

PopImageView

Another Image Viewer for Linux

By: Dr. Eric Oliver Flores Toro

Version: 1.0.0

Date: July 2025

e-mail: eoftoro@gmail.com

1. Introduction

Welcome to imageview, a lightweight and intuitive image viewer application designed specifically for Linux users. Built with C++ and the powerful Qt toolkit, imageview provides a smooth and efficient way to browse, view, and perform basic manipulations on your image collection.

imageview aims to offer a clean graphical user interface (GUI) with essential features for everyday image handling, without requiring elevated system permissions.

This application leverages the power and flexibility of the Qt framework to provide a robust and user-friendly image viewing experience on Linux.

Core Technologies:

- **C++:** The primary programming language.
- **Qt Toolkit:** For GUI development, cross-platform compatibility, and core functionalities (Widgets, Core, GUI, Multimedia, Concurrent, PrintSupport).

Qt Modules Used:

- **Qt Core:** Fundamental non-GUI classes (event loop, signals & slots, I/O, threading).
- **Qt GUI:** Base classes for graphical user interfaces (QImage, QPixmap, QPainter).
- **Qt Widgets:** Standard UI components (QMainWindow, QPushButton, QLabel, QListWidget).

- **Qt Multimedia:** For image reading/writing capabilities (QImageReader, QImageWriter, potentially QExifImageReader).
- **Qt Concurrent:** For asynchronous operations like thumbnail generation (QtConcurrent::run).
- **Qt PrintSupport:** For printing images to physical printers (QPrinter, QPrintDialog).

Other Libraries/Standards:

- **Standard C++ Library:** For general programming tasks.
- **XDG Base Directory Specification:** For configuration and cache management (via QStandardPaths).

Key Features:

- **File Management:** Open individual image files or entire directories.
- **Image Navigation:** Easily move between images within a directory.
- **Core Viewing:** Zoom in/out, fit to screen, and fullscreen display.
- **Image Transformation:** Rotate images (90° increments) and flip them horizontally or vertically.
- **Basic Filters:** Apply grayscale, sepia, or negative effects, with an option to revert to the normal image.
- **Clipboard Support:** Copy the current image to the clipboard or paste an image from the clipboard.
- **Image Export:** Save images to various formats (BMP, TIFF, PNG).
- **Print Support:** Print images to configured printers.
- **Image Gallery:** A convenient vertical gallery pane displays thumbnails of images in your current directory.
- **User Experience:** Dark Mode, customizable toolbars, context menus, resizable windows, and keyboard shortcuts.
- **Image Metadata:** View basic file system metadata for open images.

2. Installation

imageview is currently distributed as source code, allowing you to build it specifically for your Linux environment.

2.1. Building from Source

To install imageview from its source code, follow these steps:

1. **Prerequisites:** Ensure you have the Qt 5 development libraries installed on your system, along with a C++ compiler (like G++). You will specifically need `qtbase5-dev`, `qtmultimedia5-dev`, `libqt5concurrent5-dev`, and `qtprintsupport5-dev` (or their Qt 6 equivalents).

2. **Debian/Ubuntu:**

```
sudo apt update
sudo apt install qtbase5-dev qtmultimedia5-dev libqt5concurrent5-dev
libqt5printsupport5-dev build-essential
```

3. **Fedora:**

```
sudo dnf install qt5-qtbase-devel qt5-qtmultimedia-devel qt5-qtconcurrent-devel
qt5-qtprintsupport-devel gcc-c++
```

4. **Arch Linux:**

```
sudo pacman -S qt5-base qt5-multimedia qt5-concurrent qt5-printsupport
(Note: Package names might vary slightly depending on your exact distribution version.)
```

5. **Clone the Repository:** (Assuming you have git installed)

```
git clone <repository_url> # Replace with the actual repository URL if available
cd <cloned_directory>    # e.g., cd imageview
```

(If no repository URL, ensure you have extracted the source code to a directory, e.g., ~/Projects/imageview)

6. **Navigate to Project Directory:**

```
cd ~/Projects/c++/popimageview # Or wherever you placed the source files
```

Run qmake: This tool reads the project file (.pro) and generates a Makefile.

```
Qmake
```

7. **Run make:** This command compiles the source code into an executable application.

```
make
```

8. **Run the Application:** Once make completes without errors, your imageview executable will be created in the current directory (or within release/ or debug/ subdirectories).

```
./imageview
```

3. Getting Started

Upon launching imageview, you will see the main application window.

- **Main Window:** A large central area where images will be displayed.
- **Menu Bar:** Located at the top, providing access to all application features (File, Edit, View, Image, Help).
- **Toolbars:** Customizable icon-based shortcuts for common actions, located below the menu bar.
- **Image Gallery (Left Pane):** A vertical pane on the left side of the window. This pane will display thumbnails of all images found in the currently active directory.

By default, imageview will attempt to open images from your ~/Pictures directory. If this directory is empty or inaccessible, it will default to your home directory (~/).

4. How to Use: A Mini Tutorial

This tutorial will guide you through the core functionalities of imageview.

4.1. Opening Images

You can open images in a couple of ways:

Open a Single Image:

1. Click File in the menu bar, then select Open... (or use the shortcut Ctrl+O).
2. A file dialog will appear. Navigate to the image file you wish to open, select it, and click Open.
3. The selected image will be displayed in the main viewing area.

Open a Directory of Images:

1. Click File in the menu bar, then select Open Directory... (or use the shortcut Ctrl+Shift+O).
2. A directory selection dialog will appear. Navigate to the folder containing your images, select it, and click Open.

3. The image viewer will load the first image in that directory, and the left gallery pane will populate with thumbnails of all recognized image files in that directory.

4.2. Navigating Images

Once you've opened a directory:

- **Using Gallery:** Click on any thumbnail in the left gallery pane to instantly display that image in the main viewing area.
- **Using Menus/Shortcuts:**
 - To go to the **Next Image:** Click View -> Next Image (or use Ctrl+Right Arrow).
 - To go to the **Previous Image:** Click View -> Previous Image (or use Ctrl+Left Arrow).

4.3. Basic Viewing Operations

- **Zoom In/Out:**
- **Menu/Toolbar:** Click View -> Zoom In (Ctrl++) or Zoom Out (Ctrl+-). Corresponding toolbar buttons are also available.
- **Mouse Wheel:** Place your mouse cursor over the image viewer and hold Ctrl while scrolling your mouse wheel up (zoom in) or down (zoom out).
- **Fit to Screen:** Click View -> Fit to Screen (or Ctrl+F) to scale the image to perfectly fit the current window size.
- **Actual Size:** Click View -> Actual Size (or Ctrl+0) to display the image at its true 100% pixel size.
- **Fullscreen Mode:** Click View -> Fullscreen (or F11) to toggle the application between fullscreen and windowed modes. Press F11 again or Esc to exit fullscreen.
- **Panning (moving the image):** When an image is zoomed in (larger than the viewer), click and drag the image with your left mouse button to pan around.

4.4. Image Transformations

imageview allows for basic, non-destructive image transformations (they won't permanently alter your original file until you explicitly export).

- **Rotate:**
- Click Image -> Rotate Right (90°) (or Ctrl+R) to rotate the image 90 degrees clockwise.
- Click Image -> Rotate Left (-90°) (or Ctrl+L) to rotate the image 90 degrees counter-clockwise.
- **Flip:**
- Click Image -> Flip Horizontal (or Ctrl+H) to mirror the image along its vertical axis.
- Click Image -> Flip Vertical (or Ctrl+V) to mirror the image along its horizontal axis.
- **Applying Filters:**
- Click Image -> Filters and select one of the available options:
- Grayscale: Converts the image to black and white.
- Sepia: Applies a warm, brownish tone.
- Negative: Inverts the colors of the image.
- Normal: **Crucially, this filter will remove all previously applied filters and revert the image to its original state as loaded from disk.**

4.5. Undo and Redo

- imageview supports undoing and redoing most image transformation and filter operations.
- **Undo:** Click Edit -> Undo (or Ctrl+Z) to revert the last applied image operation.
- **Redo:** Click Edit -> Redo (or Ctrl+Y) to re-apply an operation that was previously undone.

4.6. Copy and Paste

- **Copy Image:** Click Edit -> Copy (or Ctrl+C) to copy the currently displayed image (including any transformations/filters) to your system clipboard. You can then paste it into other applications.
- **Paste Image:** Click Edit -> Paste (or Ctrl+V) to paste an image from your system clipboard into imageview. The pasted image will replace the current view, and the gallery will clear as it's not a disk file.

4.7. Exporting Images

To save the current image (with all its applied transformations and filters) to a new file or a different format:

1. Click File -> Export As... (or Ctrl+E).
2. A save file dialog will appear.
3. Choose a location, type a filename, and select your desired format from the "Save as type" dropdown (e.g., BMP, TIFF, PNG).
4. Click Save.

4.8. Printing Images

To send the current image to a physical printer:

1. Click File -> Print... (or Ctrl+P).
2. Your system's standard print dialog will appear. Configure your printer settings as needed.
3. Click Print to send the image to the printer.

5. Interface Elements Reference

5.1. Menu Bar

- **File:** Open..., Open Directory..., Export As..., Print..., Exit.
- **Edit:** Undo, Redo, Copy, Paste.
- **View:** Zoom In, Zoom Out, Fit to Screen, Actual Size, Fullscreen, Next Image, Previous Image, Dark Mode.
- **Image:** Rotate Right (90°), Rotate Left (-90°), Flip Horizontal, Flip Vertical, Filters (submenu: Grayscale, Sepia, Negative, Normal), Metadata.
- **Help:** About...

5.2. Toolbars

Quick access buttons for frequently used actions. Hover your mouse over an icon to see its tooltip.

5.3. Image Viewer Pane

The central, largest area where the currently selected image is displayed. Supports zooming and panning with the mouse.

5.4. Image Gallery Pane

The vertical pane on the left, displaying thumbnails of images in the current directory. Clicking a thumbnail loads that image into the viewer.

5.5. Context Menus

Right-click functionality on the image viewer or gallery might offer quick actions. (Currently, basic functionality, but can be expanded for future versions).

5.6. Keyboard Shortcuts

Many common actions have keyboard shortcuts for quick access (e.g., Ctrl+O for Open, Ctrl+Z for Undo, F11 for Fullscreen). These are listed next to the menu items.

6. Troubleshooting

- **"Menus don't work/are empty":**
- Ensure you have correctly followed all installation and compilation steps.
- Verify that your ImageApplication.h and ImageApplication.cpp files match the latest provided code exactly.
- Perform a `make clean` followed by `qmake` and `make`.
- **"Images don't load/gallery is empty":**
- Check the directory you selected in Open Directory... contains actual image files (JPG, PNG, BMP, TIFF, GIF).
- Verify paths are correct (e.g., ~/Pictures).
- Check the terminal output for any error messages during loading.
- **"Application crashes on filter/transformation":**
- Ensure your ImageViewerWidget.cpp is the latest version. Recent updates specifically addressed memory handling and filter application to prevent crashes.
- This might indicate a system-specific Qt version issue.

- **"Next/Previous Image doesn't work":**
- Ensure you opened a *directory* of images, not just a single file. Navigation is only possible within a loaded directory.
- Verify that ImageApplication.cpp matches the latest code that fixed navigation logic.
- **"Image Metadata shows limited info":**
- Currently, imageview primarily extracts basic file system metadata. Full EXIF data (from camera, etc.) support is planned for future enhancements, as it relies on a Qt module (QtMultimedia) that has caused version-specific issues during compilation setup.

If you encounter persistent issues, please re-verify all code files against the provided complete versions and perform a clean build.