Enhance-IT: Full Development & Debugging Log

Project Overview

Enhance-IT is a mini-project built to enhance low-resolution images using the **Real-ESRGAN** super-resolution model. It consists of two primary phases:

- **Phase 1: Manual Inference** using command line execution.
- **Phase 2: Web Interface** using Flask for easy user interaction.

Phase 1: Manual Real-ESRGAN Execution

1. Initial Setup

- Downloaded the **Real-ESRGAN** repository.
- Created a virtual environment using `python -m venv venv`.
- Activated the venv and installed core dependencies:

```
pip install -r requirements.txt
pip install numpy==1.23.5
```

2. Organizing Inputs

- Added `inputs/` folder and placed `test.jpg`.
- Ran the script manually:

```
python inference_realesrgan.py -i inputs/test.jpg -o results --suffix
out
```

3. Issues Faced & Fixes

Issue	Solution
`ModuleNotFoundError: realesrgan.version`	Adjusted file structure and ensured `__init__.py` included correctly.
Indentation Errors	Reformatted misplaced blocks in `inference_realesrgan.py`.
“slow_conv2d_cpu” not implemented for ‘Half’	Added `--tile 64` and `--fp32` flags to inference command.
`cv2` not found	Installed with `pip install opencv-python` inside the venv.
`Numpy is not available` / `_ARRAY_API not found`	Reinstalled with `pip install numpy==1.23.5 --force-reinstall`.
Compatibility with Torch and	Avoided NumPy > 1.24 for `basicsr` compatibility.

Issue	Solution
NumPy 2.x	

Phase 2: Web Interface via Flask

1. Folder Structure

```
Enhance-It/
├── Real-ESRGAN/
├── results/
├── uploads/
├── web-app/
│   ├── app.py
│   ├── templates/
│   │   └── index.html
├── requirements.txt
├── README.md
```

2. Flask Integration (`web-app/app.py`)

- Used `subprocess` to call `inference_realesrgan.py`.
- Key upload-to-result pipeline:

```
subprocess.run([
    sys.executable, '../Real-ESRGAN/inference_realesrgan.py',
    '-i', input_path,
    '-o', RESULT_FOLDER,
    '--suffix', 'out',
    '--tile', '64',
    '--fp32'
], capture_output=True, text=True)
```

3. Running the Web Server

```
cd Enhance-It/web-app
python app.py
```

4. Testing Workflow

- Uploaded image from the browser UI.
- File saved in `/uploads`.
- Output appears in `/results` folder.
- Served to user with correct image URL mapping.

5. Web Errors & Fixes

Issue	Fix
`No module named cv2`	Ensured it was installed inside venv.
`File not found: inference_realesrgan.py`	Corrected path to `../Real-ESRGAN/...`

Issue	Fix
	from `web-app`.
`IndentationError`	Cleaned up `app.py` using consistent spaces.
`404 - Result not found`	Ensured suffix and result filename match during template rendering.
`UnboundLocalError: output_tile`	Caused by model failing mid-inference, fixed using `--tile 64`.

Final Notes

- **Every time you restart:**

```
cd Enhance-It
.\venv\Scripts\activate
cd web-app
python app.py
```

- Ensure test images are JPG/PNG and not corrupted.
- Outputs go to `/results` with `_out` appended to name.

Next Steps

- Deploy online (Render/Heroku).
- Add drag-and-drop UI.
- Batch processing support.
- Include model selection dropdown (Anime, General, etc.).

Credits

- xinntao/Real-ESRGAN
- Flask Documentation

✅**Enhance-IT** is now fully functional and ready for real-world testing or publishing on GitHub!