NativeCAM hypothetical installation procedure on Debian based systems

The following procedure has been “inspired” by the original procedure written, I suppose, by FernV and tested by freemoore on his machine and then by me in a virtual machine.

If you have a working installation of LinuxCNC, you could apply some changes to make NativeCAM working.
The important thing is to have the paths adapted to the position where the NativeCAM folder actually is.

I have made a LinuxCNC fresh install on a virtual machine by using the installation image from LinuxCNC web site.
The image coulde be found in the download section.
Started downloading the LinuxCNC installation image from LinuxCNC web site:

https://www.linuxcnc.org/iso/linuxcnc_2.9.4-amd64.hybrid.iso

1. Install, if not done yet, python3-lxml using the package manager (Synaptic Package Manager) of your Debian Linux.
If you have LinuxCNC already installed, that package should already be installed too.

2. Download NativeCAM from:
`https://github.com/freemoore/NativeCAM`

(Press the green button “Code” and select “Download ZIP”)

3. Expand the .zip archive and rename the resulting folder as NativeCAM.

Verify that the path `/usr/share/linuxcnc/gladevcp/` is in your disk.

In the terminal you could type:
`ls /usr/share/linuxcnc/`

If the is no folder named `gladevcp` create it:
`sudo mkdir /usr/share/linuxcnc/gladevcp`
(a password is needed)

Then move the NativeCAM folder in:
`/usr/share/linuxcnc/gladevcp/`

```
sudo mv NativeCAM /usr/share/linuxcnc/gladevcp/
```

Now ncam.py shoud be in:
`/usr/share/linuxcnc/aux_gladevcp/NativeCAM/ncam.py`

In the terminal you could type:
```
cd /usr/share/linuxcnc/gladevcp/NativeCAM/
ls
```
to verify.

4. To know where python path is, open the terminal and type:

```
pi@raspberrypi:~ $ python3
Python 3.11.2 (main, Nov 30 2024, 21:22:50) [GCC 12.2.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>>
import sys
>>>
import pprint
>>>
pprint.pprint(sys.path)
['',
 '/usr/lib/python311.zip',
 '/usr/lib/python3.11',
 '/usr/lib/python3.11/lib-dynload',
 '/usr/local/lib/python3.11/dist-packages',
 '/usr/lib/python3/dist-packages',
 '/usr/lib/python3.11/dist-packages']
>>>
```

(type `exit()` to exit python interpreter and return to terminal)
These are the places where python will search for modules.

(Sorry, but I don't know which file establishes that)

5. Now we need to add the NativeCAM folder to the path by creating a symbolic link to the NativeCAM files.

Move in the directory:

```
cd /usr/lib/python3/dist-packages
```

Create symbolic links to the files in the NativeCAM folder:

```
sudo ln /usr/share/linuxcnc/gladevcp/NativeCAM/ncam.py -s
sudo ln /usr/share/linuxcnc/gladevcp/NativeCAM/ncam.glade -s
sudo ln /usr/share/linuxcnc/gladevcp/NativeCAM/pref_edit.py -s
```

6. Modify hal_pythonplugin.py file using a text editor, in example:

```
sudo gedit /usr/lib/python3/dist-packages/gladevcp/hal_pythonplugin.py
```

Add the line, in example, at the top:

```
from ncam import NCam
```

7. Note: skip this step. Goto step **8**
since in my pc the following file is not modified, so I don't know if it really needs to be modified.
We could keep this step for later, if something is not working.

Modify hal_python.xml in /usr/share/glade/catalogs (glade can be glade3 or glade 2)
Open a terminal and type:

```
sudo gedit /usr/share/glade/catalogs/hal_python.xml
```

Find (it is in the beginning):

```
<glade-widget-classes>
```

Add after:

```
<glade-widget-class name="Ncam" generic-name="ncam" title="ncam">
     <properties>
          <property id="size" query="False" default="1" visible="False"/>
          <property id="spacing" query="False" default="0" visible="False"/>
          <property id="homogeneous" query="False" default="0" visible="False"/>
     </properties>
</glade-widget-class>
```

Find:

```
<glade-widget-group name="python" title="HAL Python">
```

Add after:

```
<glade-widget-class-ref name="Ncam"/>
```

IMPORTANT NOTE : when linuxcnc updates, it recreates directories and if features do not load you will have to check and redo some steps.

8. Using NativeCAM embedded in LinuxCNC.
Add the following lines in your .ini file inside [DISPLAY] section and changing *username* as the yours. The .ini is in a place like:
/home/*username*/linuxcnc/configs/sim.axis/

```
[DISPLAY]
# required NativeCAM item :
NCAM_DIR = ncam

# required NativeCAM item :
PROGRAM_PREFIX = ncam/scripts/

# required NativeCAM item :
EMBED_TAB_NAME = NativeCAM
EMBED_TAB_COMMAND = gladevcp -x {XID} -U --catalog=mill
/usr/share/linuxcnc/gladevcp/NativeCAM/ncam.ui

.....

[RS274NGC]
PARAMETER_FILE = linuxcnc.var
SUBROUTINE_PATH = ncam/my-stuff:ncam/lib/mill:ncam/lib/utilities
```

Now when run LinuxCNC, a NativeCAM tab should be available.

9. Optional: If it is needed to run NativeCAM standalone from any place we need to add it to the command path.

```
cd /usr/bin/
sudo ln /usr/share/linuxcnc/aux_gladevcp/NativeCAM/ncam.py
sudo mv ncam.py ncam
```

Now, to run the application simply type `ncam`.

To verify the path from which ncam is run:
`which ncam`

It should return: /usr/bin/ncam

10. Last and optional step:
replace ncam.py and pref_edit.py files when and if there are new updated (and hopefully fixed) versions.

NOTE PER L'INSTALLAZIONE DI NativeCAM

Per visualizzare i percorsi di ricerca dei moduli da importare in un programma python:
(esempio: `from ncam import NCam`)
(in quale file viene stabilito il percorso?)

```
pi@raspberrypi:~ $ python3 -m site
sys.path = [
    '/home/pi',
    '/usr/lib/python37.zip',
    '/usr/lib/python3.7',
    '/usr/lib/python3.7/lib-dynload',
    '/usr/local/lib/python3.7/dist-packages',
    '/usr/lib/python3/dist-packages',
    '/usr/lib/python3/dist-packages/NativeCAM',
]
```

oppure da riga di comando python:
(pprint() fornisce una formattazione migliore dell'output)

```
pi@raspberrypi:~ $ python3
Python 3.7.3 (default, Mar 23 2024, 16:12:05)
[GCC 8.3.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import sys
>>> import pprint
>>> pprint.pprint(sys.path)
['',
 '/usr/lib/python37.zip',
 '/usr/lib/python3.7',
 '/usr/lib/python3.7/lib-dynload',
 '/usr/local/lib/python3.7/dist-packages',
 '/usr/lib/python3/dist-packages',
 '/usr/lib/python3/dist-packages/NativeCAM']
>>
```