

UBUNTU 20.24 환경 설정

담당자



JUBI

ubuntu 정보

IP 주소	192.168.21.30
username	ljhp1004
password	a1234

```
ssh ljhp1004@192.168.21.30
```

```
ssh ljhp1004@ssafy220.iptime.org
```

ubuntu 정보

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) 공인 IP 주소 확인

3) Jupyter Notebook 실행

REFERENCE

Ubuntu 20.04에서 nvidia driver, cuda, cudnn, pytorch 설치의 모든 것
ubuntu 20.04, nvidia driver 495, cuda 11.3, cudnn 8.2.1, pytorch 버전을 설치
하는 방법입니다.

 https://ingu627.github.io/tips/install_cuda_linux/

버전 정리

	now	recommended
NVIDIA Driver	nvidia-driver-450-server : 450.248.02	450.xx 이상
CUDA	CUDA Toolkit 11.0.2 (July 2020)	11.0.2 (July 2020)
cuDNN		v8.9.7 (December 5th, 2023) for CUDA 11.x
Anaconda		Anaconda3-2022.10-Linux-x86_64.sh
python		

0 기존 NVIDIA, CUDA 완전 삭제

① NVIDIA 그래픽 드라이버 관련 패키지 삭제

- NVIDIA 그래픽 드라이버와 관련된 모든 설정 파일 및 의존성을 함께 제거
- 옵션

sudo	슈퍼 유저 권한으로 명령을 실행
apt-get	
purge	

```
sudo apt-get purge nvidia*
```

② autoremove

- 불필요한 패키지들을 시스템에서 자동으로 제거
- 현재 시스템에서 더 이상 필요하지 않은 패키지들이 자동으로 식별되고 제거된다

```
sudo apt-get autoremove
```

③ autoclean

- 로컬 패키지 캐시에서 다운로드한 패키지 파일의 오래된 버전을 제거

```
sudo apt-get autoclean
```

④ cuda 관련 프로그램 설치 제거

```
sudo rm -rf /usr/local/cuda*
```

⑤ 삭제 확인

```
nvidia-smi
```

```
l1jhp1004@s220:~$ nvidia-smi
-bash: /usr/bin/nvidia-smi: 그런 파일이나 디렉터리가 없습니다
```

```
nvcc -V
```

```
l1jhp1004@s220:~$ nvcc -V
명령어 'nvcc'을(를) 찾을 수 없습니다. 그러나 다음을 통해 설치할 수 있습니다 :
sudo apt install nvidia-cuda-toolkit
```

1 NVIDIA DRIVER 설치

① 설치 가능한 드라이버 확인

```
ubuntu-drivers devices
```

```

ljhp1004@s220:~$ ubuntu-drivers devices
== /sys/devices/pci0000:00/0000:00:01.0/0000:01:00.0 ==
modalias : pci:v000010DEd00001F51sv0000144Dsd0000C17Bbc03sc00i00
vendor    : NVIDIA Corporation
model     : TU106BM [GeForce RTX 2060 Mobile]
driver    : nvidia-driver-535 - distro non-free
driver    : nvidia-driver-535-open - distro non-free
driver    : nvidia-driver-525 - distro non-free
driver    : nvidia-driver-470 - distro non-free
driver    : nvidia-driver-535-server-open - distro non-free recommended
driver    : nvidia-driver-525-server - distro non-free
driver    : nvidia-driver-450-server - distro non-free
driver    : nvidia-driver-535-server - distro non-free
driver    : nvidia-driver-525-open - distro non-free
driver    : nvidia-driver-470-server - distro non-free
driver    : nvidia-driver-418-server - distro non-free
driver    : xserver-xorg-video-nouveau - distro free builtin

```

② 드라이버 설치

자동으로 드라이버 설치

```
sudo ubuntu-drivers autoinstall
```

- 설치 실패 시

```

ljhp1004@s220:~$ sudo ubuntu-drivers autoinstall
패키지 목록을 읽는 중입니다 ... 완료
의존성 트리를 만드는 중입니다
상태 정보를 읽는 중입니다 ... 완료
0개 업그레이드, 0개 새로 설치, 0개 제거 및 0개 업그레이드 안 함.

```

⇒ 특정 버전의 드라이버 설치하기

원하는 버전의 드라이버 설치

```
sudo apt install nvidia-driver-버전
```

```
sudo apt install nvidia-driver-450-server
```

→ torch==1.6.0 & torchvision==0.7.0 과 호환되는 cuDNN v7.6.4와 호환되는 드라이버

③ modprobe 패키지 설치

| NVIDIA kernel module의 load를 도와주는 패키지

```
sudo apt-get install dkms nvidia-modprobe
```

④ apt update & upgrade

```
sudo apt update
```

```
sudo apt upgrade
```

⑤ 재부팅

```
sudo reboot
```

⑥ 설치 확인

```
nvidia-smi
```

- 설치가 안 된 경우

```
No devices were found
```

- 설치 성공

```

tjhp1004@s220:~$ nvidia-smi
Thu Feb  1 08:15:15 2024

+-----+
| NVIDIA-SMI 450.248.02   Driver Version: 450.248.02   CUDA Version: 11.0   |
+-----+-----+
| GPU  Name           Persistence-M| Bus-Id        Disp.A | Volatile Uncorr. ECC |
| Fan  Temp  Perf    Pwr:Usage/Cap|     Memory-Usage | GPU-Util  Compute M. |
|                               |             MIG M. |
+-----+-----+
|   0  GeForce RTX 2060    off      | 00000000:01:00.0 On  |          0%      N/A |
| N/A   42C    P8          6W /  N/A | 48MiB / 5926MiB |              Default |
|                               |             N/A   |
+-----+-----+

Processes:
+-----+-----+
| GPU  GI   CI           PID  Type  Process name                      GPU Memory |
|   ID  ID   ID                               Usage   |
+-----+-----+
|   0  N/A  N/A           902   G    /usr/lib/xorg/Xorg                 36MiB |
|   0  N/A  N/A          1172   G    /usr/bin/gnome-shell              10MiB |
+-----+-----+

```

2 CUDA 11.0.2 설치

① wget 으로 설치

① 아래 사이트 이동

CUDA Toolkit Archive

Previous releases of the CUDA Toolkit, GPU Computing SDK, documentation and developer drivers can be found using the links below. Please select the release you want from the list

 <https://developer.nvidia.com/cuda-toolkit-archive>



② CUDA Toolkit 11.0.2 다운로드

1. CUDA Toolkit 11.0.2 클릭
2. Select Target Platform

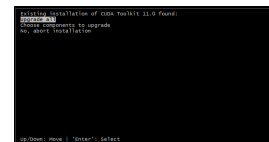
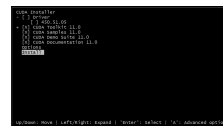
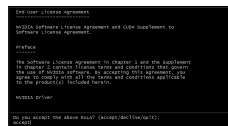
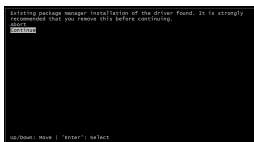
Operating System	Linux
Architecture	x86_64
Distribution	Ubuntu
Version	20.04
Installer Type	runfile (local)

3. Installation Instructions 확인

```
wget https://developer.download.nvidia.com/compute/cuda/11
```

```
ljhp1004@s220:~$ ls  
cuda_11.0.2_450.51.05_linux.run
```

```
sudo sh cuda_11.0.2_450.51.05_linux.run
```



- 만약 위 과정이 안된다면 reference 다시 참고

4. 설치 성공 완료

```
ljhp1004@s220:~$ sudo sh cuda_11.0.2_450.51.05_linux.run  
===== summary =====  
Driver: Not Selected  
Toolkit: Installed in /usr/local/cuda-11.0/  
Samples: Installed in /home/ljhp1004/, but missing recommended libraries  
  
Please make sure that  
- PATH includes /usr/local/cuda-11.0/bin  
- LD_LIBRARY_PATH includes /usr/local/cuda-11.0/lib64, or, add /usr/local/cuda-11.0/lib64 to /etc/ld.so.conf and run ldconfig as root  
  
To uninstall the CUDA Toolkit, run cuda-uninstaller in /usr/local/cuda-11.0/bin  
  
Please see CUDA_Installation_Guide_Linux.pdf in /usr/local/cuda-11.0/doc/pdf for detailed information on setting up CUDA.  
***WARNING: Incomplete installation! This installation did not install the CUDA Driver. A driver of version at least .00 is required for CUDA 11.0 functionality to work.  
To install the driver using this installer, run the following command, replacing <cudaInstaller> with the name of this run file:  
sudo <cudaInstaller>.run --silent --driver  
Logfile is /var/log/cuda-installer.log
```

③ cuda 버전 확인

```
nvcc -V
```

```
ljhp1004@s220:~$ nvcc -V  
nvcc: NVIDIA (R) Cuda compiler driver  
Copyright (c) 2005-2020 NVIDIA Corporation  
Built on Thu_Jun_11_22:26:38_PDT_2020  
Cuda compilation tools, release 11.0, v11.0.194  
Build cuda_11.0_bu.TC445_37.28540450_0
```


② 환경 변수 추가

| /usr/local/에서 cuda 버전 확인 후 명령어 실행하기

```
sudo sh -c "echo 'export PATH=$PATH:/usr/local/cuda-11.0/bin':  
sudo sh -c "echo 'export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/us  
sudo sh -c "echo 'export CUDARDIR=/usr/local/cuda-11.0'>> /etc  
source /etc/profile
```

```
sudo '/usr/local/cuda-11.0/lib64' | sudo tee -a /etc/ld.so.co  
sudo ldconfig
```

- 확인

```
echo $PATH  
echo $LD_LIBRARY_PATH  
echo $CUDARDIR
```

```
l1jhp1004@s220:~$ echo $PATH  
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin:/usr/local/cuda-11.0/bin  
l1jhp1004@s220:~$ echo $LD_LIBRARY_PATH  
:/usr/local/cuda-11.0/lib64  
l1jhp1004@s220:~$ echo $CUDARDIR  
/usr/local/cuda-11.0
```

3 cuDNN설치 (설치 안됨 PASS)

① 설치 파일 다운로드

사이트 이동

NVIDIA CUDA Deep Neural Network (cuDNN)

cuDNN provides highly tuned implementations for standard routines such as forward and backward convolution, pooling, normalization, and activation layers.

 <https://developer.nvidia.com/cudnn>



Download cuDNN Library 클릭

- 로그인 필수

- 체크 : I Agree To the Terms of the cuDNN Software License Agreement
- [Download cuDNN v8.8.7 \(December 5th, 2023\), for CUDA 11.x](#) 클릭
- Local Installer for Ubuntu20.24 x86_64 (Deb) 링크 복사

wget 다운로드

```
wget https://developer.nvidia.com/downloads/compute/cudnn/sec
```

```
wget https://developer.nvidia.com/downloads/compute/cudnn/sec
```

```
ljhp1004@s220:~$ ls
NVIDIA_CUDA-11.0_Samples  cuda_11.0.2_450.51.05_linux.run  cudnn-linux-x86_64-8.9.7.29_cuda11-archive.tar.xz
```

```
tar -xvf cudnn-linux-x86_64-8.9.7.29_cuda11-archive.tar.xz
```

● TROUBLE SHOOTING ●

```
ljhp1004@s220:~$ tar -xvf cudnn-linux-x86_64-8.9.7.29_cuda11-archive.tar.xz
xz: (stdin): 파일 포맷을 인식할 수 없습니다
tar: child returned status 1
tar: Error is not recoverable: exiting now
```

4 PYTHON 가상 환경 설치

① python 버전 확인

```
python3 --version
```

```
ljhp1004@s220:~$ python3 --version
Python 3.8.10
```

② conda 설치

설치 여부 확인 : `conda --version`

① Anaconda 다운로드

```
wget https://repo.anaconda.com/archive/Anaconda3-2022.10-Linux
```

② 스크립트 실행

```
bash Anaconda3-2022.10-Linux-x86_64.sh
```

③ 설치 지침 따르기

```
Anaconda3 will now be installed into this location:
/home/ljhp1004/anaconda3

- Press ENTER to confirm the location
- Press CTRL-C to abort the installation
- Or specify a different location below

[/home/ljhp1004/anaconda3] >>>
PREFIX=/home/ljhp1004/anaconda3
Unpacking payload ...
```

④ 시스템 경로에 추가

```
sudo sh -c "echo 'export PATH=$PATH:/$HOME/anaconda3/bin:/$HOME/anaconda3/bin' >> /etc/profile"
source /$HOME/.bashrc
```

⑤ 설치 확인

```
conda --version
```

```
(base) ljhp1004@s220:~$ conda --version
conda 22.9.0
```

③ git 설치

```
sudo apt install git
```

- 설치 확인

```
git --version
```

```
(base) ljhp1004@S220:~/TTS$ git --version  
git version 2.25.1
```

④ 가상환경 생성

생성

```
conda create -n ttsenv python=3.7
```

가상환경 목록 조회

```
conda info --envs
```

```
(base) ljhp1004@S220:~$ conda info --envs  
# conda environments:  
#  
base                *  /home/ljhp1004/anaconda3  
ttsenv              /home/ljhp1004/anaconda3/envs/ttsenv
```

가상환경 활성화

```
source activate ttsenv
```

설치된 패키지 확인

```
conda list
```

▼ 초기 설치 패키지 목록

_libgcc_mutex
 _openmp_mutex
 certifi
 ld_impl_linux-64
 libffi
 libgcc-ng
 libgomp
 libstdcxx-ng
 ncurses
 openssl
 pip
 python
 readline
 setuptools
 sqlite
 tk
 wheel
 xz
 zlib

```

(ttssenv) ljh1004@s220:~$ conda list
# packages in environment at /home/ljh1004/anaconda3/envs/ttssenv:
#
# Name                    Version            Build    Channel
_libgcc_mutex             0.1                main
_openmp_mutex             5.1                1_gnu
ca-certificates           2023.12.12         h06a4308_0
certifi                   2022.12.7          py37h06a4308_0
ld_impl_linux-64         2.38               h1181459_1
libffi                    3.4.4              h6a678d5_0
libgcc-ng                 11.2.0             h1234567_1
libgomp                   11.2.0             h1234567_1
libstdcxx-ng              11.2.0             h1234567_1
ncurses                   6.4                h6a678d5_0
openssl                   1.1.1w             h7f8727e_0
pip                       22.3.1             py37h06a4308_0
python                    3.7.16             h7a1cb2a_0
readline                  8.2                h5eee18b_0
setuptools                65.6.3             py37h06a4308_0
sqlite                    3.41.2             h5eee18b_0
tk                        8.6.12             h1ccaba5_0
wheel                     0.38.4             py37h06a4308_0
xz                         5.4.5              h5eee18b_0
zlib                      1.2.13             h5eee18b_0
  
```

⑤ pre-requisites 설치

1) git clone

```
mkdir TTS && cd TTS
```

```
git clone https://github.com/jaywalnut310/vits.git
```

```
cd vits
```

2) requirements.txt 설치

```
pip install -r requirements.txt
```

▼ 설치 항목

설치해야 할 항목

Cython	0.29.21
librosa	0.8.0
matplotlib	3.3.1
numpy	1.18.5
phonemizer	2.2.1
scipy	1.5.2
tensorboard	2.3.0
torch	1.6.0
torchvision	0.7.0
Unidecode	1.1.1

설치된 패키지 목록

```
(ttsenv) ljhpl004@ps220:~/TTTS/vits$ conda list
# packages in environment at /home/ljhpl004/anaconda3/envs/ttsenv:
#
  Name                                Version                                Build                                Channel
  _libgcc_mutex                       0.1                                   main                                conda-forge
  _openmp_mutex                       5.1                                   _gnu                                conda-forge
  absl-py                             23.2.0                               py31_0                             pypi
  attrs                               3.0.1                                py31_0                             pypi
  audioread                           2.14.0                               py31_0                             pypi
  babel                               2023.12.12                           h06a4308_0                         pypi
  cachetools                          4.2.4                                py31_0                             pypi
  certifi                             2022.12.7                            py37h06a4308_0                     conda-forge
  cffi                                 1.15.1                               py31_0                             pypi
  charset-normalizer                  3.3.2                                py31_0                             pypi
  cldutils                            3.19.0                               py31_0                             pypi
  colorama                            0.4.6                                py31_0                             pypi
  colorlog                            6.8.2                                py31_0                             pypi
  csvw                                3.1.3                                py31_0                             pypi
  cyclical                             0.11.0                               py31_0                             pypi
  cython                              0.29.21                              py31_0                             pypi
  decorator                           5.1.1                                py31_0                             pypi
  future                              0.18.3                               py31_0                             pypi
  google-auth                         1.35.0                               py31_0                             pypi
  google-auth-oauthlib                0.4.6                                py31_0                             pypi
  grpcio                              1.60.0                               py31_0                             pypi
  idna                                 3.6                                   py31_0                             pypi
  importlib-metadata                  4.13.0                               py31_0                             pypi
  importlib-resources                  5.12.0                               py31_0                             pypi
  isodate                             0.6.1                                py31_0                             pypi
  joblib                              1.3.2                                py31_0                             pypi
  jsonschema                          4.17.3                               py31_0                             pypi
  kiwisolver                          1.4.5                                py31_0                             pypi
  language-tags                       1.2.0                                py31_0                             pypi
  ld_impl_linux-64                   2.38                                 h1181459_1                         conda-forge
  libffi                              3.4.4                                h6a678d5_0                         conda-forge
  libgcc-ng                           11.2.0                               h1234567_1                         conda-forge
  libgomp                             11.2.0                               h1234567_1                         conda-forge
  librosa                             0.8.0                                py31_0                             pypi
  libstdcxx-ng                        11.2.0                               h1234567_1                         conda-forge
  llvmlite                            0.39.1                               py31_0                             pypi
  lxml                                5.1.0                                py31_0                             pypi
  markdown                             3.4.4                                py31_0                             pypi
  markupsafe                          2.1.4                                py31_0                             pypi
  matplotlib                           3.3.1                                py31_0                             pypi
  ncurses                             6.4                                   h6a678d5_0                         conda-forge
  numba                                0.56.4                               py31_0                             pypi
  numpy                                1.18.5                               py31_0                             pypi
  oauthlib                            3.2.2                                py31_0                             pypi
  openssl                             1.1.1w                               h7f8727e_0                         conda-forge
  packaging                           23.2                                py31_0                             pypi
  phonemizer                          2.2.1                                py31_0                             pypi
  pillow                              9.5.0                                py31_0                             pypi
  pip                                 22.3.1                               py37h06a4308_0                     conda-forge
  pkgutil-resolve-name                1.3.10                              py31_0                             pypi
  platformdirs                        4.0.0                                py31_0                             pypi
  pooch                               1.8.0                                py31_0                             pypi
  protobuf                            4.24.4                               py31_0                             pypi
  pyasn1                              0.5.1                                py31_0                             pypi
  pyasn1-modules                      0.3.0                                py31_0                             pypi
  pycparser                           2.21                                 py31_0                             pypi
  pylatexenc                          2.10                                 py31_0                             pypi
  pyparsing                           3.1.1                                py31_0                             pypi
  pyrsistent                          0.19.3                               py31_0                             pypi
  python                              3.7.16                               h7a1c3b2a_0                         conda-forge
  python-dateutil                     2.8.2                                py31_0                             pypi
  pytz                                2023.4                               py31_0                             pypi
  rdflib                              6.3.2                                py31_0                             pypi
  readline                             8.2                                   h5eeel18b_0                         conda-forge
  regex                               2023.12.25                           py31_0                             pypi
  requests                            2.31.0                               py31_0                             pypi
  requests-oauthlib                   1.3.1                                py31_0                             pypi
  resampy                             0.4.2                                py31_0                             pypi
  rfc3986                             1.5.0                                py31_0                             pypi
  rsa                                 4.9                                   py31_0                             pypi
  scikit-learn                        1.0.2                                py31_0                             pypi
  scipy                               1.5.2                                py31_0                             pypi
  segments                            2.2.1                                py31_0                             pypi
  setuptools                          65.6.3                               py37h06a4308_0                     conda-forge
  six                                 1.16.0                               py31_0                             pypi
  soundfile                           0.12.1                               py31_0                             pypi
  sqlite                              3.41.2                               h5eeel18b_0                         conda-forge
  tabulate                            0.9.0                                py31_0                             pypi
  tensorboard                         2.3.0                                py31_0                             pypi
  tensorboard-plugin-wit              1.8.1                                py31_0                             pypi
  threadpoolctl                       3.1.0                                py31_0                             pypi
  tk                                  8.6.12                               hlccaba5_0                         conda-forge
  torch                               1.6.0                                py31_0                             pypi
  torchvision                         0.7.0                                py31_0                             pypi
  typing-extensions                    4.7.1                                py31_0                             pypi
  unicodecode                         1.1.1                                py31_0                             pypi
  writemplate                         4.1.1                                py31_0                             pypi
  urllib3                             2.0.7                                py31_0                             pypi
  werkzeug                            2.2.3                                py31_0                             pypi
  wheel                               0.38.4                               py37h06a4308_0                     conda-forge
  xz                                  5.4.5                                h5eeel18b_0                         conda-forge
  zipp                                3.15.0                               py31_0                             pypi
  zlib                               1.2.13                              h5eeel18b_0                         conda-forge
```

- #### 설치 항목 체크

3) 확장 모듈 빌드

```
cd monotonic_align
```

```
python setup.py build_ext --build-lib=.
```

```
(ttsenv) ljhp1004@S220:~/TTS/vits/monotonic_align$ python setup.py build_ext --build-lib=.  
b=./  
Compiling core.pyx because it changed.  
[1/1] Cythonizing core.pyx  
/home/ljhp1004/anaconda3/envs/ttsenv/lib/python3.7/site-packages/Cython/Compiler/Main.py:369: FutureWarning: Cython directive 'language_level' not set, using 2 for now (Py2).  
This will change in a later release! File: /home/ljhp1004/TTS/vits/monotonic_align/core.pyx  
tree = Parsing.p_module(s, pxd, full_module_name)
```

- 명령어 실행 결과 아래의 것들이 생성됨
 - build
 - core.c
 - monotonic_align

4) espeak 설치

| ESPEAK : 텍스트를 오디오로 변환

```
sudo apt-get install espeak -y
```

- 설치 확인

```
espeak --version
```

```
(ttsenv) ljhp1004@S220:~/TTS$ espeak --version  
eSpeak text-to-speech: 1.48.03 04.Mar.14 Data at: /usr/lib/x86_64-linux-gnu/espeak-data
```

- 음성 파일 만들기

```
espeak "Hello, this is a test." -w output.wav
```

- 크기가 71088 인 output.wav 파일이 생성됨
- 음성 파일 재생해보기

5) gdown으로 모델 체크포인트 다운로드

- gdown 설치

```
pip install gdown
```

- vits로 이동

```
cd /$HOME/TTS/vits
```

- 체크포인트 다운로드 : `pretrained_ljh.pth` 다운로드

```
gdown 'https://drive.google.com/uc?id=1q86w74Ygw2hNzYP9cWk'
```

⑥ Jupyter Notebook 연결 (?)

1) Jupyter Notebook 설치

```
pip install jupyter
```

- 설치 확인

```
jupyter --version
```

```
(ttsenv) ljhp1004@S220:~/TTS/vits$ jupyter --version
Selected Jupyter core packages...
IPython          : 7.34.0
ipykernel        : 6.16.2
ipywidgets       : 8.1.1
jupyter_client   : 7.4.9
jupyter_core     : 4.12.0
jupyter_server   : 1.24.0
jupyterlab       : not installed
nbclient         : 0.7.4
nbconvert        : 7.6.0
nbformat         : 5.8.0
notebook         : 6.5.6
qtconsole        : 5.4.4
traitlets        : 5.9.0
```

2) config file 만들기

```
jupyter notebook --generate-config
```

```
(ttsenv) ljhp1004@S220:~/TTS/vits$ jupyter notebook --generate-config
Writing default config to: /home/ljhp1004/.jupyter/jupyter_notebook_config.py
```

3) Server 비밀번호 생성

- ipython 실행

```
ipython
```

```
(ttsenv) ljhp1004@S220:~/TTS/vits$ ipython
Python 3.7.16 (default, Jan 17 2023, 22:20:44)
Type 'copyright', 'credits' or 'license' for more information
IPython 7.34.0 -- An enhanced Interactive Python. Type '?' for help.

In [1]:
```

```
from notebook.auth import password
passwd()
```

) 공인 IP 주소 확인

```
ifconfig
```

```
(ttsenv) ljhp1004@S220:~/TTS/vits$ ifconfig
enp3s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.0.111 netmask 255.255.255.0 broadcast 192.168.0.255
    inet6 fe80::2fb:d90c:1ad7:d237 prefixlen 64 scopeid 0x20<link>
    ether 98:83:89:a0:52:fa txqueuelen 1000 (Ethernet)
    RX packets 950992 bytes 1330222843 (1.3 GB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 461230 bytes 33299442 (33.2 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 3439 bytes 392539 (392.5 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 3439 bytes 392539 (392.5 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
ip addr
```

```
(ttsenv) ljhp1004@s220:~/TTS/vits$ ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp3s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 98:83:89:a0:52:fa brd ff:ff:ff:ff:ff:ff
    inet 192.168.0.111/24 brd 192.168.0.255 scope global dynamic noprefixroute enp3s0
        valid_lft 6573sec preferred_lft 6573sec
    inet6 fe80::2fb:d90c:1ad7:d237/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
3: wlo1: <BROADCAST,MULTICAST> mtu 1500 qdisc noqueue state DOWN group default qlen 1000
    link/ether 04:ed:33:8e:89:47 brd ff:ff:ff:ff:ff:ff
    altname wlp0s20f3
```

3) Jupyter Notebook 실행

```
jupyter notebook
```

```
(ttsenv) ljhp1004@s220:~/TTS/vits$ jupyter notebook

Read the migration plan to Notebook 7 to learn about the new features and the actions to take if you are using extensions.
https://jupyter-notebook.readthedocs.io/en/latest/migrate_to_notebook7.html

Please note that updating to Notebook 7 might break some of your extensions.

[I 11:42:49.493 NotebookApp] Serving notebooks from local directory: /home/ljhp1004/TTS/vits
[I 11:42:49.493 NotebookApp] Jupyter Notebook 6.5.6 is running at:
[I 11:42:49.493 NotebookApp] http://localhost:8888/?token=dee80938beca75d9adbe071e99532b11afc6cfb45f980176
[I 11:42:49.493 NotebookApp] or http://127.0.0.1:8888/?token=dee80938beca75d9adbe071e99532b11afc6cfb45f980176
[I 11:42:49.493 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
[W 11:42:49.495 NotebookApp] No web browser found: could not locate runnable browser.
[C 11:42:49.496 NotebookApp]

To access the notebook, open this file in a browser:
file:///home/ljhp1004/.local/share/jupyter/runtime/nbserver-12731-open.html
Or copy and paste one of these URLs:
http://localhost:8888/?token=dee80938beca75d9adbe071e99532b11afc6cfb45f980176
or http://127.0.0.1:8888/?token=dee80938beca75d9adbe071e99532b11afc6cfb45f980176
```