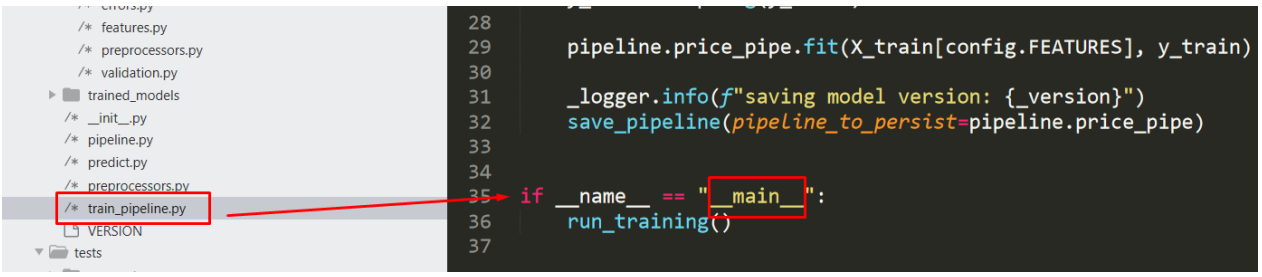
Remarque : pourquoi on ne voit pas le log du module train_pipeline?



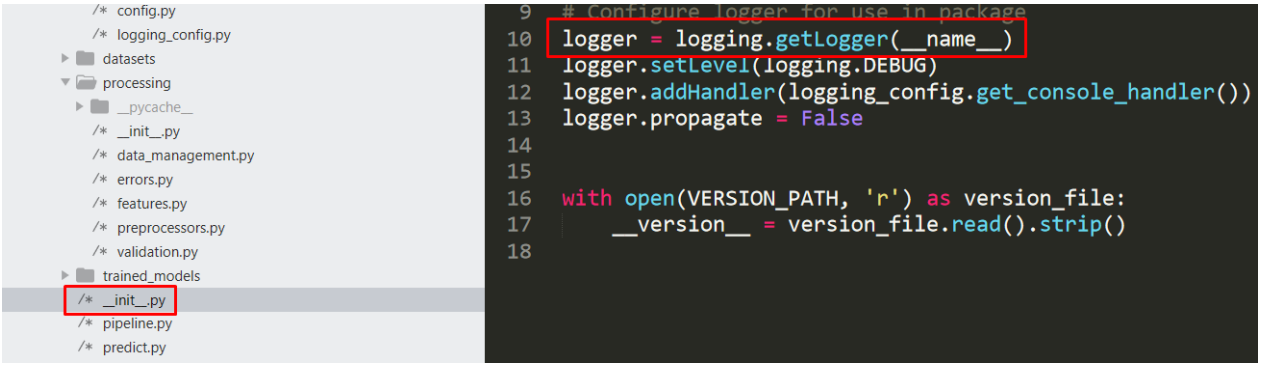
La **réponse**, puisque **tox** appelle le fichier **train_pipeline** directement, comme vous voyez ici



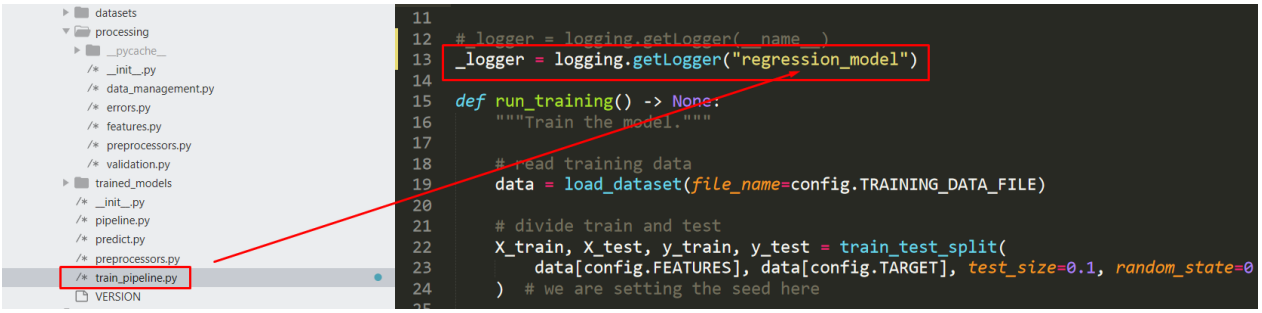
Le __name__ ici est présentement main



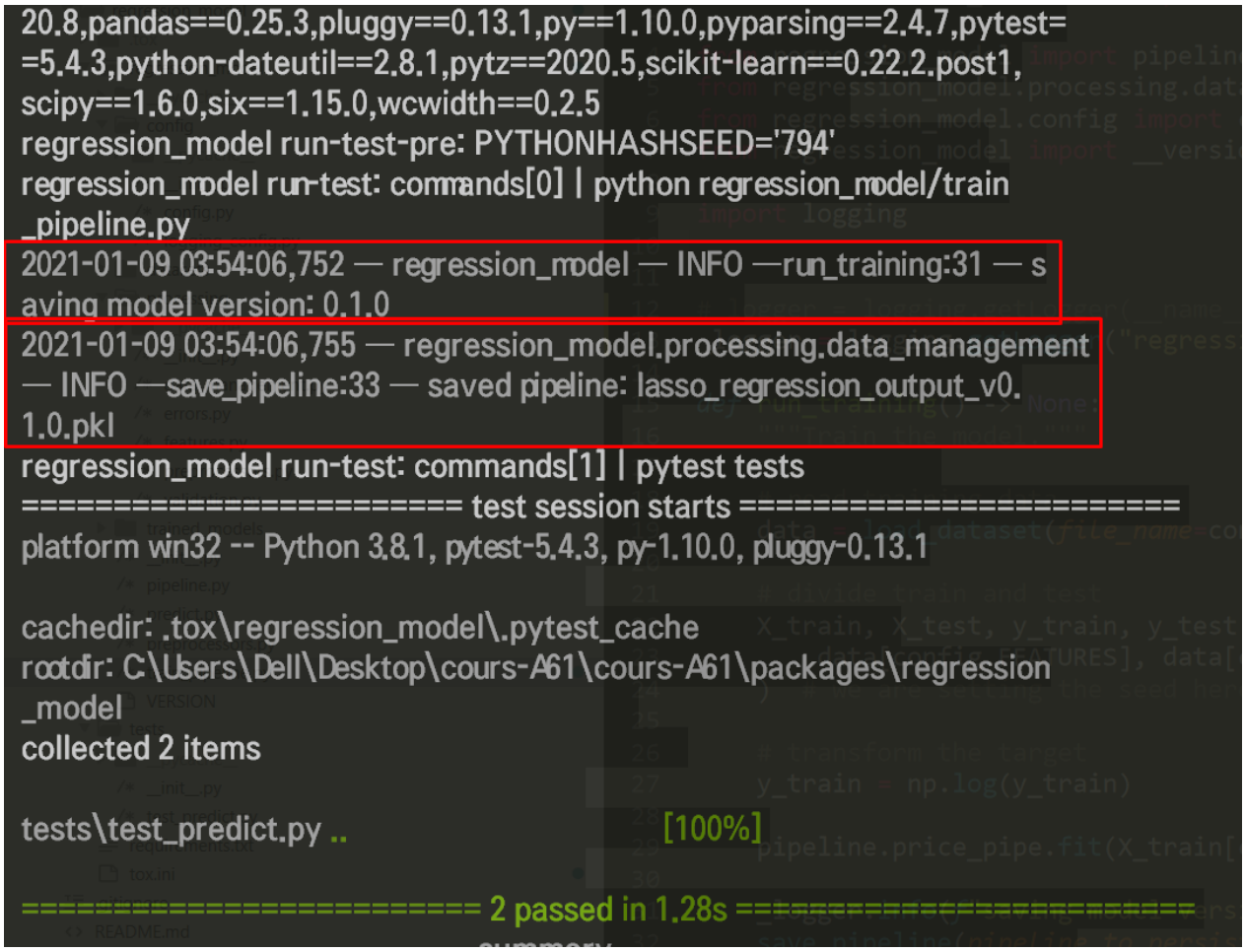
Et le logger quand, il est configuré et appelé regression_model, comme suit :



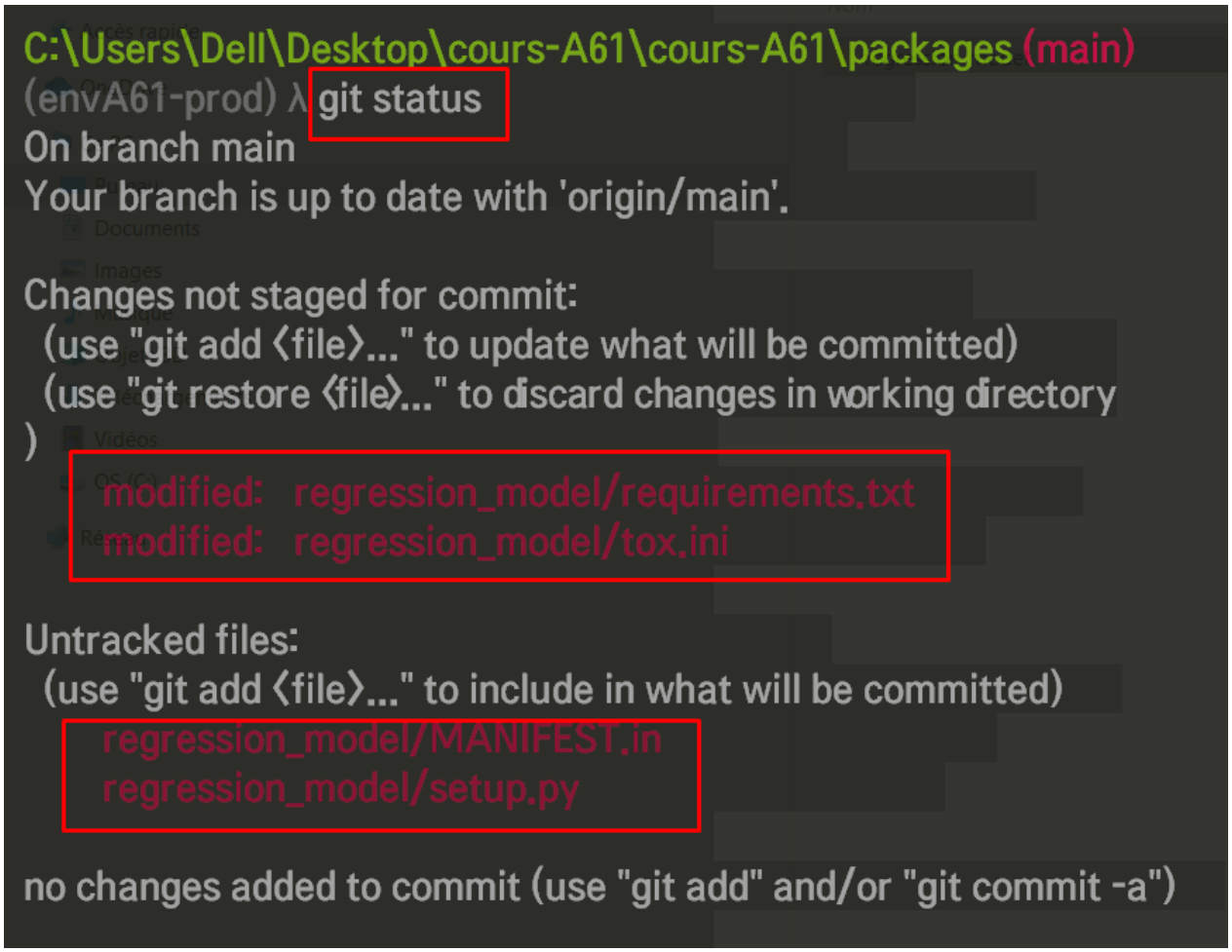
Si on remplace **__name__** par **regression_model** comme suit :



On obtient: on peut voir maintenant les deux lignes de logs…

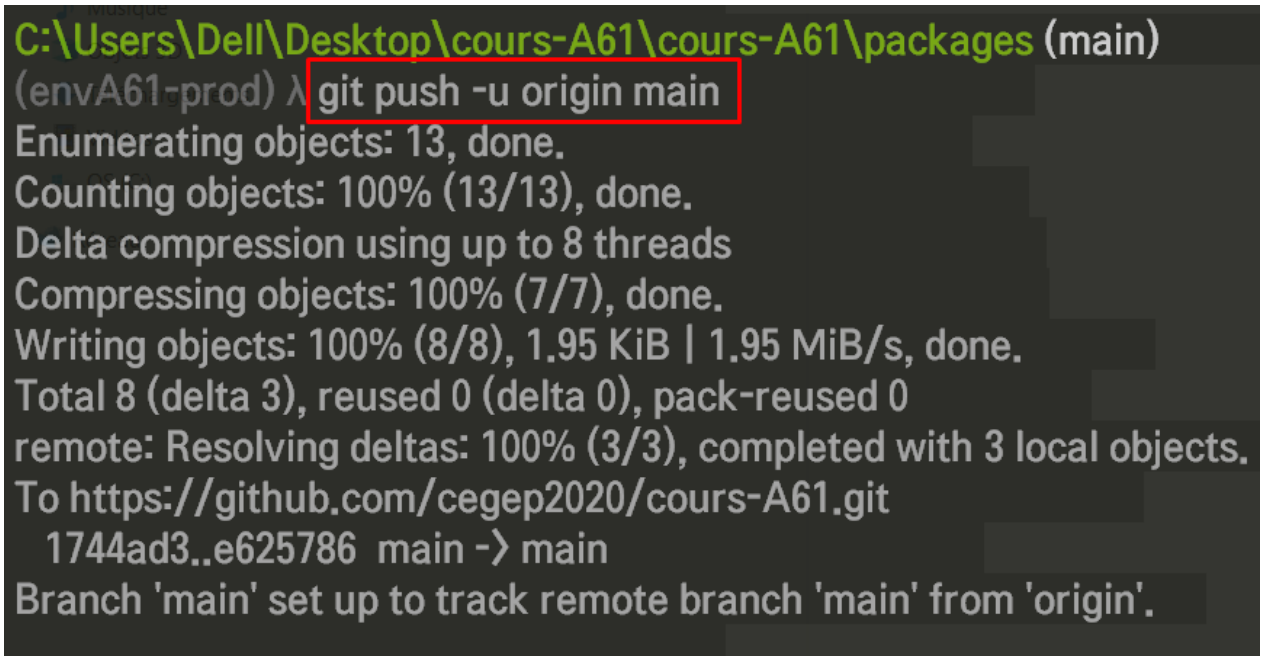


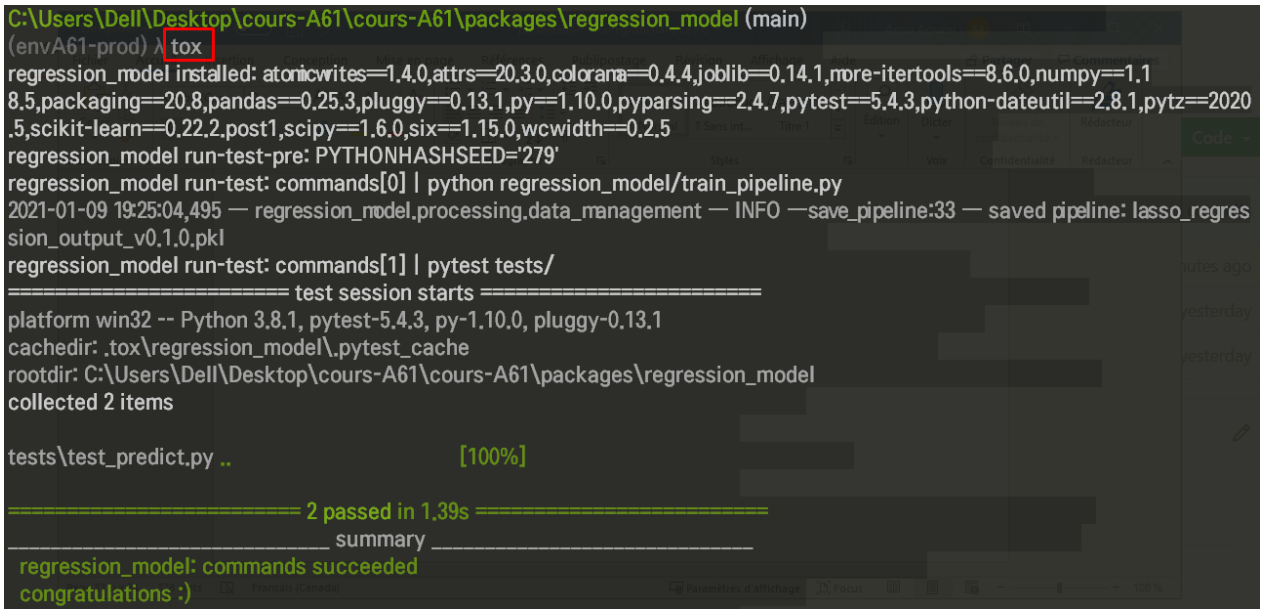
Partie-7 Créer un package

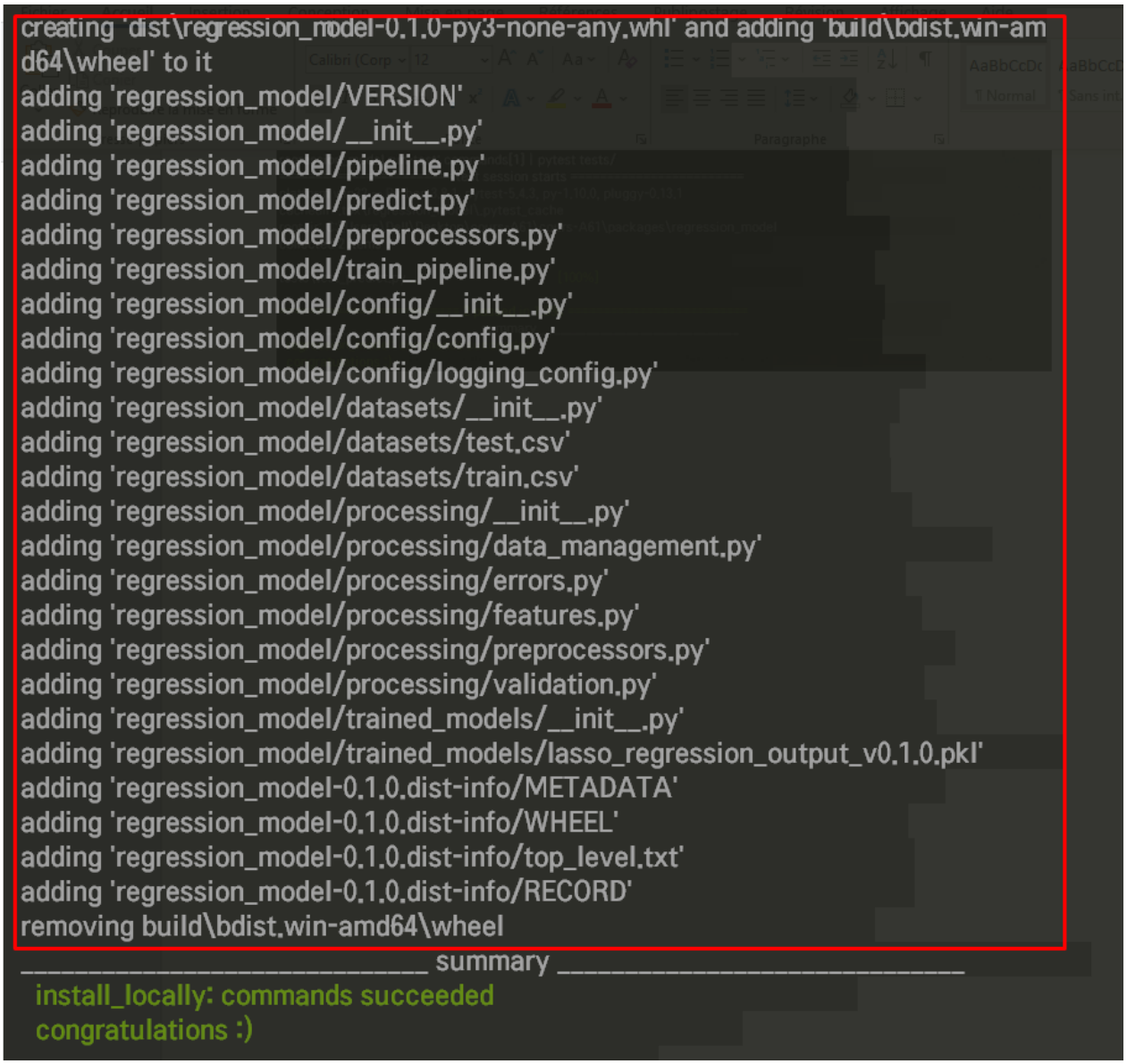

C:\Users\Dell\Desktop\cours-A61\cours-A61\packages (main)
(envA61-prod) λ git status
On branch main
Your branch is up to date with 'origin/main'.
Changes not staged for commit:
(use "git add <file>..." to update what will be committed)
(use "git restore <file>..." to discard changes in working directory
)
modified: regression_model/requirements.txt
modified: regression_model/tox.ini
Untracked files:
(use "git add <file>..." to include in what will be committed)
regression_model/MANIFEST.in
regression_model/setup.py
no changes added to commit (use "git add" and/or "git commit -a")

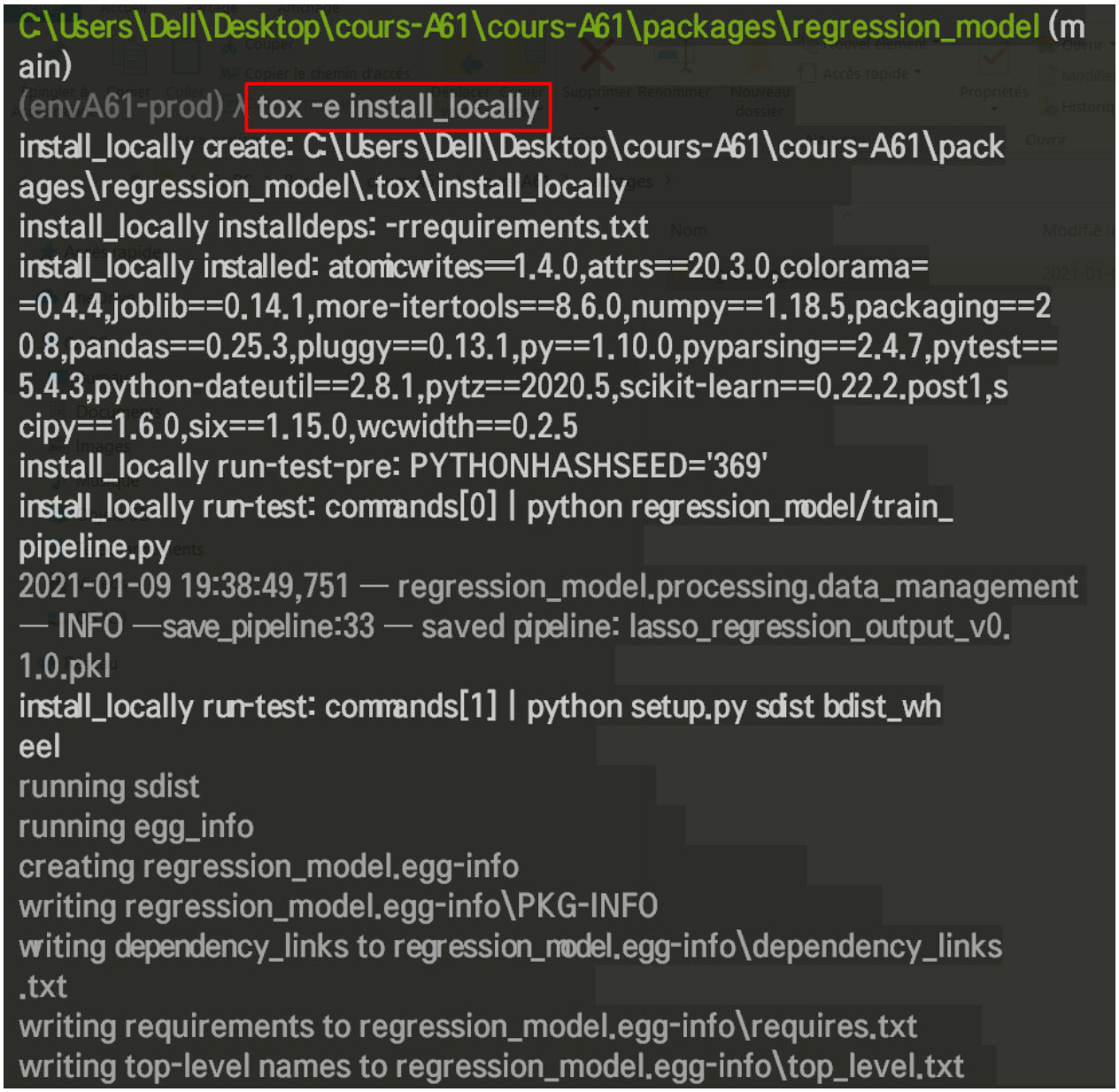
```
C:\Users\Dell\Desktop\cours-A61\cours-A61\packages (main)
(envA61-prod) λ git add .

C:\Users\Dell\Desktop\cours-A61\cours-A61\packages (main)
(envA61-prod) λ git status
On branch main
Your branch is up to date with 'origin/main'.

Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        new file:   regression_model/MANIFEST.in
        modified:   regression_model/requirements.txt
        new file:   regression_model/setup.py
        modified:   regression_model/tox.ini
```

```
C:\Users\Dell\Desktop\cours-A61\cours-A61\packages (main)
(envA61-prod) λ git commit -m "Partie-7-Ajout Package Building"
[main e625786] Partie-7-Ajout Package Building
 4 files changed, 115 insertions(+), 2 deletions(-)
 create mode 100644 packages/regression_model/MANIFEST.in
 create mode 100644 packages/regression_model/setup.py
```


C:\Users\Dell\Desktop\cours-A61\cours-A61\packages (main)
(envA61-prod) λ git push -u origin main
Enumerating objects: 13, done.
Counting objects: 100% (13/13), done.
Delta compression using up to 8 threads
Compressing objects: 100% (7/7), done.
Writing objects: 100% (8/8), 1.95 KiB | 1.95 MiB/s, done.
Total 8 (delta 3), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (3/3), completed with 3 local objects.
To https://github.com/cegep2020/cours-A61.git
1744ad3..e625786 main -> main
Branch 'main' set up to track remote branch 'main' from 'origin'.


C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\regression_model (main)
(envA61-prod) λ tox
regression_model installed: atomicwrites==1.4.0,attrs==20.3.0,colorama==0.4.4,joblib==0.14.1,more-itertools==8.6.0,numpy==1.18.5,packaging==20.8,pandas==0.25.3,pluggy==0.13.1,py==1.10.0,pyparsing==2.4.7,pytest==5.4.3,python-dateutil==2.8.1,pytz==2020.5,scikit-learn==0.22.2.post1,scipy==1.6.0,six==1.15.0,wcwidth==0.2.5
regression_model run-test-pre: PYTHONHASHSEED='279'
regression_model run-test: commands[0] | python regression_model/train_pipeline.py
2021-01-09 19:25:04,495 — regression_model.processing.data_management — INFO —save_pipeline:33 — saved pipeline: lasso_regression_output_v0.1.0.pkl
regression_model run-test: commands[1] | pytest tests/
========== test session starts ==========
platform win32 -- Python 3.8.1, pytest-5.4.3, py-1.10.0, pluggy-0.13.1
cachedir: .tox\regression_model\.pytest_cache
rootdir: C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\regression_model
collected 2 items
tests\test_predict.py .. [100%]
========== 2 passed in 1.39s ==========
_____ summary _____
regression_model: commands succeeded
congratulations :)

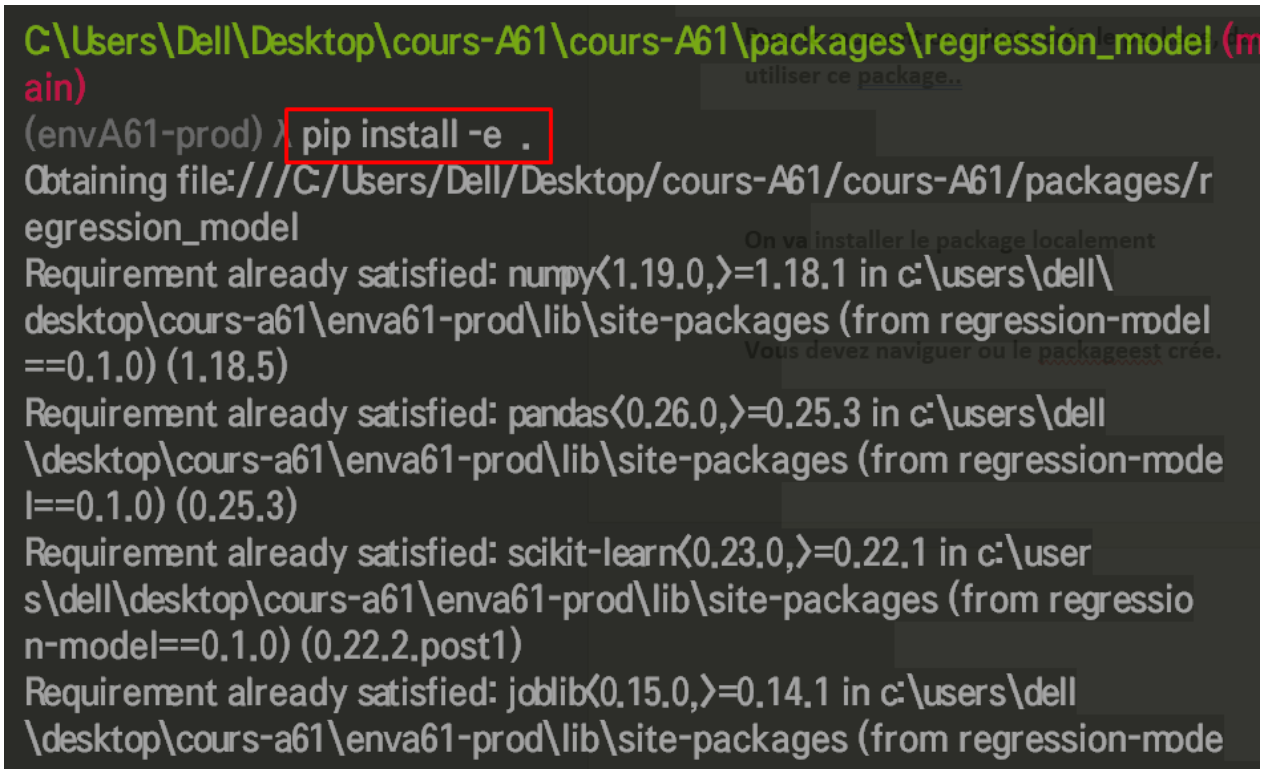

creating 'dist\regression_model-0.1.0-py3-none-any.whl' and adding 'build\bdist.win-amd64\wheel' to it
adding 'regression_model/VERSION'
adding 'regression_model/__init__.py'
adding 'regression_model/pipeline.py'
adding 'regression_model/predict.py'
adding 'regression_model/preprocessors.py'
adding 'regression_model/train_pipeline.py'
adding 'regression_model/config/__init__.py'
adding 'regression_model/config/config.py'
adding 'regression_model/config/logging_config.py'
adding 'regression_model/datasets/__init__.py'
adding 'regression_model/datasets/test.csv'
adding 'regression_model/datasets/train.csv'
adding 'regression_model/processing/__init__.py'
adding 'regression_model/processing/data_management.py'
adding 'regression_model/processing/errors.py'
adding 'regression_model/processing/features.py'
adding 'regression_model/processing/preprocessors.py'
adding 'regression_model/processing/validation.py'
adding 'regression_model/trained_models/__init__.py'
adding 'regression_model/trained_models/lasso_regression_output_v0.1.0.pkl'
adding 'regression_model-0.1.0.dist-info/METADATA'
adding 'regression_model-0.1.0.dist-info/WHEEL'
adding 'regression_model-0.1.0.dist-info/top_level.txt'
adding 'regression_model-0.1.0.dist-info/RECORD'
removing build\bdist.win-amd64\wheel
_____ summary _____
install_locally: commands succeeded
congratulations :)



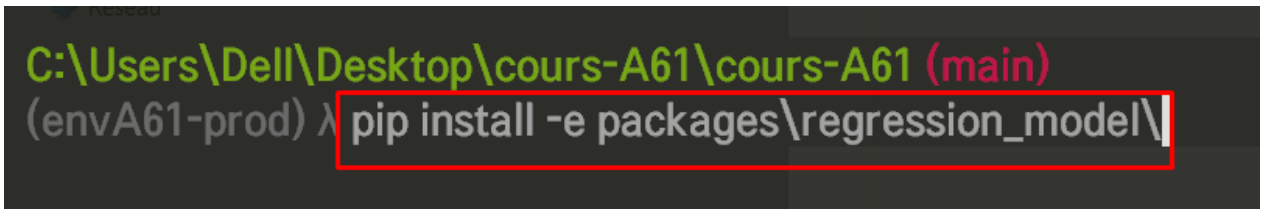
Pour le moment on a juste créé le package, dans la suite on va voir comment distribuer et utiliser ce package.

On va installer le package localement

Vous devez naviguer ou le package est créé.



Ou bien



Exploitation

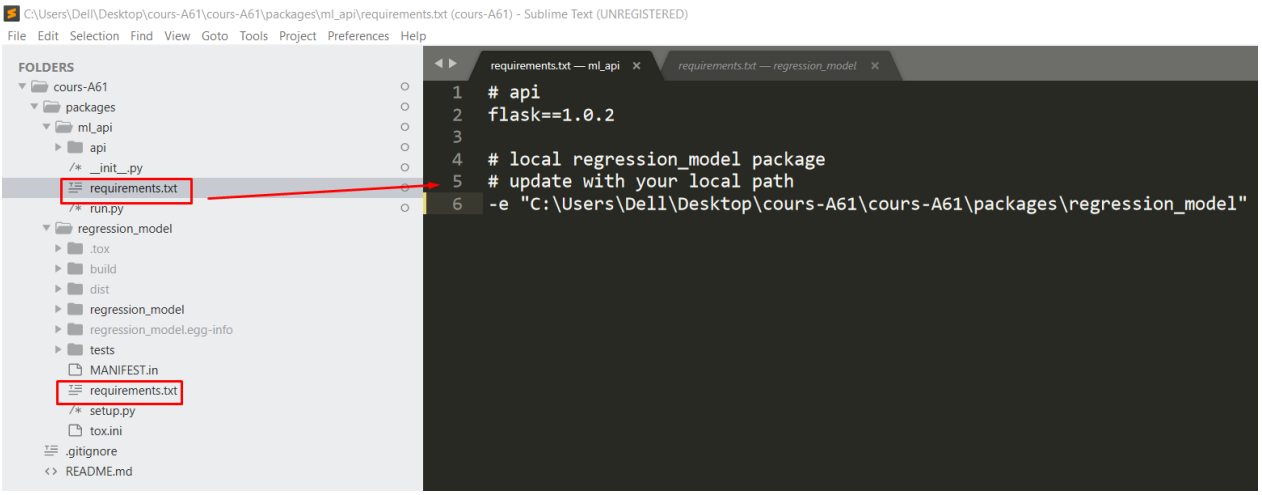
```
C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ python
Python 3.8.1 (tags/v3.8.1:1b293b6, Dec 18 2019, 23:11:46) [MSC v.1916
64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> import regression_model
>>>
>>> regression_model.__version__
'0.1.0'
>>>
```

Note : Dans la suite, on va voir qu'est-ce qu'on peut faire avec ce package

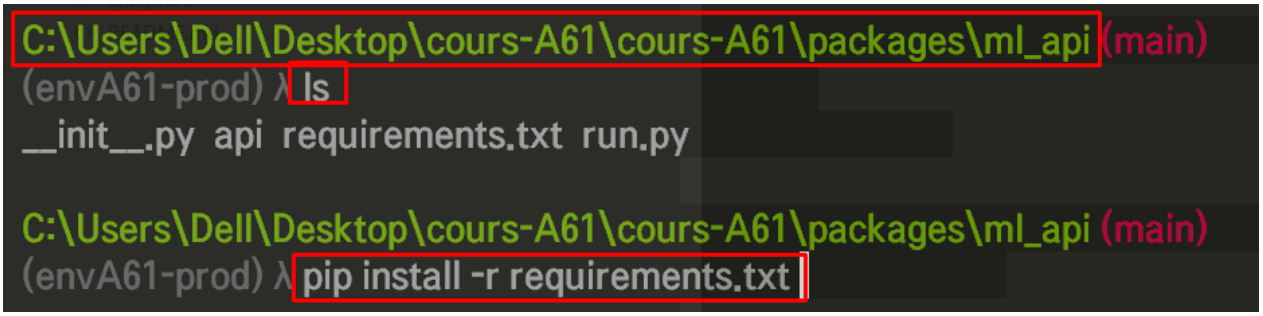
Partie 8 : Preparation de Rest-API de service de modèle

```
C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ git status
On branch main
Your branch is up to date with 'origin/main'.

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory
)
        modified:   packages/regression_model/setup.py

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        packages/ml_api/

no changes added to commit (use "git add" and/or "git commit -a")
```

Vous devez avoir deux fichiers de requirement pour l'API et le modèle.

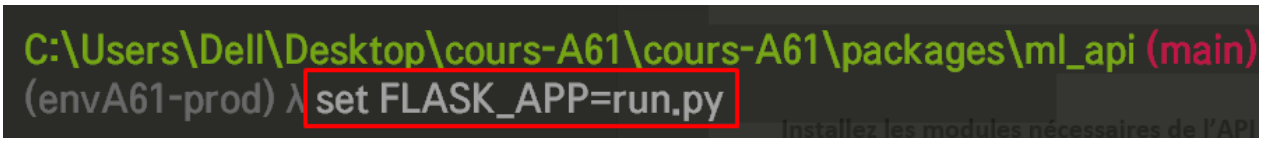


Installez les modules nécessaires de l'API comme suit :

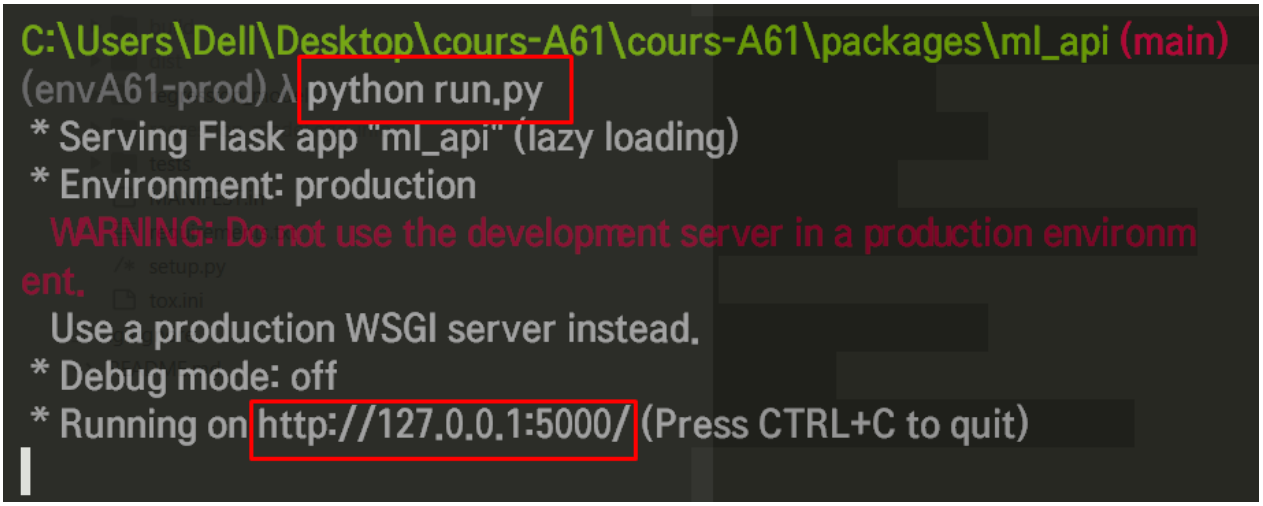


Mnt exécutez et vérifiez que tout fonctionne correctement, run app.

Avant, on doit configurer une variable d'environnement pour indiquer a flask , le point d'entrée pour démarrer, comme suit :

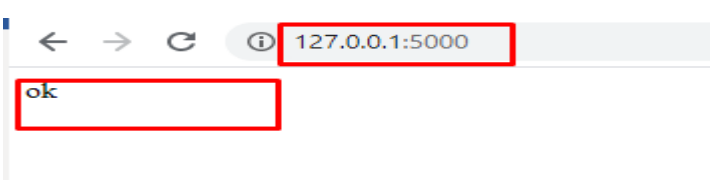


Puis run

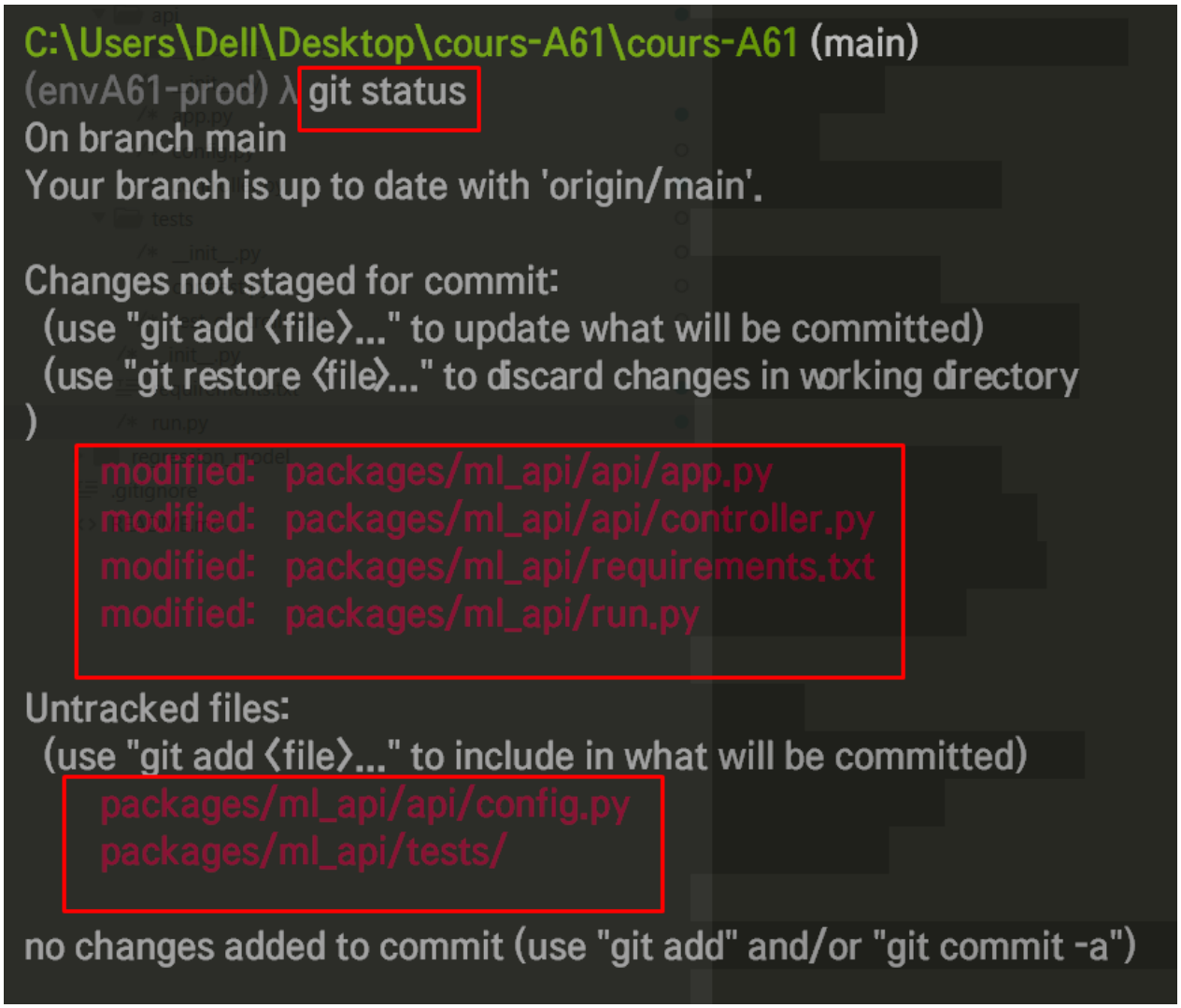


```
C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ git add .

C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ git commit -m "Developper- REST API-Flask"
[main 7a00929] Developper- REST API-Flask
 7 files changed, 45 insertions(+), 4 deletions(-)
 create mode 100644 packages/ml_api/__init__.py
 create mode 100644 packages/ml_api/api/__init__.py
 create mode 100644 packages/ml_api/api/app.py
 create mode 100644 packages/ml_api/api/controller.py
 create mode 100644 packages/ml_api/requirements.txt
 create mode 100644 packages/ml_api/run.py

C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ git push -u origin main
Enumerating objects: 16, done.
Counting objects: 100% (16/16), done.
```

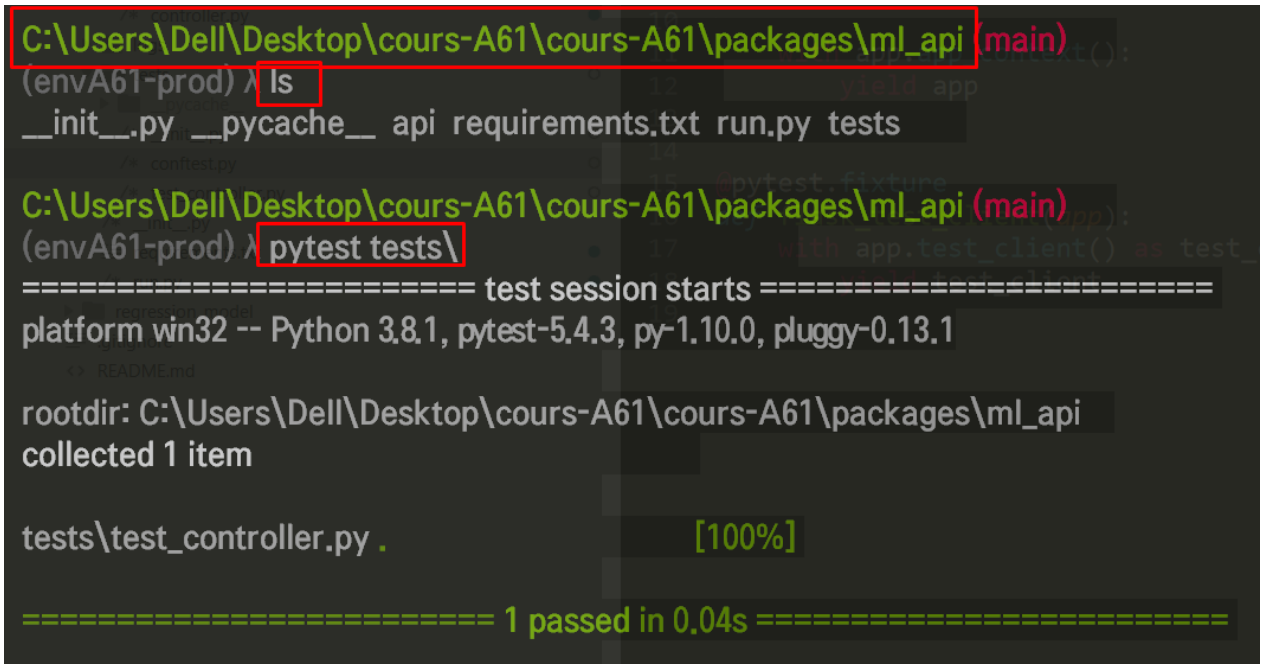
Sortie :

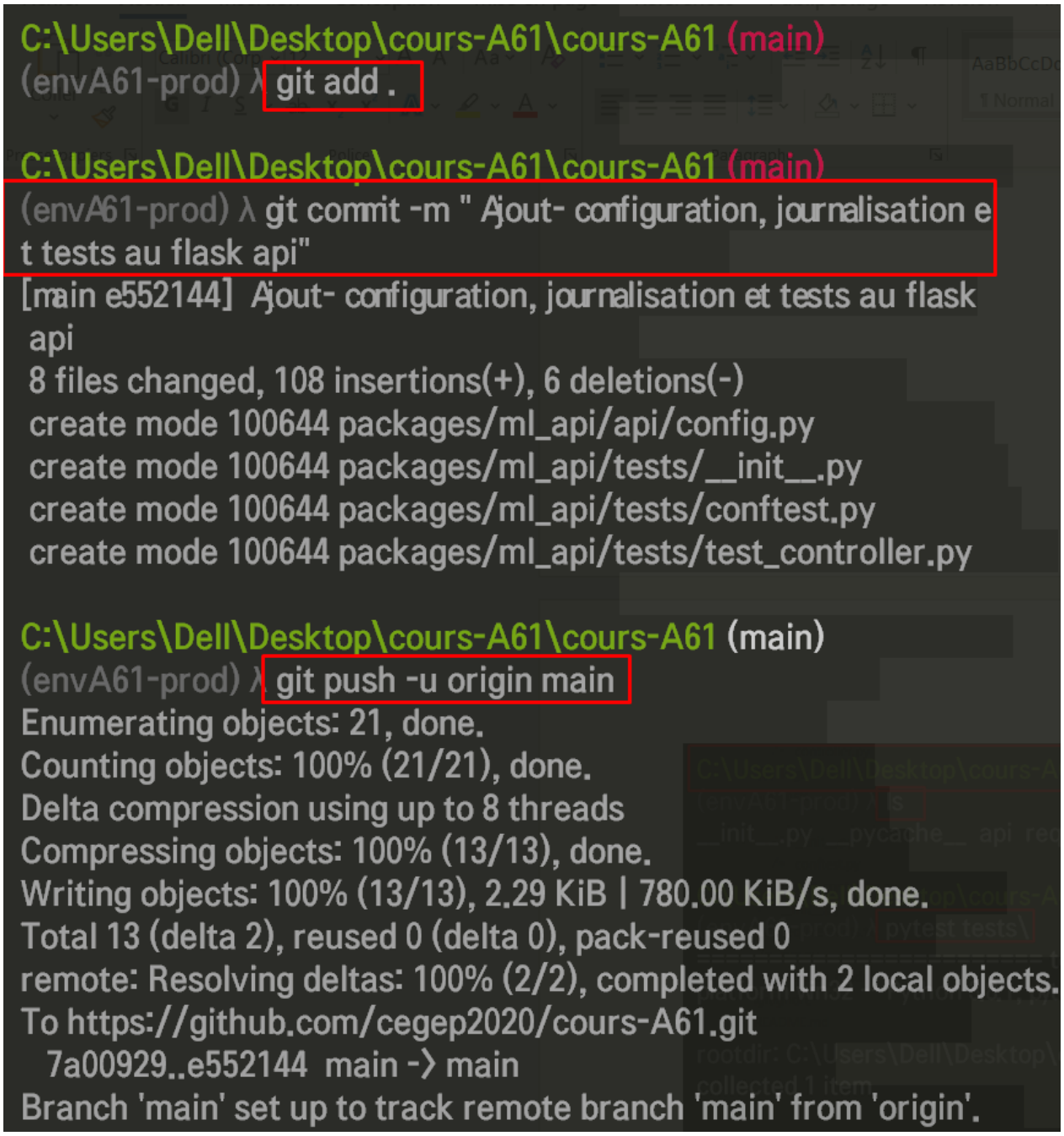


Partie-9 Ajout de la configuration et de la journalisation et tests à l'API Flask

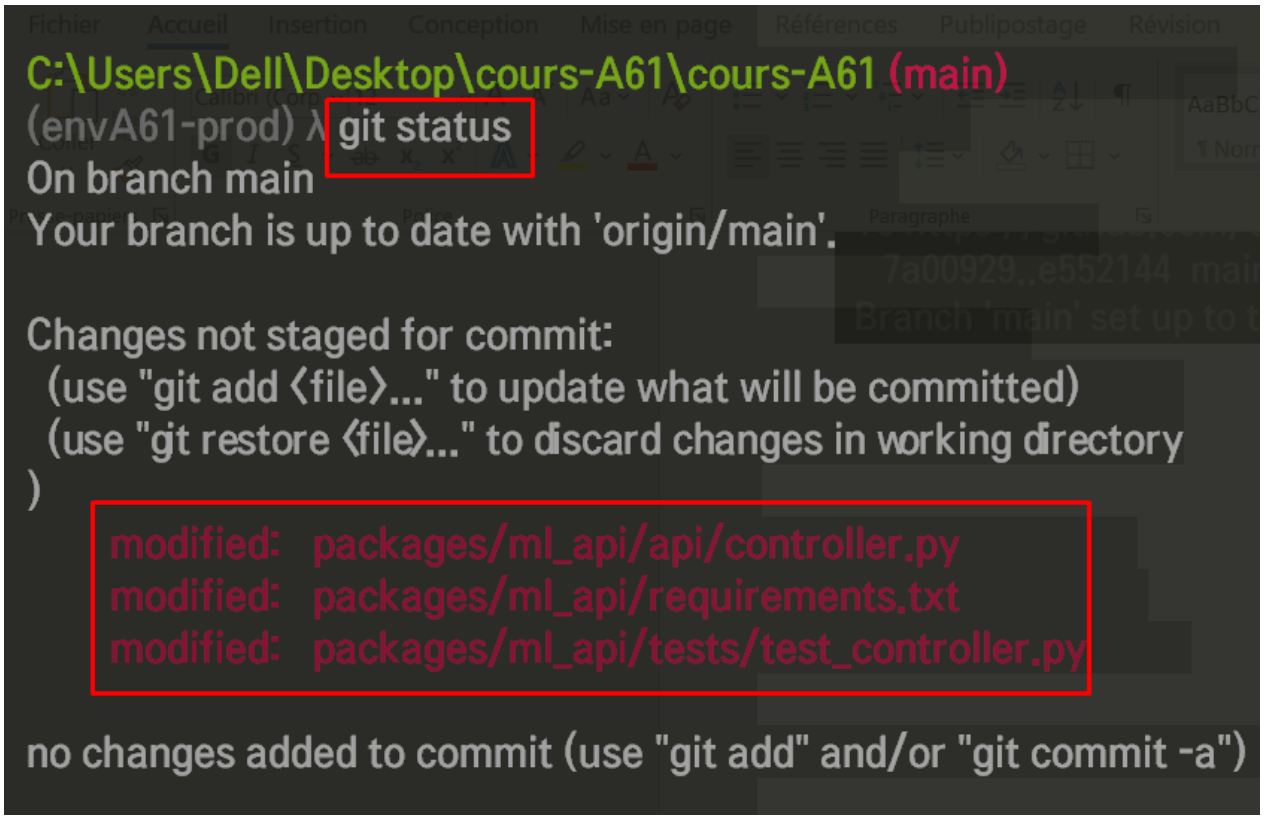


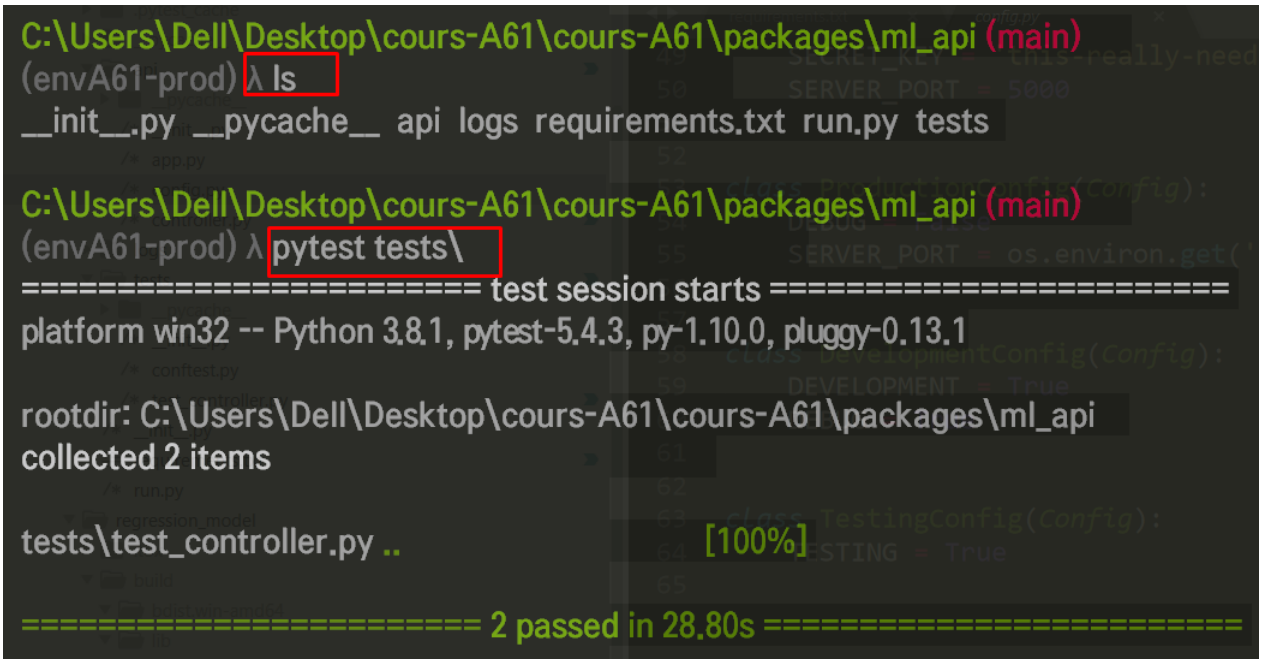
Tester

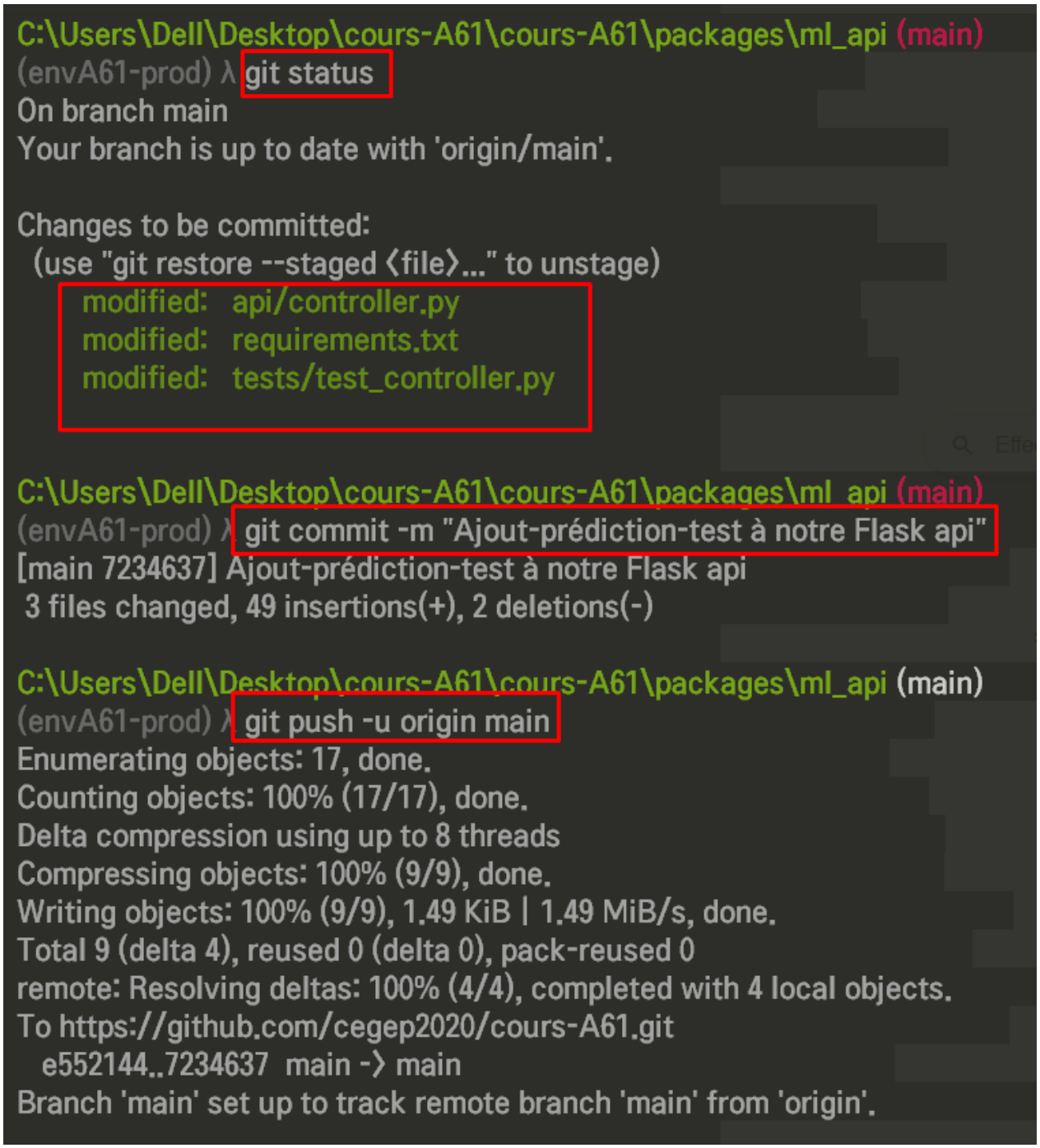

C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\ml_api (main)
(envA61-prod) λ ls
__init__.py __pycache__ api requirements.txt run.py tests
C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\ml_api (main)
(envA61-prod) λ pytest tests\
========== test session starts ==========
platform win32 -- Python 3.8.1, pytest-5.4.3, py-1.10.0, pluggy-0.13.1
rootdir: C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\ml_api
collected 1 item
tests\test_controller.py . [100%]
========== 1 passed in 0.04s ==========


C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ git add .
C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ git commit -m " Ajout- configuration, journalisation e
t tests au flask api"
[main e552144] Ajout- configuration, journalisation et tests au flask
api
8 files changed, 108 insertions(+), 6 deletions(-)
create mode 100644 packages/ml_api/api/config.py
create mode 100644 packages/ml_api/tests/__init__.py
create mode 100644 packages/ml_api/tests/conftest.py
create mode 100644 packages/ml_api/tests/test_controller.py
C:\Users\Dell\Desktop\cours-A61\cours-A61 (main)
(envA61-prod) λ git push -u origin main
Enumerating objects: 21, done.
Counting objects: 100% (21/21), done.
Delta compression using up to 8 threads
Compressing objects: 100% (13/13), done.
Writing objects: 100% (13/13), 2.29 KiB | 780.00 KiB/s, done.
Total 13 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To https://github.com/cegep2020/cours-A61.git
7a00929..e552144 main -> main
Branch 'main' set up to track remote branch 'main' from 'origin'.

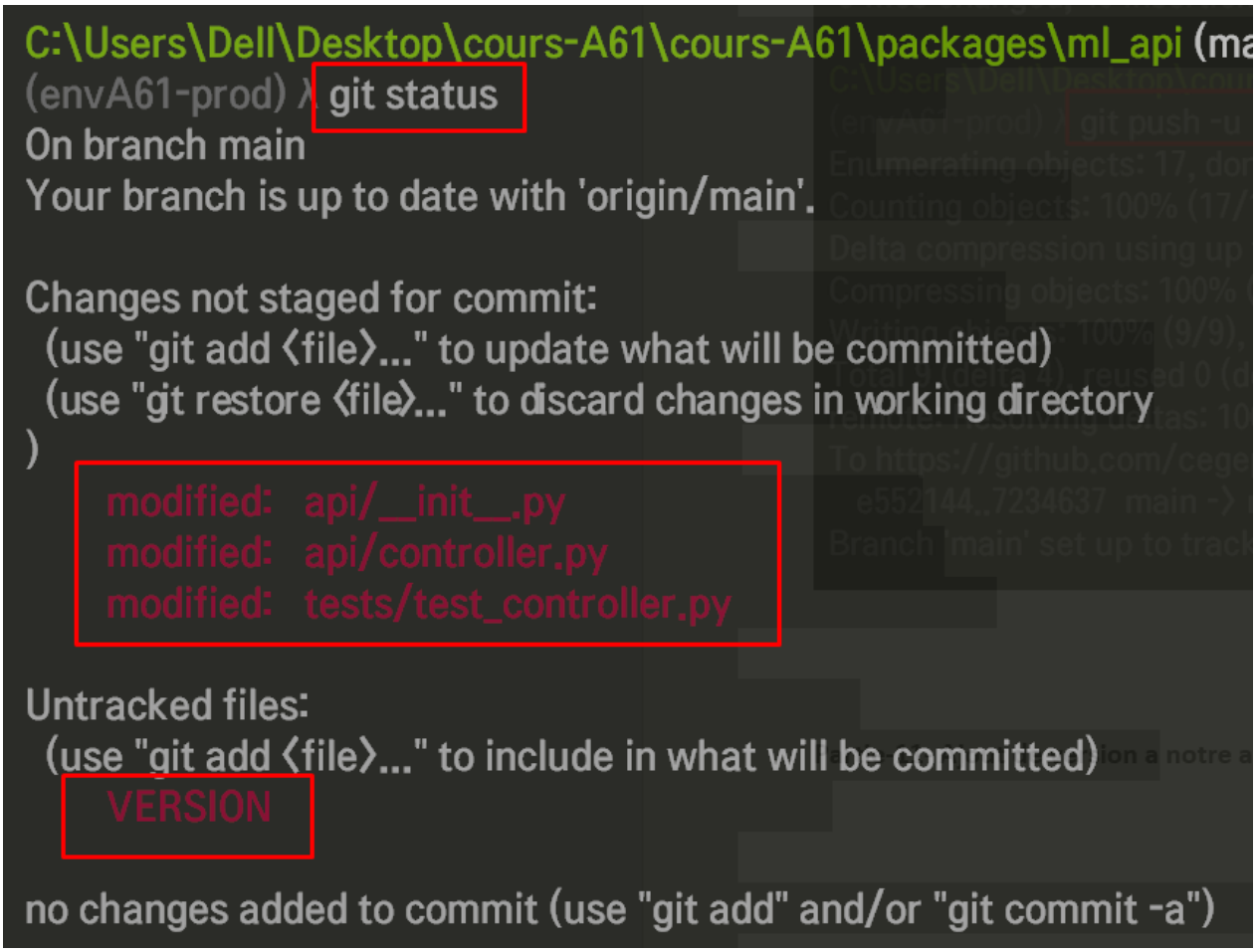
Partie 10. Ajout de prédiction à l'API Flask




C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\ml_api (main)
(envA61-prod) λ ls
__init__.py __pycache__ api logs requirements.txt run.py tests
C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\ml_api (main)
(envA61-prod) λ pytest tests\
========== test session starts ==========
platform win32 -- Python 3.8.1, pytest-5.4.3, py-1.10.0, pluggy-0.13.1
rootdir: C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\ml_api
collected 2 items
tests\test_controller.py .. [100%]
========== 2 passed in 28.80s ==========



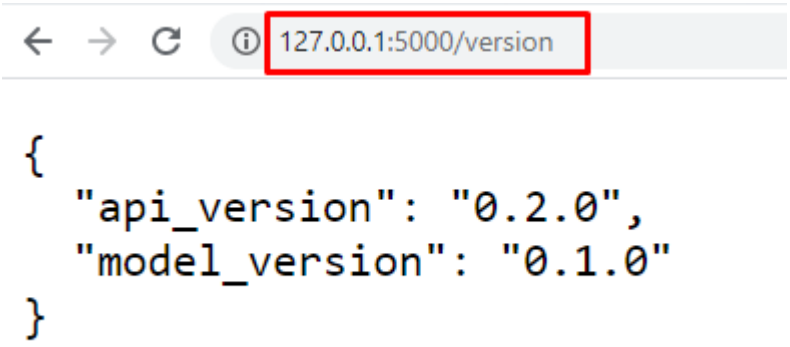
Partie-11- Ajout de version a notre application flask.

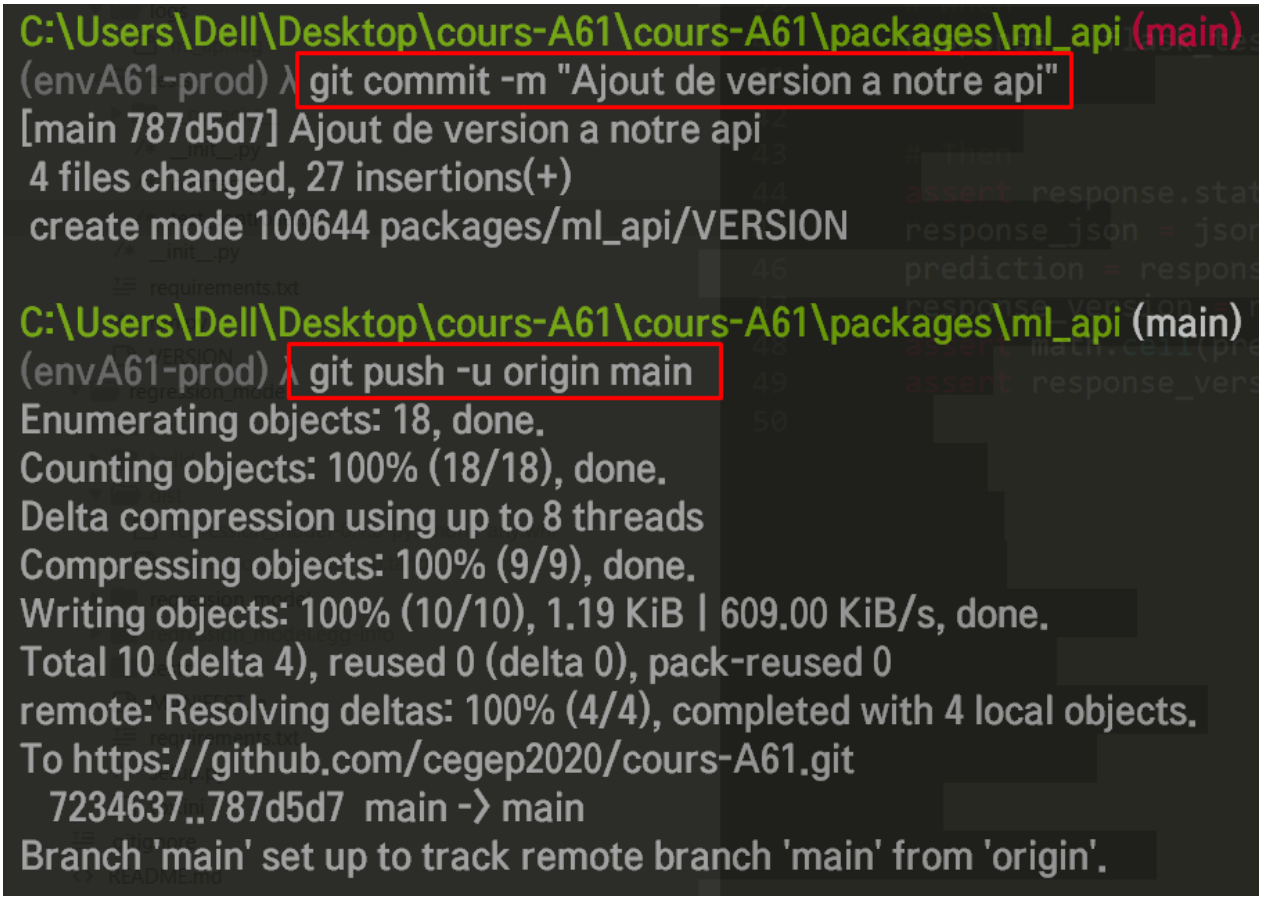


Exécutez les tests

```
C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\ml_api (main)
(envA61-prod) λ ls
VERSION     __pycache__  logs          run.py
__init__.py  api         requirements.txt  tests

C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\ml_api (main)
(envA61-prod) λ pytest tests\
========================= test session starts =========================
platform win32 -- Python 3.8.1, pytest-5.4.3, py-1.10.0, pluggy-0.13.1

rootdir: C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\ml_api
collected 3 items

tests\test_controller.py ...                                    [100%]

========================== 3 passed in 2.10s ==========================
```

```
C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\ml_api (main)
(envA61-prod) λ python run.py
2021-01-10 14:59:57,201 — api.app — DEBUG —create_app:18 — Application
 instance created
 * Serving Flask app "ml_api" (lazy loading)
 * Environment: production
   WARNING: Do not use the development server in a production environm
ent.
   Use a production WSGI server instead.
 * Debug mode: on
 * Restarting with stat
2021-01-10 14:59:58,580 — api.app — DEBUG —create_app:18 — Application
 instance created
 * Debugger is active!
 * Debugger PIN: 254-811-199
 * Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
```





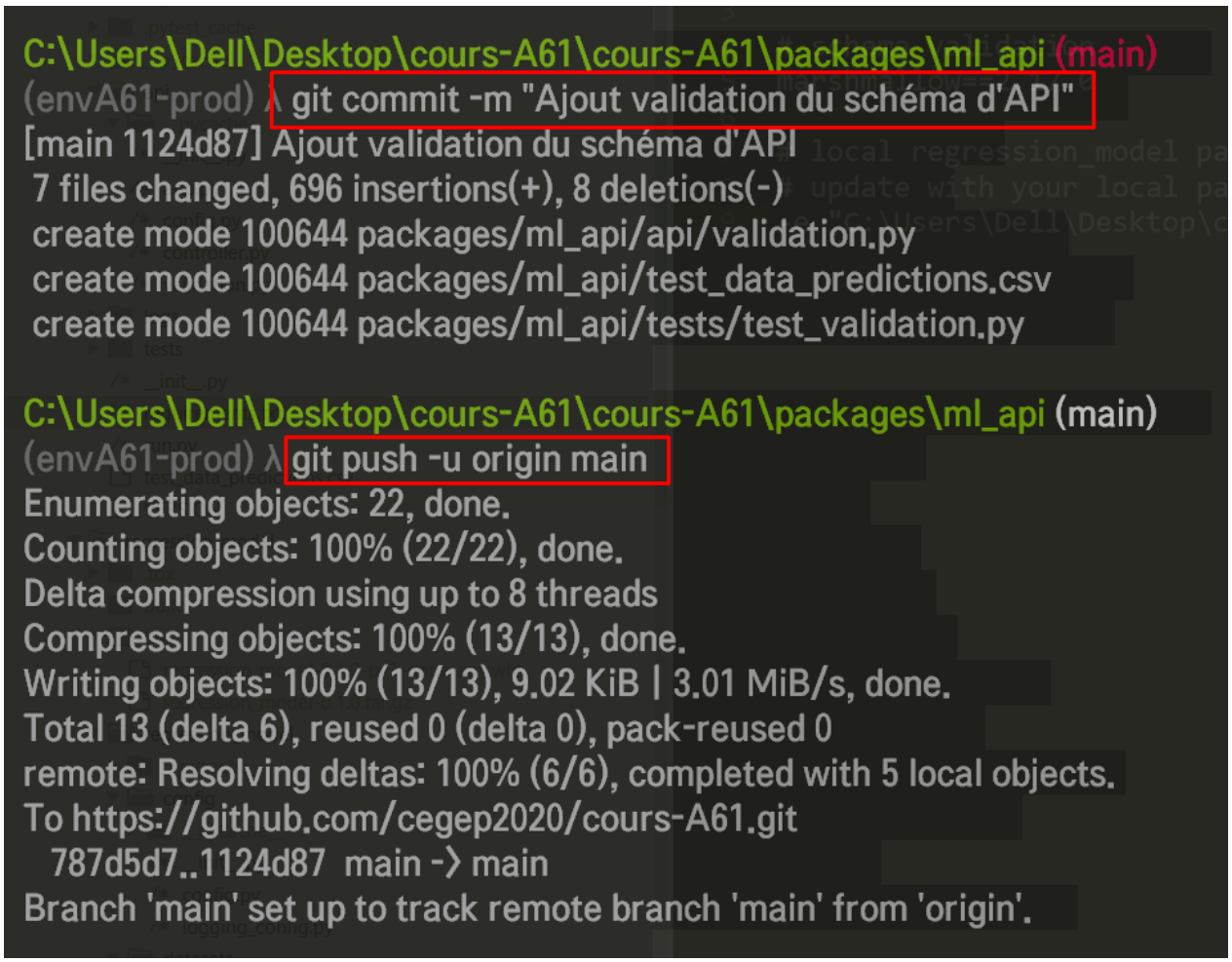
Partie-12 Ajout de Schéma de validation à l'API Flask

```
C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\ml_api (main)
(envA61-prod) λ git  status
On branch main
Your branch is up to date with 'origin/main'.

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory
)
        modified:   api/config.py
        modified:   api/controller.py
        modified:   requirements.txt
        modified:   tests/test_controller.py

Untracked files:
  (use "git add <file>..." to include in what will be committed)
        api/validation.py
        test_data_predictions.csv
        tests/test_validation.py

no changes added to commit (use "git add" and/or "git commit -a")
```

```
C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\ml_api (main)
(envA61-prod) λ pip install -r requirements.txt
```

```
C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\ml_api (main)
(envA61-prod) λ pytest tests
```

```
packages\ml_api\tests\test_controller.py ...                             [ 75%]
packages\ml_api\tests\test_validation.py .                               [100%]

========================== 4 passed in 1.42 seconds ==========================
```


C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\ml_api (main)
(envA61-prod) λ git commit -m "Ajout validation du schéma d'API"
[main 1124d87] Ajout validation du schéma d'API
7 files changed, 696 insertions(+), 8 deletions(-)
create mode 100644 packages/ml_api/api/validation.py
create mode 100644 packages/ml_api/test_data_predictions.csv
create mode 100644 packages/ml_api/tests/test_validation.py
C:\Users\Dell\Desktop\cours-A61\cours-A61\packages\ml_api (main)
(envA61-prod) λ git push -u origin main
Enumerating objects: 22, done.
Counting objects: 100% (22/22), done.
Delta compression using up to 8 threads
Compressing objects: 100% (13/13), done.
Writing objects: 100% (13/13), 9.02 KiB | 3.01 MiB/s, done.
Total 13 (delta 6), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (6/6), completed with 5 local objects.
To https://github.com/cegep2020/cours-A61.git
787d5d7..1124d87 main -> main
Branch 'main' set up to track remote branch 'main' from 'origin'.