Setup_Instruction

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1 Setting Up nbconvert for LaTeX PDF Conversion with MiKTeX on Windows

This guide explains how to set up Jupyter `nbconvert` to convert notebooks to PDF using LaTeX with MiKTeX on Windows. It covers Anaconda environments (recommended for PyCharm integration), standard Python virtual environments, and global Python environments, with installation options for the **current user only** using `AppData\Local` paths. It addresses common issues like PATH configuration, missing executables, and PyCharm SDK errors.

1.1 What is a User Account?

A **user account** in Windows is a unique profile identified by a username (e.g., the name you see when logging in). It controls where user-specific files and programs are stored, under `C:\Users\<UserAccount>`. The `<UserAccount>` placeholder in this guide represents your Windows username, found by running `whoami` in PowerShell (e.g., `computername\username`). Software can be installed: - **For all users**: In `C:\Program Files`, requiring admin rights, accessible to all accounts. - **For current user**: In `C:\Users\<UserAccount>\AppData\Local`, no admin rights needed, isolated to your account.

This guide uses current user installations to avoid permission issues and ensure isolation.

1.2 Prerequisites

- Windows 10 or later.
- Administrative access for installing MiKTeX (or user-only MiKTeX installation).
- Jupyter notebook file (e.g., `Data_Extraction.ipynb`) in `C:\Users\<UserAccount>\PyCharmMiscProject`.
- PyCharm Professional (for Jupyter support and **File > Export to PDF**).

1.3 Step 1: Install MiKTeX

1. **Download MiKTeX**:
   - Visit miktex.org/download.
   - Download the latest installer (e.g., MiKTeX 24.1).
2. **Install MiKTeX**:
   - Run the installer, selecting "Install for current user" to place it in `C:\Users\<UserAccount>\AppData\Local\Programs\MiKTeX`.
   - Enable "Install missing packages on-the-fly."
3. **Verify Installation**:

- Open PowerShell:
  `xelatex --version`
- Expected output: `MiKTeX-XeTeX 4.10` or similar.

4. **Add MiKTeX to PATH** (if not automatic):
   - Open Environment Variables (search "Environment Variables" in Windows).
   - Add `C:\Users\<UserAccount>\AppData\Local\Programs\MiKTeX\miktex\bin\x64` to user PATH.
   - Restart PowerShell and verify `xelatex --version`.

1.4 Step 2: Set Up Anaconda Environment (Recommended)

1. **Install Anaconda**:
   - Download the Anaconda installer from anaconda.com/download (64-bit, Python 3.11 or 3.12 recommended).
   - Run the installer:
     - Select "Install for current user" (installs to `C:\Users\<UserAccount>\AppData\Local\Anaconda3`).
     - Uncheck "Add Anaconda to PATH" (use Anaconda Prompt to avoid conflicts).
     - Check "Register Anaconda as my default Python."
   - Verify:

     ```
     & "C:\Users\<UserAccount>\AppData\Local\Anaconda3\Scripts\conda.exe" --version
     ```

     - Expected: `conda x.x.x`.
2. **Create an Anaconda Environment**:
   - Open Anaconda Prompt (from Start Menu).
   - Create an environment with Python 3.12:

     ```
     conda create -n pycharm_nbconvert python=3.12
     ```

   - Activate it:

     ```
     conda activate pycharm_nbconvert
     ```

3. **Install Jupyter, nbconvert, and notebook**:

   ```
   conda install jupyter nbconvert notebook
   ```

4. **Verify Installation**:

   ```
   python --version
   jupyter --version
   jupyter-nbconvert --version
   notebook --version
   ```

   - Expected: `Python 3.12.x`, version numbers for Jupyter packages.

5. **Test PDF Conversion in Terminal**:

   ```
   cd C:\Users\<UserAccount>\PyCharmMiscProject
   jupyter nbconvert --to pdf Data_Extraction.ipynb
   ```

- Output: `Data_Extraction.pdf` in `C:\Users\<UserAccount>\PyCharmMiscProject`.

1.5 Step 3: Set Up Standard Python Environment (Alternative)

1.5.1 Option A: Virtual Environment

1. **Install Python**:
   - Download Python 3.12 from python.org/downloads.
   - Run the installer:
     - Select "Install for current user" (installs to `C:\Users\<UserAccount>\AppData\Local\Programs\P`
     - Check "Add Python to PATH."
   - Verify:

     ```
     & "C:\Users\<UserAccount>\AppData\Local\Programs\Python\Python312\python.exe" --versi
     where.exe python
     ```

     - Expected: `Python 3.12.x`, path includes `C:\Users\<UserAccount>\AppData\Local\Programs\Py`
2. **Create a Virtual Environment**:

   ```
   cd C:\Users\<UserAccount>\PyCharmMiscProject
   & "C:\Users\<UserAccount>\AppData\Local\Programs\Python\Python312\python.exe" -m venv .ver
   ```
3. **Activate Virtual Environment**:

   ```
   .\.venv\Scripts\Activate.ps1
   ```
4. **Install Jupyter and nbconvert**:

   ```
   pip install --upgrade pip
   pip install jupyter nbconvert notebook
   ```
5. **Verify Installation**:

   ```
   jupyter --version
   jupyter-nbconvert --version
   notebook --version
   ```
6. **Test PDF Conversion in Terminal**:

   ```
   jupyter nbconvert --to pdf Data_Extraction.ipynb
   ```

1.5.2 Option B: Global Environment

1. **Install Jupyter and nbconvert**:

   ```
   & "C:\Users\<UserAccount>\AppData\Local\Programs\Python\Python312\python.exe" -m pip insta
   ```
2. **Verify Scripts Directory in PATH**:
   - Check PATH:

     ```
     $Env:Path
     ```

- Add `C:\Users\<UserAccount>\AppData\Local\Programs\Python\Python312\Scripts` if missing:
  - Open Environment Variables.
  - Edit user PATH.
  - Restart PowerShell.

3. **Handle Multiple Python Versions**:
   - If multiple versions exist, prioritize 3.12:
     - Reorder PATH to place `C:\Users\<UserAccount>\AppData\Local\Programs\Python\Python312` and `Scripts` first.
     - Uninstall unused versions via `Control Panel > Programs > Programs and Features`.
   - Verify:

     ```
     python --version
     ```

4. **Test PDF Conversion in Terminal**:

   ```
   cd C:\Users\<UserAccount>\PyCharmMiscProject
   jupyter nbconvert --to pdf Data_Extraction.ipynb
   ```

1.6 Step 4: Configure PyCharm for File > Export to PDF

1. **Set Up Anaconda Environment in PyCharm**:
   - Open PyCharm, go to `File > Settings > Project: PyCharmMiscProject > Python Interpreter`.
   - Click gear icon > `Add Interpreter` > `Conda Environment`.
   - Select `Existing environment` and browse to `C:\Users\<UserAccount>\AppData\Local\Anaconda3\e`
   - Apply and wait for indexing.
2. **Set Up Virtual Environment (Alternative)**:
   - Add `C:\Users\<UserAccount>\PyCharmMiscProject\.venv\Scripts\python.exe` as the interpreter.
3. **Verify Packages**:
   - In `Python Interpreter`, click `+`, search for `jupyter`, `nbconvert`, and `notebook`, and ensure they're installed.
4. **Test Export to PDF**:
   - Open `Data_Extraction.ipynb` in PyCharm.
   - Go to `File > Export to PDF`.
   - Check `C:\Users\<UserAccount>\PyCharmMiscProject` for `Data_Extraction.pdf`.

1.7 Step 5: Troubleshoot Common Issues

1. **"jupyter is not recognized"**:
   - Ensure the environment's `Scripts` directory is in PATH (e.g., `C:\Users\<UserAccount>\AppData\Local\Anaconda3\envs\pycharm_nbconvert\Scripts` or `C:\Users\<UserAccount>\AppData\Local\Programs\Python\Python312\Scripts`).
   - Check for `jupyter.exe`:
     `dir C:\Users\<UserAccount>\AppData\Local\Anaconda3\envs\pycharm_nbconvert\Scripts\jupy`

- Reinstall:
  `conda activate pycharm_nbconvert`
  `conda install jupyter nbconvert notebook`
- Or use full path:
  `C:\Users\<UserAccount>\AppData\Local\Anaconda3\envs\pycharm_nbconvert\Scripts\jupyter`

2. **PyCharm SDK Invalid**:
   - Delete and recreate the environment (Step 2 or 3).
   - In PyCharm, go to `File > Invalidate Caches / Restart`.
   - Update PyCharm to 2025.1.1 or later (`Help > Check for Updates`).
3. **LaTeX Compilation Errors**:
   - Check `C:\Users\<UserAccount>\PyCharmMiscProject\notebook.log` for errors.
   - Install missing packages via MiKTeX Console.
   - Simplify `Data_Extraction.ipynb`.
4. **PDF Not Generated**:
   - Run with verbose output:
     `jupyter nbconvert --to pdf Data_Extraction.ipynb --no-prompt`
   - Manually compile LaTeX:
     `cd C:\Users\<UserAccount>\PyCharmMiscProject`
     `xelatex notebook.tex`
   - Alternative: Convert to HTML:
     `jupyter nbconvert --to html Data_Extraction.ipynb`

1.8 Notes

- MiKTeX's `xelatex` is used by `nbconvert` for PDF conversion.
- Anaconda environments simplify package management and avoid PATH conflicts.
- Current user installations isolate software to `C:\Users\<UserAccount>\AppData\Local`, ideal for non-admin setups.
- Python 3.12 is recommended for compatibility with PyCharm and Jupyter.
- Keep MiKTeX updated via MiKTeX Console.

1.9 Example Command (Anaconda)

In Anaconda Prompt:

```
conda activate pycharm_nbconvert
cd C:\Users\<UserAccount>\PyCharmMiscProject
jupyter nbconvert --to pdf Data_Extraction.ipynb
```

1.10 Example Command (Virtual Environment)

In PowerShell:

```
.\venv\Scripts\Activate.ps1
cd C:\Users\<UserAccount>\PyCharmMiscProject
jupyter nbconvert --to pdf Data_Extraction.ipynb
```