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
```

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 설치하는 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		

0️⃣ 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

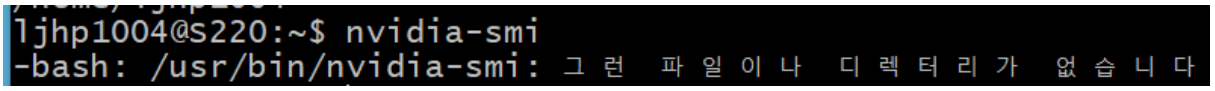
```
sudo apt-get autoclean
```

④ cuda 관련 프로그램 설치 제거

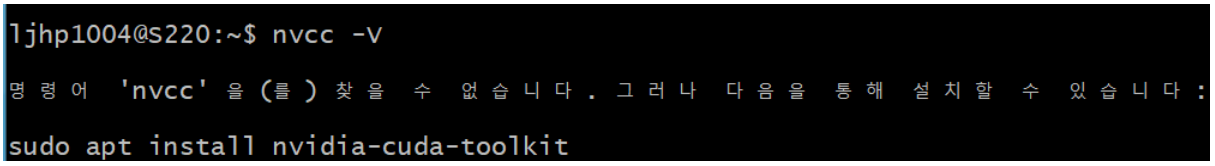
```
sudo rm -rf /usr/local/cuda*
```

⑤ 삭제 확인

```
nvidia-smi
```




```
nvcc -V
```



1️⃣ 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

```
ljhp1004@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 |                  N/A |
| N/A   42C    P8     6W /  N/A |     48MiB /  5926MiB |      0%      Default |
|                               |                      |                  N/A |
+-------------------------------+----------------------+----------------------+

+-----------------------------------------------------------------------------+
| Processes:                                                                  |
|  GPU   GI   CI        PID   Type   Process name                  GPU Memory |
|        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 |
+-----------------------------------------------------------------------------+
```

2️⃣ CUDA 11.0.2 설치

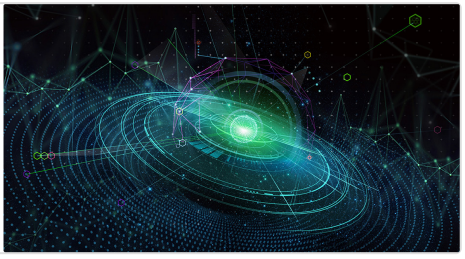
① wget 으로 설치

❶ 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



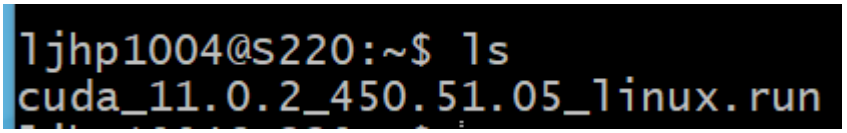
❷ CUDA Toolkit 11.0.2 다운로드

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)

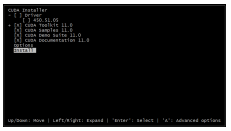
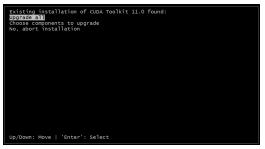
3. Installation Instructions 확인

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



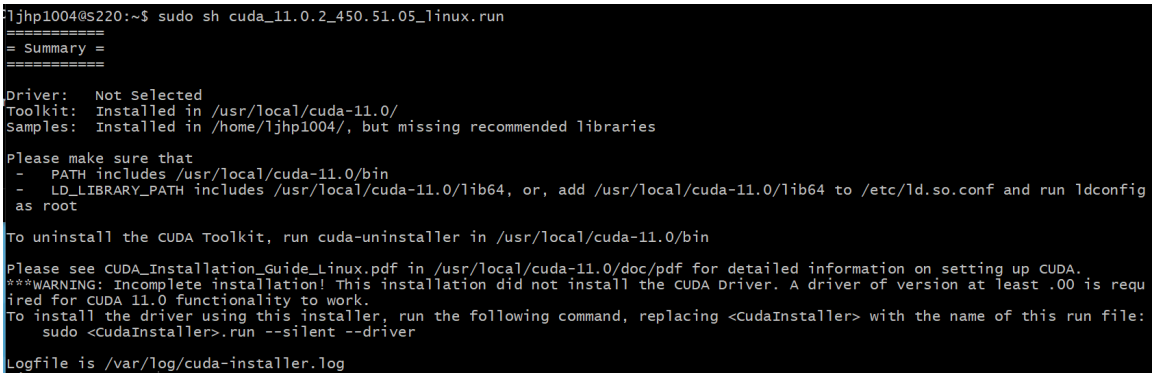

```
sudo sh cuda_11.0.2_450.51.05_linux.run
```



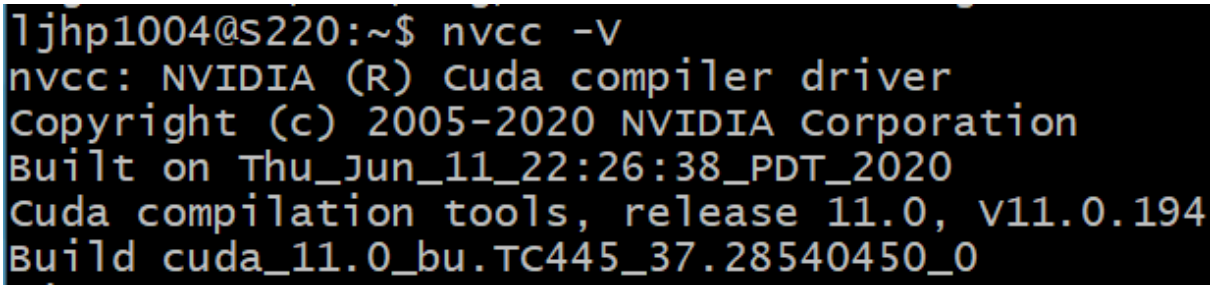
- 만약 위 과정이 안된다면 reference 다시 참고

4. 설치 성공 완료



❸ cuda 버전 확인

```
nvcc -V
```



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'>> /et
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
```

```
ljhp1004@S220:~$ echo $PATH
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin:/usr/local/cuda-11.0/bin
ljhp1004@S220:~$ echo $LD_LIBRARY_PATH
:/usr/local/cuda-11.0/lib64
ljhp1004@S220:~$ echo $CUDARDIR
/usr/local/cuda-11.0
```

3️⃣ cuDNN설치 (설치 안됨 PASS)

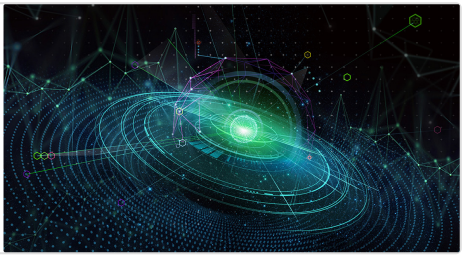
① 설치 파일 다운로드

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): 파 일  포 맷 을  인 식 할  수  없 습 니 다
tar: Child returned status 1
tar: Error is not recoverable: exiting now
```

4️⃣ 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`

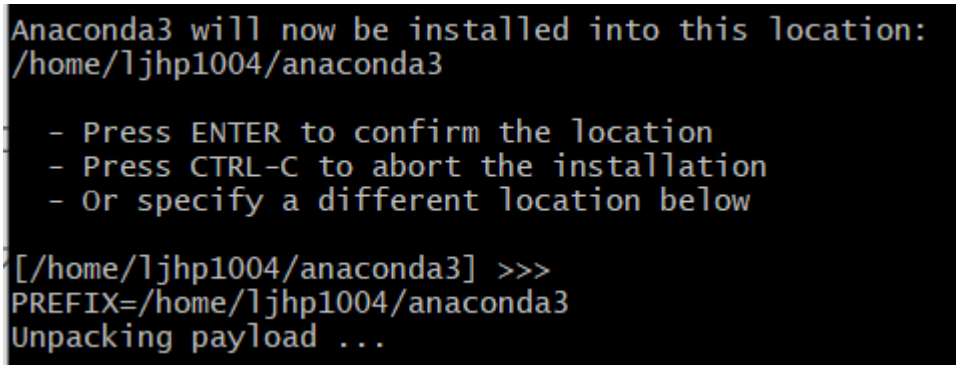
❶ Anaconda 다운로드

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

❷ 스크립트 실행

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

❸ 설치 지침 따르기

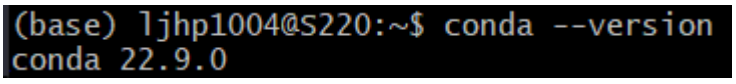


❹시스템 경로에 추가

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

❺ 설치 확인

```
conda --version
```



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

```
(ttsenv) ljhp1004@S220:~$ conda list
# packages in environment at /home/ljhp1004/anaconda3/envs/ttsenv:
#
# 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
```

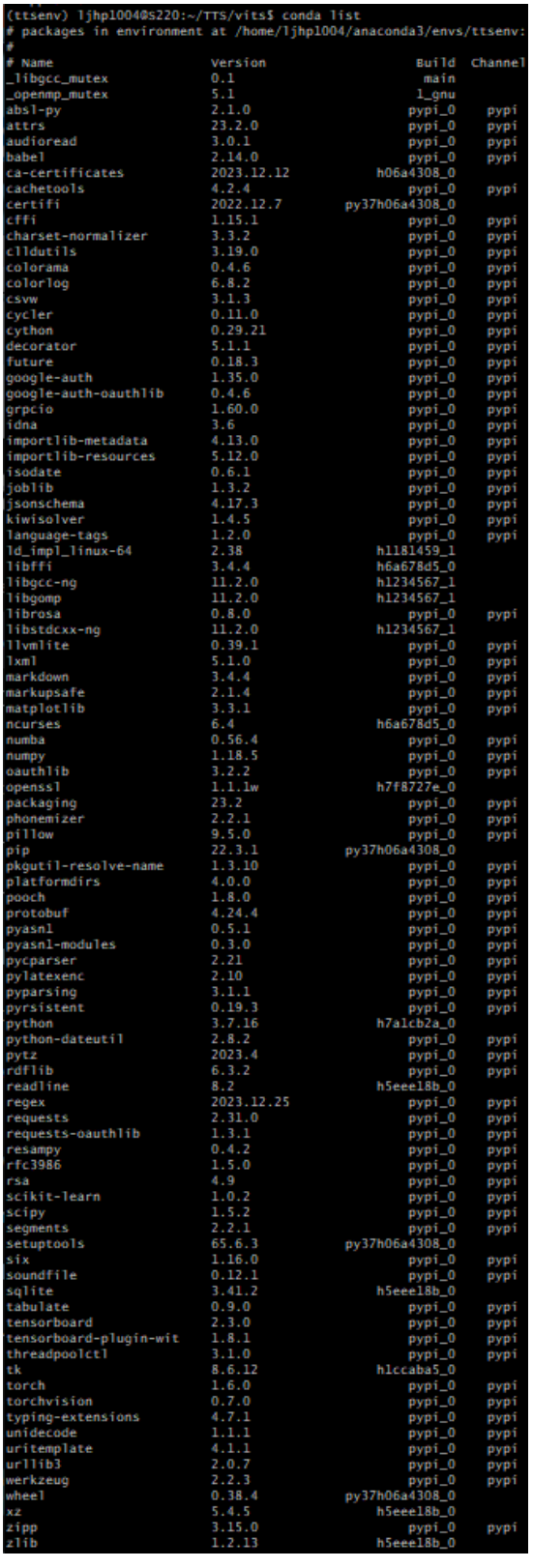
```
cd vits
```

2) requirements.txt 설치

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

▼ 설치 항목

설치해야 할 항목	설치된 패키지 목록
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



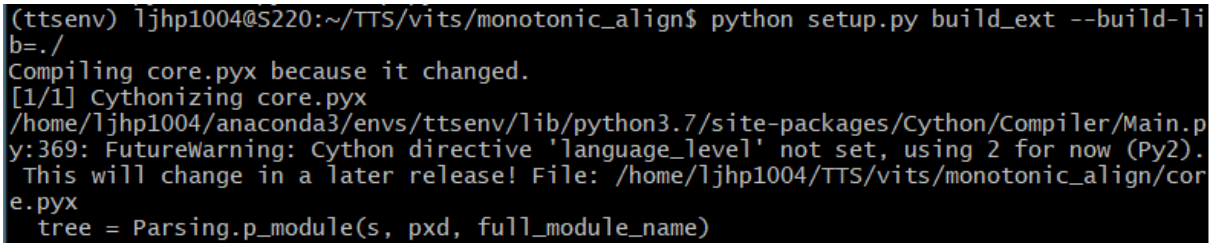
```
(ttsenv) ljhp1004@s220:~/TTS/vits$ conda list
# packages in environment at /home/ljhp1004/anaconda3/envs/ttsenv:
#
# Name                    Version                   Build  Channel
_libgcc_mutex             0.1                        main
_openmp_mutex             5.1                        1_gnu
absl-py                   2.1.0                    pypi_0    pypi
attrs                     23.2.0                   pypi_0    pypi
audioread                 3.0.1                    pypi_0    pypi
babel                     2.14.0                   pypi_0    pypi
ca-certificates           2023.12.12          h06a4308_0
cachetools                4.2.4                    pypi_0    pypi
certifi                   2022.12.7           py37h06a4308_0
cffi                      1.15.1                   pypi_0    pypi
charset-normalizer        3.3.2                    pypi_0    pypi
cldutils                  3.19.0                   pypi_0    pypi
colorama                  0.4.6                    pypi_0    pypi
colorlog                  6.8.2                    pypi_0    pypi
csvw                      3.1.3                    pypi_0    pypi
cycler                    0.11.0                   pypi_0    pypi
cython                    0.29.21                  pypi_0    pypi
decorator                 5.1.1                    pypi_0    pypi
future                    0.18.3                   pypi_0    pypi
google-auth               1.35.0                   pypi_0    pypi
google-auth-oauthlib      0.4.6                    pypi_0    pypi
grpcio                    1.60.0                   pypi_0    pypi
idna                      3.6                      pypi_0    pypi
importlib-metadata        4.13.0                   pypi_0    pypi
importlib-resources       5.12.0                   pypi_0    pypi
isodate                   0.6.1                    pypi_0    pypi
joblib                    1.3.2                    pypi_0    pypi
jsonschema                4.17.3                   pypi_0    pypi
kiwisolver                1.4.5                    pypi_0    pypi
language-tags             1.2.0                    pypi_0    pypi
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
librosa                   0.8.0                    pypi_0    pypi
libstdcxx-ng              11.2.0              h1234567_1
llvmlite                  0.39.1                   pypi_0    pypi
lxml                      5.1.0                    pypi_0    pypi
markdown                  3.4.4                    pypi_0    pypi
markupsafe                2.1.4                    pypi_0    pypi
matplotlib                3.3.1                    pypi_0    pypi
ncurses                   6.4                 h6a678d5_0
numba                     0.56.4                   pypi_0    pypi
numpy                     1.18.5                   pypi_0    pypi
oauthlib                  3.2.2                    pypi_0    pypi
openssl                   1.1.1w              h7f8727e_0
packaging                 23.2                     pypi_0    pypi
phonemizer                2.2.1                    pypi_0    pypi
pillow                    9.5.0                    pypi_0    pypi
pip                       22.3.1              py37h06a4308_0
pkgutil-resolve-name      1.3.10                   pypi_0    pypi
platformdirs              4.0.0                    pypi_0    pypi
pooch                     1.8.0                    pypi_0    pypi
protobuf                  4.24.4                   pypi_0    pypi
pyasn1                    0.5.1                    pypi_0    pypi
pyasn1-modules            0.3.0                    pypi_0    pypi
pycparser                 2.21                     pypi_0    pypi
pylatexenc                2.10                     pypi_0    pypi
pyparsing                 3.1.1                    pypi_0    pypi
pyrsistent                0.19.3                   pypi_0    pypi
python                    3.7.16              h7a1cb2a_0
python-dateutil           2.8.2                    pypi_0    pypi
pytz                      2023.4                   pypi_0    pypi
rdflib                    6.3.2                    pypi_0    pypi
readline                  8.2                 h5eee18b_0
regex                     2023.12.25               pypi_0    pypi
requests                  2.31.0                   pypi_0    pypi
requests-oauthlib         1.3.1                    pypi_0    pypi
resampy                   0.4.2                    pypi_0    pypi
rfc3986                   1.5.0                    pypi_0    pypi
rsa                       4.9                      pypi_0    pypi
scikit-learn              1.0.2                    pypi_0    pypi
scipy                     1.5.2                    pypi_0    pypi
segments                  2.2.1                    pypi_0    pypi
setuptools                65.6.3              py37h06a4308_0
six                       1.16.0                   pypi_0    pypi
soundfile                 0.12.1                   pypi_0    pypi
sqlite                    3.41.2              h5eee18b_0
tabulate                  0.9.0                    pypi_0    pypi
tensorboard               2.3.0                    pypi_0    pypi
tensorboard-plugin-wit    1.8.1                    pypi_0    pypi
threadpoolctl             3.1.0                    pypi_0    pypi
tk                        8.6.12              h1ccaba5_0
torch                     1.6.0                    pypi_0    pypi
torchvision               0.7.0                    pypi_0    pypi
typing-extensions         4.7.1                    pypi_0    pypi
unidecode                 1.1.1                    pypi_0    pypi
uritemplate               4.1.1                    pypi_0    pypi
urllib3                   2.0.7                    pypi_0    pypi
werkzeug                  2.2.3                    pypi_0    pypi
wheel                     0.38.4              py37h06a4308_0
xz                        5.4.5                    h5eee18b_0
zipp                      3.15.0                   pypi_0    pypi
zlib                      1.2.13                   h5eee18b_0
```

- ### 설치 항목 체크

3) 확장 모듈 빌드

```
cd monotonic_align
```

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



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

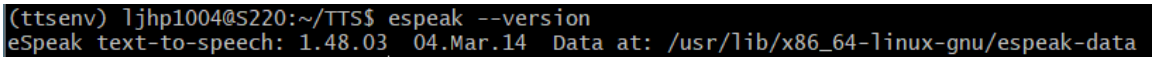
4) espeak 설치

> ESPEAK : 텍스트를 오디오로 변환

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

- 설치 확인

  ```
  espeak --version
  ```

- 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
```

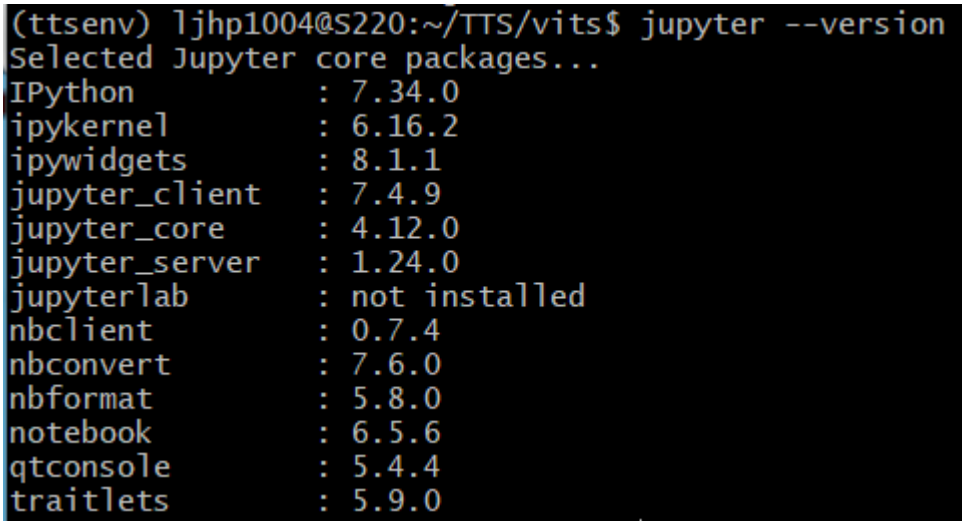
⑥ Jupyter Notebook 연결 (?)

1) Jupyter Notebook 설치

```
pip install jupyter
```

- 설치 확인

```
jupyter --version
```



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
```