

Informe del Proyecto: Industrial_Robotics_Gym con PyBullet

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1. Introducción

El proyecto consiste en utilizar la librería `IndustrialRoboticsGym` junto con `PyBullet` para simular robots industriales. El objetivo era ejecutar simulaciones de entornos y robots dentro de un contenedor Docker, asegurando que el entorno fuera reproducible.

2. Paso a Paso Realizado

A continuación se detallan los pasos ejecutados durante la configuración del proyecto:

1. Creación y preparación del contenedor Docker para tener un entorno limpio.
2. Clonación del repositorio `IndustrialRoboticsGym` dentro de `/app/src`.
3. Configuración de la variable de entorno `PYTHONPATH` para incluir `/app`.

```
export PYTHONPATH="/app:$PYTHONPATH"
```

4. Intentos de instalación del repositorio `RoLE`, que es necesario para la definición de parámetros de robots. Se intentó:
 - Clonar mediante `Git`.
 - Descargar con `curl` y descomprimir con `unzip`.

Estos intentos fallaron debido a errores de conexión y archivos zip corruptos.

5. Se aplicó una solución temporal comentando la línea:

```
import RoLE.Parameters.Robot as Parameters
```

y reemplazando la lista de robots por una lista vacía:

```
CONST_ROBOT_TYPE = []
```

6. Se intentó ejecutar el entorno con:

```
from src.IndustrialRoboticsGym.Environment.Core import  
    IndustrialRoboticsGym_Env_Cls  
env = IndustrialRoboticsGym_Env_Cls(mode="Default")
```

El entorno se carga, pero no se pueden simular robots debido a la ausencia del módulo `RoLE`.

3. Problemas Encontrados

- La dependencia `RoLE` no estaba disponible ni se pudo descargar correctamente.
- La importación de `Parameters` causaba errores de `IndentationError` y `NameError`.
- Debido a esto, aunque el entorno de simulación se puede iniciar, no es funcional para simulaciones completas.

4. Evidencias

```

migue@miguel-VivoBook-ASUSLaptop-M1603QA-M1603QA:~$ cd -
git clone https://github.com/parak/PyBullet_Industrial_Robotics_Gym.git
cd PyBullet_Industrial_Robotics_Gym
cat: la ruta de destino 'PyBullet_Industrial_Robotics_Gym' ya existe y no es un directorio vacio.
migue@miguel-VivoBook-ASUSLaptop-M1603QA-M1603QA:~/PyBullet_Industrial_Robotics_Gym$ nano generate_requirements.py
migue@miguel-VivoBook-ASUSLaptop-M1603QA-M1603QA:~/PyBullet_Industrial_Robotics_Gym$ python3 generate_requirements.py
# Archivo requirements.txt creado correctamente
migue@miguel-VivoBook-ASUSLaptop-M1603QA-M1603QA:~/PyBullet_Industrial_Robotics_Gym$ nano Dockerfile
migue@miguel-VivoBook-ASUSLaptop-M1603QA-M1603QA:~/PyBullet_Industrial_Robotics_Gym$ docker build -t pybullet_e1 .
[+] Building 343.8s (11/11) FINISHED
    docker:default
    => transferring dockerfile: 520B
    [internal] load metadata for docker.io/library/python:3.10-slim
    [internal] load dockerimage
    => transferring context: 2B
    [1/6] FROM docker.io/library/python:3.10-slim@sha256:975a1e08a1c1f5960d319eeaa466ae867d709cc22a12f4ca473771eeac36c0
    => resolve docker.io/library/python:3.10-slim@sha256:975a1e08a1c1f5960d319eeaa466ae867d709cc22a12f4ca473771eeac36c0
    sha256:2debdbfd1ddab8de15ba4c2536ae18bc00d473031be4d9516080295ff7cb4d 1.75K / 1.75K
    sha256:70808bf33f7c3dc3bcb1eb158f34a08b476511d860fac3a393030c3390b054 5.40K / 5.40K
    sha256:dfececf77c7b7c79a79a7603f8a100f65f20980831506c33ef45813da5939 1.29M / 1.29M
    sha256:c33af77f9c0e11abff4f254eb4ed1caf65f20980831506c33ef45813da5939 1.29M / 1.29M
    sha256:c3fand678c7cb7c3c5bbab6a4670b45252566812c68550d4940bc0d475 13.82M / 13.82M
    sha256:975a1e08a1c1f5960d319eeaa466ae867d709cc22a12f4ca473771eeac36c0 18.37Ab / 18.37Ab
    sha256:amdrcnrmvsn12745c-2a513f177089539ab0c1eff9013101809d3136c 2.40M / 2.40M
    => extracting sha256:fcdced7702a50bf6d8719a17ac1305140d8f1305198062c948fb7203107fc
    => extracting sha256:b307ff590bd11abff4287d66d61cadcf6579800865319ec4575811d5659
    => extracting sha256:c3fand678c7cb7c3c5bbab6a4670b45252566812c68550d4940bc0d475
    => extracting sha256:a08dc70899352747c5b33f1377889539ab0c1eff9013101809d3136c
    [internal] load build context
    => transferring context: 212.47MB
    [2/6] RUN apt-get update && apt-get install -y python3-tk git
    [3/6] WORKDIR /app
    [4/6] COPY . /app
    [5/6] RUN pip install --upgrade pip
    [6/6] RUN pip install -r requirements.txt
    => exporting layers
    => exporting image sha256:950b156062e358f35f7e7a0b33131a10d15c2ea75156630bbe5d0df49c
    => naming to docker.io/library/pybullet_e1
migue@miguel-VivoBook-ASUSLaptop-M1603QA-M1603QA:~/PyBullet_Industrial_Robotics_Gym$

```

Figura 1: evidencia de Clonación, desarrollo del Dockerfile y creación de la imagen

```
SyntaxError: '(' was never closed
root@f294013275af:/app# python3
Python 3.10.19 (main, Nov 4 2025, 04:27:44) [GCC 14.2.0] on linux
Type "help", "copyright", "credits() or license() for more information.
>>> from src.Industrial_Robotics_Gym.Environment.Core Import Industrial_Robotics_Gym_Env_Cls
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
  File "/app/src/Industrial_Robotics_Gym/_init_.py", line 58
    for _, (r_name_l, r_str_l) in enumerate(zip(CONST_ROBOT_NAME, CONST_ROBOT_TYPE == []
                                                ^
SyntaxError: '(' was never closed
>>>
>>> # Crear el entorno
>>> env = Industrial_Robotics_Gym_Env_Cls(mode='Default')
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'Industrial_Robotics_Gym_Env_Cls' is not defined
>>> print(Entorno cargado correctamente)
Entorno cargado correctamente
>>>
>>> # Cuando termines, cerrar el entorno
>>> env.close()
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'env' is not defined
>>>
root@f294013275af:/app# v1 /app/src/Industrial_Robotics_Gym/_init_.py
bash: v1: command not found
root@f294013275af:/app# rm -rf /app/src/Industrial_Robotics_Gym
rm -rf /app/pyBullet_Industrial_Robotics_Gym
rm -rf /app/roll
root@f294013275af:/app#
```

Figura 2: Evidencia de los errores

```
File "/app/src/Industrial_Robotics_Gym/_init_.py", line 84
Parameters.ABB_IRR_14000_R_Str, Parameters.ABB_IRB_14000_R_Str, Parameters.EPSON_LS3_B401S_Str]
IndentationError: unexpected indent
>>> env = Industrial_Robotics_Gym_Env_Cls(mode='Default')
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'Industrial_Robotics_Gym_Env_Cls' is not defined
>>>
root@f294813275af:/app# cd /app
curl -L -o role.zip https://github.com/ADVRHmanoids/ROLE/archive/refs/heads/main.zip
unzip role.zip
mv ROLE-main ROE
rm role.zip

% Total    % Received % Xferd Average Speed Time     Time     Time
                                Dload Upload   Total   Spent    Left
Speed
100   9100    0   0      0     0      0      0 --:--:-- --:--:-- --:--:--
Archive: role.zip
End-of-central-directory signature not found. Either this file is not
a zipfile, or it constitutes one disk of a multi-part archive. In the
latter case the central directory and zipfile comment will be found on
the last disk(s) of this archive.
unzip: cannot find zipfile directory in one of role.zip or
role.zip.zip, and cannot find role.zip.ZIP, period.
mv: cannot stat 'ROLE-main': No such file or directory
root@f294813275af:/app# # 1. Comenta la Import de Role
sed -i 's|import ROLE.Parameters.Robot as Parameters| import ROLE.Parameters.Robot as Parameters|' /app/src/Industrial_Robotics_Gym/_init_.py

# 2. Sustituye la definicion de CONST_ROBOT_TYPE con lista vacia
sed -i 's|"CONST_ROBOT_TYPE"==>"CONST_ROBOT_TYPE"|[]|' /app/src/Industrial_Robotics_Gym/_init_.py

# 3. Guarda y cierra (ya está modificado)
root@f294813275af:/app# python
Python 3.10.9 (main, Nov 2025, 84-2744) [GCC 14.2.0] on linux
```

Figura 3: Mas errores

```

>>> from src.Industrial_Robotics_Gym.Environment.Core import Industrial_Robotics_Gym_Env_Cls
/usr/local/lib/python3.10/site-packages/gymnasium/envs/registration.py:636: UserWarning: WARN: Overriding environment Ur3-Default-Reach-v0 already in registry.
  logger.warn(f"Overriding environment {new_spec.id} already in registry.")
/usr/local/lib/python3.10/site-packages/gymnasium/envs/registration.py:636: UserWarning: WARN: Overriding environment Abbrb128-Default-Reach-v0 already in registry.
  logger.warn(f"Overriding environment {new_spec.id} already in registry.")
/usr/local/lib/python3.10/site-packages/gymnasium/envs/registration.py:636: UserWarning: WARN: Overriding environment Abbrb128L-Default-Reach-v0 already in registry.
  logger.warn(f"Overriding environment {new_spec.id} already in registry.")
/usr/local/lib/python3.10/site-packages/gymnasium/envs/registration.py:636: UserWarning: WARN: Overriding environment Abbrb14000L-Default-Reach-v0 already in registry.
  logger.warn(f"Overriding environment {new_spec.id} already in registry.")
/usr/local/lib/python3.10/site-packages/gymnasium/envs/registration.py:636: UserWarning: WARN: Overriding environment Abbrb14000R-Default-Reach-v0 already in registry.
  logger.warn(f"Overriding environment {new_spec.id} already in registry.")
/usr/local/lib/python3.10/site-packages/gymnasium/envs/registration.py:636: UserWarning: WARN: Overriding environment EpsilonL3-Default-Reach-v0 already in registry.
  logger.warn(f"Overriding environment {new_spec.id} already in registry.")
/usr/local/lib/python3.10/site-packages/gymnasium/envs/registration.py:636: UserWarning: WARN: Overriding environment Ur3-Collision-Free-Reach-v0 already in registry.
  logger.warn(f"Overriding environment {new_spec.id} already in registry.")
/usr/local/lib/python3.10/site-packages/gymnasium/envs/registration.py:636: UserWarning: WARN: Overriding environment Abbrb128-Collision-Free-Reach-v0 already in registry.
  logger.warn(f"Overriding environment {new_spec.id} already in registry.")
/usr/local/lib/python3.10/site-packages/gymnasium/envs/registration.py:636: UserWarning: WARN: Overriding environment Abbrb128L-Collision-Free-Reach-v0 already in registry.
  logger.warn(f"Overriding environment {new_spec.id} already in registry.")
/usr/local/lib/python3.10/site-packages/gymnasium/envs/registration.py:636: UserWarning: WARN: Overriding environment Abbrb14000L-Collision-Free-Reach-v0 already in registry.
  logger.warn(f"Overriding environment {new_spec.id} already in registry.")
/usr/local/lib/python3.10/site-packages/gymnasium/envs/registration.py:636: UserWarning: WARN: Overriding environment Abbrb14000R-Collision-Free-Reach-v0 already in registry.
  logger.warn(f"Overriding environment {new_spec.id} already in registry.")
/usr/local/lib/python3.10/site-packages/gymnasium/envs/registration.py:636: UserWarning: WARN: Overriding environment EpsilonL3-Collision-Free-Reach-v0 already in registry.
  logger.warn(f"Overriding environment {new_spec.id} already in registry.")
pybullet build time: Jan 29 2025 23:16:28
>>> env = Industrial_Robotics_Gym_Env_Cls(node="Default")
argv[0] = --background_color_red=0.0
argv[1] = --background_color_green=0.0
argv[2] = --background_color_blue=0.0
startThreads creating 1 threads.
starting thread 0
started thread 0

```

Figura 4: aun mas errores

5. Conclusión

El proyecto se encuentra parcialmente funcional. Se documentaron todos los pasos realizados y los bloqueos encontrados. Para ejecutar la simulación completa es indispensable obtener acceso al módulo RoLE. Una vez instalado, se podrán simular correctamente los robots definidos en `Industrial_Robotics_Gym`.