ArchivePearl

User Manual

Version 1.5 beta

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Introduction: What is ArchivePearl?

Archive Pearl is a desktop application for Microsoft Windows designed to assist historians, archivists, and researchers in processing and analyzing historical documents. It integrates document viewing, text editing, and Artificial Intelligence (AI) capabilities via external APIs (OpenAI, Anthropic, Google) to facilitate tasks such as transcription, text correction, relevance analysis, metadata extraction, and content analysis. The software provides a structured environment for managing document images and their associated textual data through various processing stages. It also allows users to process many documents at once, in parallel, significantly speeding up the process.

The workflow typically begins with setting up the application, which involves installing the executable and configuring API keys within the settings interface. API keys from at least one supported provider are required to utilize the AI-driven features. These keys are stored locally on the user's machine in a configuration file. Users must obtain these keys directly from the respective AI service providers and manage their own accounts and billing associated with API usage.

Document import is handled through several methods accessible via the "File" menu or drag-and-drop functionality. Users can import PDF files, from which Archive Pearl extracts page images and any embedded text. Folders containing image files (JPG, JPEG, PNG) can also be imported directly. The program automatically converts large images to a standard width and optionally attempts AI-based orientation correction if enabled in settings. Alternatively, users can import folders containing paired image and text (.txt) files from programs like Transkribus.

The primary user interface consists of a resizable two-panel layout. The right panel displays the document image, offering zoom and pan capabilities for detailed inspection. The left panel serves as a text editor, displaying the currently selected version of the text associated with the image (e.g., Original_Text, Corrected_Text). A dropdown menu allows switching between available text versions for the current page or document. Navigation controls permit moving between pages/documents, while a separate set of controls (toggleable) facilitates navigation between multiple images associated with a single document entry, particularly relevant after document separation has been applied.

AI processing functions are accessed via the "Process" menu and operate based on user-configurable presets defined in the Settings window. By changing the prompts (ie. General and Specific Instructions) in the Settings Window, the user can alter the behaviour of each function. They can also create their own functions to suit their own needs.

Most functions can target the current page or all pages, with an option to skip pages where the target data field already contains content. Key AI functions include Handwritten Text Recognition (HTR), which generates Original_Text from an image; Correct Text, which refines an existing text version (e.g., Original_Text) against the image, saving the result as Corrected_Text; Format Text, which reformats text based on a preset; and Translate Text, which generates a translation saved to the Translation field.

Further analysis capabilities include extracting names and places and highlighting them in the text for easy correction. These can then be reviewed and standardized using the 'Edit Names & Places' collation tool, allowing users to fix errors in names and places across the entire document. An

'Identify Errors' function flags potentially incorrect words in a chosen text version, storing the results in the Errors field and enabling visual highlighting.

For structuring content, the 'Identify Document Separators' function uses AI to analyze text (based on a chosen preset like 'Letterbook' or 'Diary'; users can again create their own) and insert ***** markers at detected logical breaks, saving the result. Subsequently, 'Apply Document Separation' reorganizes the project data based on these markers, grouping consecutive pages into single document entries and associating multiple source image paths with each new entry.

A relevance analysis feature allows users to define criteria and use AI to classify documents, updating a Relevance field used for filtering and navigation.

User interaction remains central throughout the process. Text in any displayed version can be manually edited, with changes saved automatically on navigation or project save. Highlighting features allow visual identification of extracted names, places, potential errors, or differences between text versions directly in the editor. The separate Image Preprocessing Tool (Ctrl+I / Ctrl+Shift+I) provides manual controls for splitting, cropping, and straightening images before they are submitted for AI tasks. Text versions can be reverted, either discarding the current version for the preceding one on a single page or, irreversibly, removing all generated text versions across the entire project to return to the Original_Text.

Finally, Archive Pearl offers multiple export formats. Users can export the processed text as a single consolidated file or as individual text files per page/document. A searchable PDF export option embeds the selected text invisibly behind the document image. A highly configurable CSV export allows users to select metadata columns (defined by presets), choose the source text version, optionally generate metadata using AI, perform sequential date/place analysis, apply relevance filters, and structure the output for import into databases or analytical software. The exported CSV uses standardized column names, with the main text content placed in a column named Original_Text. This comprehensive feature set positions Archive Pearl as a tool for managing the workflow from raw historical documents to structured, analyzable data.

1.0 Requirements

This program is for Windows only and should ideally run on Windows 10 or later. It requires an internet connection and at least one API key from OpenAI, Anthropic, or Google (see section 3.0 below).

2.0 Installation

You can download the executable file for ArchivePearl (v 1.5 beta) from the GitHub repository or directly from [link provided by developer]. Once downloaded, create a directory for the program (e.g., C:\TranscriptionPearl) and move the TranscriptionPearl.exe file, along with the util directory and any associated files (.ico, etc.), into that directory. The program relies on the files within the util directory to function correctly.

As this program is open-source software, it may be read as a virus or potentially malicious program by Windows Defender or other antivirus software. If this happens, you can choose to add an exception and run the program anyway. Ensure the entire program directory, including the util folder, is allowed by your antivirus software.

3.0 API Key Setup

3.1 Introducing API Keys

API (Application Programming Interface) Keys are unique identifiers, similar to a combined username and password, that allow external applications like ArchivePearl to securely access services provided by AI companies (OpenAI, Anthropic, Google). When you request a transcription or other AI processing task, ArchivePearl sends your API key along with the request. The AI provider's server uses the key to identify your account and authorize the task. Your API keys are stored locally and securely on your computer within the application's settings file and are never transmitted except directly to the respective AI provider during processing requests.

3.2 Costs and Tokenization

Using the AI capabilities of ArchivePearl involves sending data to the AI providers' servers, and you will be billed by those companies for this usage. Billing is typically based on the number of "tokens" processed, both for the data you send (input tokens) and the data you receive back (output tokens).

A token is roughly equivalent to ¾ of an English word. Pricing varies significantly between providers and models. For text processing, input tokens are generally cheaper than output tokens, with rates potentially ranging from less than $1.00 to over $3.00 per million input tokens and higher rates for output tokens. Image processing costs also vary; for example, Gemini models might cost around $0.00025 per image, OpenAI's GPT-4o around $0.001275 per 1024x1024 tile (high detail), and Anthropic's Claude models potentially around $0.0045 per image. **These prices are estimates and subject to change. Users must consult the current pricing pages for OpenAI, Anthropic, and Google AI Studio before using ArchivePearl.**

When you use ArchivePearl:

HTR (Recognize Text): Sends the page image and a prompt (default ~160 tokens). The output tokens depend on the amount of text on the page.

Correct Text: Sends the page image, the existing transcription (e.g., Original_Text), and a prompt (default ~150 tokens). Input tokens include the prompt *plus* the tokens in the transcription being corrected. Output tokens depend on the length of the corrected text.

Other AI Functions (Format, Translate, Names/Places, Errors, Relevance, Metadata): Send the relevant source text (e.g., Corrected_Text) and a specific prompt. Some functions (like Auto-Rotate) send only the image and a prompt. The number of input/output tokens depends on the function, the source text length, and the prompt size defined in Settings.

You can estimate text token counts using tools like the OpenAI Tokenizer, though counts may differ slightly for Anthropic and Gemini models. Image costs depend on the provider's pricing structure (per image or per pixel/tile). You can manage costs by setting usage limits within your API provider accounts.

3.3 Obtaining API Keys

Obtaining an API key is generally straightforward, similar to signing up for web services. Numerous online tutorials provide detailed steps. Below is a general guide:

1. **Create an Account:** Sign up for an account on the platform of the AI provider (OpenAI Platform, Anthropic Console, Google AI Studio). Note that these developer accounts are often separate from consumer accounts (like ChatGPT or Claude chat).
2. **Navigate to API Keys:** Find the API Key management section (often under your profile settings or a dedicated "API Keys" menu).
3. **Create a New Key:** Generate a new key, giving it a descriptive name (e.g., "TranscriptionPearlKey").
4. **Copy and Store:** The platform will display the key *only once*. **Immediately copy the key and paste it into ArchivePearl's settings (see Section 5.2) AND save it securely in a local document (like a password manager or encrypted file). If you lose the key, you cannot retrieve it and must generate a new one.**
5. **Set Up Billing:** To activate the key for use, you usually need to add billing information (credit card) or purchase credits.
6. **Set Usage Limits (Recommended):** Configure spending limits within the provider's platform to prevent unexpected high costs.

3.3.1 OpenAI API Keys

Create an account on the OpenAI platform (platform.openai.com). Click your profile (top-right), select "View API keys". Click "+ Create new secret key", name it, and copy the generated key. Set up billing under "Billing" > "Payment methods".

3.3.2 Anthropic API Keys

Create an account on the Anthropic Console (console.anthropic.com). Click your profile (top-right), select "API Keys". Click "+ Create Key", name it, and copy the generated key. Set up billing under "Settings" > "Plans & Billing".

3.3.3 Gemini API Keys

Use Google AI Studio (aistudio.google.com). Log in with your Google account. Click "Get API key" on the left, then "Create API key". Select or create a Google Cloud project if prompted. Copy the generated key. Ensure billing is enabled for the associated Google Cloud project. *Note: Google's API access can be complex; ensure you are using the Generative Language API via AI Studio, not Vertex AI unless you specifically intend to.*

4.0 Interface

4.1 Main Window Layout

The ArchivePearl interface presents a main window optimized for comparing document images and their transcriptions side-by-side. It utilizes a PanedWindow, allowing flexible resizing of the two main panels:

> **Text Editor Panel (Left):** A standard text editing area with a white background and black text (default font Calibri, size 20). It supports common editing functions like cut, copy, paste, undo, redo, and find/replace. This panel displays the currently selected text version associated with the document page.

> **Image Viewer Panel (Right):** Displays the image of the current document page within a scrollable canvas. It allows detailed examination through zooming (Ctrl + Mouse Wheel) and panning (Click-and-drag Left Mouse Button). Vertical scrolling is done with the standard Mouse Wheel.

The vertical divider between the text and image panels can be dragged left or right to adjust their relative widths according to user preference or task requirements.

4.2 Top Bar Controls

Located at the very top of the main window, this bar contains essential navigation and status indicators:

> **Displayed Text Dropdown:** Shows the type of text currently loaded in the editor panel (e.g., "None", "Original_Text", "Corrected_Text", "Formatted_Text", "Translation", "Separated_Text"). Users can select a different available text version for the current page from this dropdown. The available options are dynamically updated based on which text versions actually exist for the page.

> **Document Number Label:** Displays the internal document number (relevant after document separation).

Main Page Navigation: Standard controls for moving between the primary items (usually pages or compiled documents) in the project:

- << (First Page/Document): Navigates to the first item. (Ctrl+Home)
- < (Previous Page/Document): Navigates to the previous item. (Ctrl+Left)
- Page Counter: Shows the current item number and the total count (e.g., "1 / 150").
  - (Next Page/Document): Navigates to the next item. (Ctrl+Right)
- >> (Last Page/Document): Navigates to the last item. (Ctrl+End)

4.3 Bottom Bar Controls

Positioned at the bottom of the window, this bar contains controls primarily related to relevance analysis and multi-image document navigation. These sections can be toggled for visibility using keyboard shortcuts (Alt+N) or automatically appear when relevant data exists.

Relevance Section (Left, Toggleable): Appears after running "Find Relevant Documents".

Relevance Label and Dropdown: Allows viewing and setting the relevance status ("Relevant", "Partially Relevant", "Irrelevant", "Uncertain") for the current page/document. Changes are saved automatically when navigating away.

Relevance Navigation Buttons (Previous, Next): Jump to the previous or next item marked as "Relevant" or "Partially Relevant" in the project.

Document Page Navigation (Right, Toggleable): Appears automatically when the current item consists of multiple associated images (e.g., after document separation).

- Document Page: Label
- Document Page Navigation Controls (<<, <, Counter (1 / 3), >, >>): Navigate between the different images *within* the currently selected main item. (Alt+Left, Alt+Right)

4.4 Menu Bar

Standard menus provide access to all program functions:

File: Project management (New, Open, Save, Save As), Importing (PDF, Images, Text+Images), Exporting (Text, CSV, PDF - via submenu), Settings, Exit.

Edit: Find and Replace, Undo/Redo, Cut/Copy/Paste, Image Rotation (Clockwise, Counter-clockwise, AI Auto-Rotate), Revert Text (Current/All Pages), Delete Current Image.

Process: AI processing functions (Recognize Text, Correct Text, Format Text, Translate Text, Get Names and Places, Identify Document Separators, Apply Document Separation, Find Errors). Includes the Processing Mode submenu (Current/All Pages, Skip Completed toggle).

Highlights: Toggles for highlighting Names, Places, Changes (between text versions), and identified Errors in the text editor.

Tools: Access to the Image Preprocessing Tool (Edit Current/All Images), Edit Names & Places collation tool, Find Relevant Documents tool.

5.0 Setup and Settings

5.1 Accessing Settings

Program settings are managed through a dedicated Settings window, accessible via the "Settings" command in the **File** menu. This window organizes configuration options into logical categories selected from a menu on the left side. Changes made in the settings window are applied when saved or automatically upon closing the window with the "Done" button.

5.2 API Settings

This section is crucial for enabling the AI features. Users must enter their API keys obtained from OpenAI, Anthropic, and/or Google AI Studio into the corresponding fields.

- **OpenAI API Key:** Enter your key from the OpenAI Platform.
- **Anthropic API Key:** Enter your key from the Anthropic Console.
- **Google API Key:** Enter your key from the Google AI Studio.

Important: Ensure keys are pasted exactly as provided, with no leading or trailing spaces or extra characters. These keys are stored locally in the settings.json file located in the application's data directory (typically C:\Users\[YourUsername]\AppData\Roaming\TranscriptionPearl\settings.json on Windows). **Do not share this file, as it contains your secret API keys.**

This section also includes a field for **Batch Size**, which controls how many pages are sent for processing concurrently during AI tasks (default is 50). Lowering this may be necessary if encountering API rate limits, while increasing it might speed up processing on powerful connections (use with caution regarding costs and limits).

5.3 Model Settings

This section allows configuration of AI models and general import behavior.

Available Models: A text box lists the AI models available for selection in various presets. Users can add or remove model names (e.g., gpt-4o, claude-3-5-sonnet-20240620, gemini-1.5-pro-latest). The models listed here populate the dropdown menus in the preset configuration sections. Ensure the model names match the exact identifiers used by the respective API providers.

Check Orientation on Import: A checkbox (default off) enables an experimental feature where the program attempts to automatically detect and correct the orientation of images using an AI call during the import process. This sends each imported image to the AI specified in the "Auto_Rotate" function preset.

5.4 Preset Management

ArchivePearl uses presets to configure the behavior of various AI functions. Each preset type has its own section in the Settings window, allowing users to create, modify, delete, and select presets. A preset typically includes:

Preset Name: A user-defined name (e.g., "Standard HTR", "Diary Formatting").

Model: Selects the AI model to use from the list defined in Model Settings.

Temperature: Controls the randomness/creativity of the AI's output (lower values like 0.1-0.3 are better for factual tasks like transcription/correction, higher values like 0.7 allow more variability).

General Instructions (System Prompt): High-level instructions defining the AI's role and overall task.

Specific Instructions (User Prompt): Detailed instructions for the specific task, often including placeholders like {text_to_process} (for the input text) or {query_text} (for user-provided criteria).

Validation Text: The exact text string the AI should begin its primary response with (e.g., "Transcription:", "Metadata:"). This is crucial for the program to extract the correct output.

Image Settings (Optional): Some presets allow configuring whether to use images, which image (current, previous, next), and how many context images.

The following preset types are available:

Metadata Presets: Configure the Metadata generation function used during CSV export. Defines the model, prompts, and importantly, the specific Metadata Headers (semicolon-separated) to extract (e.g., Author;Date;Place of Creation;Summary). The selected preset here is the default used for CSV export.

Sequential Metadata Presets: Configure the AI used for the sequential date/place analysis during CSV export. Defines the model, prompts, and Required Headers for the sequential analysis (e.g., Date;Place;Author).

Analysis Presets: Configure custom analysis tasks (currently primarily used internally for Relevance Analysis, but potentially expandable). Includes options for output format (Single file, Combined file, CSV) and CSV column headers if applicable.

Document Separation Presets: Configure the Identify Document Separators (Chunk Text) function. Defines how the AI identifies logical breaks (e.g., new letters, diary entries) within a page's text based on formatting and content cues.

Function Presets: Configure the core AI functions: HTR, Correct_Text, Identify_Errors, Get_Names_and_Places, Auto_Rotate, Translation. Allows customization of prompts, models, and image usage for these built-in tasks.

Format Presets: Configure the Format Text function. Defines how the AI should reformat a transcription for readability (e.g., removing line breaks, standardizing headers).

Users can create new presets, modify existing ones (including renaming), or delete presets they no longer need.

5.5 Saving, Loading, and Default Settings

The bottom of the Settings window provides buttons for managing settings configurations:

Load Settings: Loads settings from the settings.json file.

Save Settings: Saves the current configuration to the settings.json file.

Export Settings: Allows saving the current settings configuration to a .psf (Pearl Settings File) at a location of the user's choice. This allows backing up or sharing configurations.

Import Settings: Allows loading settings from a previously exported .psf file, overwriting current settings.

Restore Defaults: Resets all settings, including API keys and presets, to their original default values. Use with caution.

Done: Closes the settings window. Any changes made since the last save are automatically saved upon clicking "Done" or closing the window via the 'X' button.

6.0 Project Management

ArchivePearl organizes work into projects. A project consists of the document images, associated text files (Original, Corrected, Formatted, Translation, Separated), and a project file (.pbf) that stores metadata and relationships.

6.1 Creating New Projects

Select **File > New Project** (Ctrl+N). This action clears the current workspace. **Important:** Before clearing, ArchivePearl will prompt you to save any unsaved changes in the current project. Creating a new project essentially prepares the application for importing new files into a temporary workspace. The project isn't formally created on disk until you use "Save Project As".

6.2 Opening Projects

Select **File > Open Project** (Ctrl+O). Navigate to and select the *directory* containing a previously saved ArchivePearl project. The program will load the .pbf file from that directory, restore the image paths (resolving relative paths based on the project directory), load all associated text versions, and display the first page. It verifies the integrity of the project structure during loading.

6.3 Saving Projects

Save Project As: Use this command (**File > Save Project As**) when saving a new project for the first time or when wanting to save the current project under a different name or location. You will be prompted to choose a directory and provide a project name. ArchivePearl will create a new folder with that name, copy all current images into an images subfolder within it, and save the project state (including all text versions and settings) into a .pbf file (which is a CSV file) within the main project folder. Image paths within the .pbf file are stored relative to the project folder.

Save Project: Use this command (**File > Save Project** or Ctrl+S) to save changes to an already existing project. This overwrites the previous .pbf file and updates any modified images in the images subfolder. The program automatically saves the currently displayed text in the editor to the appropriate DataFrame column before executing the save.

7.0 Importing Files

ArchivePearl offers several ways to bring documents into the application, accessed primarily through the **File** menu or drag-and-drop.

7.1 Importing PDFs

Select **File > Import PDF...**. Choose a PDF file. The program extracts each page as an image and saves it sequentially in the project's (or temporary) images directory. If the PDF contains embedded text (from OCR or prior transcription), this text is automatically extracted and placed into the **Original_Text** field for each corresponding page. The Text_Toggle will be set to Original_Text for these pages.

7.2 Importing Images Only

Select **File > Import Images from Folder...**. Choose a folder containing image files (JPG, JPEG, PNG). The program copies all images from the selected folder into the project's (or temporary) images directory, renaming them sequentially (e.g., 0001_p001.jpg, 0002_p002.jpg). Associated text fields (Original_Text, etc.) are initialized as empty, and Text_Toggle is set to None. PNG files are automatically converted to JPG during this process.

7.3 Importing Text and Images

Select **File > Import Text and Images...**. Choose a folder containing *pairs* of image files (JPG, JPEG, PNG) and text files (.txt). The files must have matching base names (e.g., page01.jpg and page01.txt). The program copies the images (converting PNGs to JPG) and reads the content of the corresponding text files into the **Original_Text** field. Text_Toggle is set to Original_Text for pages with text, and None otherwise. Files are sorted naturally based on their filenames before processing.

7.4 Drag and Drop Import

You can drag image files (JPG, JPEG, PNG) or PDF files directly onto the main ArchivePearl window. The program will process them as if imported via the corresponding menu options (resizing, converting PNGs, extracting PDF text/images). Dropping folders is not directly supported for import; use the menu options instead.

7.5 Importing Transcriptions from Transkribus or Other Sources

You can import existing transcriptions (e.g., from Transkribus) for correction using ArchivePearl's AI tools.

Method 1 (Recommended): Export as PDF with Text. In your original transcription software (like Transkribus), export the project as a PDF file that includes the recognized text embedded within it. Then, import this PDF into ArchivePearl using **File > Import PDF...**. This automatically pairs the text with the images. Note that PDF creation can sometimes reduce image resolution; if correction results are poor, try Method 2.

Method 2 (Manual File Pairing):

1. Export *both* images and text files from your source software (e.g., Transkribus). Ensure the export settings create one image file and one corresponding text file per page, with matching base filenames (e.g., 0001_doc.jpg and 0001_doc.txt).
2. Create a new, empty folder on your computer.
3. Copy *all* the exported image files AND *all* the corresponding .txt files directly into this new folder (do not keep them in separate subfolders).
4. In ArchivePearl, select **File > Import Text and Images...** and choose the folder you just created. ArchivePearl will import the images and load the .txt file content into the Original_Text field.

7.6 Image Processing During Import

Regardless of the import method, ArchivePearl performs initial image processing:

- **Resizing:** Very large images are resized to a maximum width (default 2048px) while preserving aspect ratio to ensure efficient handling by AI models and the interface. Image quality is maintained using high-quality resampling (Lanczos).
- **Format Conversion:** PNG images are converted to JPG format for consistency within the project. Transparency is handled by adding a white background.
- **Orientation Correction (Optional):** If the "Check Orientation on Import" setting is enabled (Section 5.3), the program will attempt to automatically rotate images to their correct upright orientation using AI analysis after import.

8.0 AI Processing Functions

ArchivePearl leverages Large Language Models (LLMs) via APIs to perform various tasks on your documents. These functions are accessed through the **Process** menu.

8.1 Overview and Processing Modes

Most AI functions can operate on either the currently displayed page or all pages in the project. This is controlled by the **Processing Mode** submenu within the **Process** menu:

- **Current Page:** Applies the selected AI function only to the page currently visible in the interface.
- **All Pages:** Applies the selected AI function to all pages in the main_df (the main data table).

- **Skip Completed Pages (Checkbox):** When checked (default), "All Pages" operations will skip pages that already have content in the target field (e.g., skip pages with existing Corrected_Text when running "Correct Text"). Uncheck this to force reprocessing of all pages, regardless of existing content.

8.2 Text Source Selection

Several AI functions (Correct Text, Format Text, Translate Text, Identify Errors, Metadata generation, Relevance Analysis) require existing text as input. Before running these functions, ArchivePearl often prompts you to select the source text using the **Text Source Selection Window**.

- This window appears automatically when you trigger an applicable AI function.
- It presents a dropdown menu listing the text versions available for the *current* page (e.g., Original_Text, Corrected_Text).
- You select the desired source text (e.g., choose "Corrected_Text" to translate the corrected version).
- The window suggests a sensible default source based on the task (e.g., "Original_Text" for correction, "Corrected_Text" for translation).
- For the "Format Text" function, this window also includes a dropdown to select the desired **Format Preset**.
- Clicking "OK" proceeds with the AI task using the selected source (and preset, if applicable) for the chosen scope (Current Page or All Pages). Clicking "Cancel" aborts the operation.

8.3 Handwritten Text Recognition (HTR)

Menu: Process > Recognize Text

Shortcut: Ctrl+1 (Current), Ctrl+Shift+1 (All)

Function: Sends the page image to the selected AI model to generate an initial transcription.

Input: Page image.

Output: Text placed in the **Original_Text** field. Text_Toggle is set to Original_Text.

Configuration: Uses settings from the "HTR" preset under "Function Presets" in Settings.

8.4 Correct Text

Menu: Process > Correct Text

Shortcut: Ctrl+2 (Current), Ctrl+Shift+2 (All)

Function: Sends the page image *and* a selected source text (e.g., Original_Text) to the AI for correction and refinement based on the image content.

Input: Page image, selected Source Text (via Text Source Selection Window).

Output: Text placed in the **Corrected_Text** field. Text_Toggle is set to Corrected_Text.

Configuration: Uses settings from the "Correct_Text" preset under "Function Presets". The source text is inserted where {text_to_process} appears in the preset's Specific Instructions.

8.5 Format Text

Menu: Process > Format Text

Shortcut: Ctrl+5 (Current), Ctrl+Shift+5 (All)

Function: Sends a selected source text to the AI to be reformatted according to instructions defined in a Format Preset (e.g., remove line breaks, standardize headers).

Input: Selected Source Text and selected Format Preset (via Text Source Selection Window).

Output: Text placed in the **Formatted_Text** field. Text_Toggle is set to Formatted_Text.

Configuration: Uses the selected "Format Preset" from Settings. Source text replaces {text_to_process}.

8.6 Translate Text

Menu: Process > Translate Text

Shortcut: Ctrl+T (Current), Ctrl+Shift+T (All)

Function: Sends a selected source text to the AI for translation into English (default behavior, can be modified via prompts).

Input: Selected Source Text (via Text Source Selection Window).

Output: Text placed in the **Translation** field. Text_Toggle is set to Translation.

Configuration: Uses settings from the "Translation" preset under "Function Presets". Source text replaces {text_to_process}.

8.7 Get Names and Places

Menu: Process > Get Names and Places

Function: Sends the best available text for the page(s) to the AI to extract names of people and places.

Input: Best available text (Original, Corrected, etc., determined automatically).

Output: Semicolon-separated lists placed in the **People** and **Places** fields for each page. Does *not* change Text_Toggle. Enables highlighting options.

Configuration: Uses settings from the "Get_Names_and_Places" preset under "Function Presets".

8.8 Identify Document Separators (Chunk Text)

Menu: Process > Identify Document Separators

Shortcut: Ctrl+3 (Current), Ctrl+Shift+3 (All)

Function: Analyzes the selected source text (using line numbers added temporarily) to identify where logical document breaks occur (e.g., start of a new letter or diary entry) based on a selected "Document Separation Preset". Inserts ***** markers into the text before the identified lines.

Input: Selected Source Text and selected Document Separation Preset (via dedicated window).

Output: Text with ***** separators placed in the **Separated_Text** field. Text_Toggle is set to Separated_Text.

Configuration: Uses the selected "Document Separation Preset" from Settings.

8.9 Identify Errors

Menu: Process > Find Errors

Function: Sends the page image and selected source text to the AI to identify words or phrases where the transcription might be inaccurate (default: <90% confidence).

Input: Page image, selected Source Text (via Text Source Selection Window).

Output: Semicolon-separated list of potential errors placed in the **Errors** field. The **Errors_Source** field is updated to record which text version (Original_Text, Corrected_Text, etc.) was analyzed. Does *not* change Text_Toggle. Enables error highlighting.

Configuration: Uses settings from the "Identify_Errors" preset under "Function Presets". Source text replaces {text_to_process}.

8.10 Auto-Rotate Image Orientation

Menu: Edit > Auto-get Rotation (Current Page / All Pages)

Function: Sends the page image to the AI to determine its text orientation (standard, rotated 90 clockwise, etc.). If rotation is needed, the image file is automatically rotated and saved.

Input: Page image.

Output: Rotated image file (if necessary). No text fields are changed.

Configuration: Uses settings from the "Auto_Rotate" preset under "Function Presets".

8.11 Find Relevant Documents (Relevance Analysis)

Menu: Tools > Find Relevant Documents

Function: Analyzes documents based on user-provided criteria to determine their relevance (Relevant, Partially Relevant, Irrelevant, Uncertain).

Input: User-provided relevance criteria (via dedicated window), selected Source Text (via dedicated window). Can run on Current Page or All Pages.

Output: Updates the **Relevance** field for processed pages. Enables the Relevance section in the bottom bar.

Configuration: Uses settings from the "Relevance" preset under "Analysis Presets". Criteria text replaces {query_text}, source text replaces {text_to_process}.

8.12 Prompting Strategies

Effective use of ArchivePearl's AI functions relies on well-crafted prompts configured in the Settings window.

8.12.1 General and Specific Instructions

Each preset uses two main prompt components:

General Instructions (System Prompt): Sets the overall context, role, and core rules for the AI (e.g., "You are an expert historian transcribing documents accurately."). This prompt is sent first to establish the AI's persona and task constraints.

Specific Instructions (User Prompt): Provides the specific task details and the data to be processed. This often includes placeholders that the program automatically fills in.

8.12.2 Validation Text

LLMs can sometimes include conversational filler (e.g., "Sure, here is the transcription:") or provide step-by-step reasoning before the final answer. The **Validation Text** field in each preset tells ArchivePearl how to identify and extract the *actual* desired output.

- You must include an instruction in your prompt (usually at the end of the General Instructions) telling the AI to *start* its response with this exact Validation Text (e.g., In your response, write "Corrected Transcript:" followed by the corrected text.).
- Enter that same text (e.g., Corrected Transcript:) into the Validation Text field in the preset settings.
- ArchivePearl uses this text to confirm the AI performed the task and to isolate the main output, discarding any preceding text.

- Default validation texts include: Transcription:, Corrected Transcript:, Formatted Text:, Translation:, Errors:, Names:, Places:, Metadata:, Orientation:, Relevance:, Document Break Lines:.

8.12.3 Placeholders ({text_to_process}, {query_text})

Presets use placeholders in the Specific Instructions to insert dynamic content:

- {text_to_process}: This is where the program inserts the selected source text (e.g., the Original_Text for correction, the Corrected_Text for translation). **Essential for presets like Correct_Text, Format_Text, Translate_Text, Identify_Errors, Metadata, Relevance.**
- {query_text}: Used specifically in the Relevance Analysis preset. This is where the user-provided relevance criteria are inserted.

Experimenting with prompt wording, structure, and the order of instructions (especially in General Instructions) can significantly impact the quality and accuracy of the AI's output. Small changes can have large effects.

8.13 Managing AI Tasks (Batching and Progress)

When processing "All Pages", ArchivePearl sends requests in batches (default size 50, configurable in API Settings) to avoid overwhelming the API provider and to manage costs and potential timeouts.

- A **Progress Window** appears for most "All Pages" operations, showing a progress bar and the percentage complete.
- Multiple pages are processed concurrently using a thread pool for efficiency.
- If errors occur (e.g., API server issues, rate limits exceeded), they are logged (see util/error_logs.txt), and the program attempts to continue with other pages. An error summary is shown upon completion if any errors occurred.
- Large jobs may take several minutes. You can check the API provider's status page (links provided in the original manual, Section 7.0) if you suspect server-side issues.

9.0 Working with Text and Images

9.1 Navigating Pages

Use the main navigation controls in the top bar (<<, <, Counter, >, >>) or keyboard shortcuts (Ctrl+Home, Ctrl+Left, Ctrl+Right, Ctrl+End) to move between the primary items in your project (usually pages, but could be compiled documents after separation). When you navigate, the text currently in the editor is automatically saved to the corresponding field in the internal data table (main_df) based on the "Displayed Text" dropdown selection.

9.2 Document Page Navigation (Multi-Image Documents)

Some operations, particularly "Apply Document Separation," can result in a single logical document in the main navigation being associated with multiple original image files.

- When such an item is selected, the **Document Page Navigation** controls appear in the bottom-right corner of the interface.
- Use these controls (<<, <, Counter, >, >>) or keyboard shortcuts (Alt+Left, Alt+Right) to cycle through the different images associated with the *current* main document/item without changing the text displayed in the editor. This allows viewing all original source images for a compiled document.
- This section is hidden if the current main item only has one associated image.

9.3 Displaying Different Text Versions

The **Displayed Text** dropdown in the top bar controls which version of the text is shown in the editor panel for the current page/document.

- Available options dynamically populate based on existing data for the page (e.g., "Translation" only appears if translation text exists).
- Options include: "None", "Original_Text", "Corrected_Text", "Formatted_Text", "Translation", "Separated_Text".
- Selecting a different version from the dropdown saves the currently edited text (if any) and loads the selected version into the editor.
- The Text_Toggle value in the underlying data (main_df) is updated to remember the last displayed version for each page.
- You can also cycle through available text versions using Ctrl+Tab.

9.4 Editing Text

The left text panel functions as a standard text editor. You can directly type, delete, cut (Ctrl+X), copy (Ctrl+C), paste (Ctrl+V), undo (Ctrl+Z), and redo (Ctrl+Y). Changes are automatically saved to the corresponding DataFrame column when you navigate to another page, save the project, or close the application.

9.5 Finding and Replacing Text

Access the Find and Replace tool via **Edit > Find and Replace** or Ctrl+F/Ctrl+H.

- Enter search and replace terms.
- Toggle **Case Sensitive** matching.
- **Find:** Locates the first match after the current cursor position within the current page.
- **Find All:** Scans the *entire project* (across all pages) for the search term based on the **currently selected text version** (from the main window's "Displayed Text" dropdown). Matches are listed internally.
- **Navigation Buttons (|<<, <<, >>, >>|):** Appear after "Find All". Allow jumping between all found matches across different pages. The Match: X / Y counter updates accordingly.
- **Replace:** Replaces the currently highlighted match (or the next one if none is selected) on the current page with the replace term.

- **Replace All:** Replaces *all* occurrences of the search term across *all* pages within the **currently selected text version**. Use with caution, as this cannot be undone globally easily.

Matches found by "Find" or navigated to via the buttons are highlighted in yellow in the text editor.

9.6 Reverting Text Changes

You can revert text to a previous version using the **Edit** menu:

- **Revert Current Page (Ctrl+R):** Offers to discard the currently displayed text version (e.g., if viewing "Corrected_Text", it offers to discard it and view "Original_Text"). It clears the data for the current version and switches the display to the next available earlier version.
- **Revert All Pages (Ctrl+Shift+R):** Prompts for confirmation and then **permanently deletes all content** in the Corrected_Text, Formatted_Text, Translation, and Separated_Text fields for *all pages* in the project, effectively resetting all pages to only have Original_Text (if it exists). Text_Toggle for all pages is set accordingly. **This action cannot be undone.**

9.7 Rotating Images

You can rotate the currently displayed image in 90-degree increments using **Edit > Rotate Image Clockwise** (Ctrl+]) or **Edit > Rotate Image Counter-clockwise** (Ctrl+[). The image file itself is overwritten with the rotated version. AI-based rotation is available via **Edit > Auto-get Rotation**.

9.8 Deleting Images

Select **Edit > Delete Current Image** (Ctrl+D). After confirmation, this action:

1. Deletes the associated image file (and text file, if one exists) from the project's images directory.
2. Removes the corresponding row from the internal data table (main_df).
3. **Important:** Renumbers the Index and Page fields for all subsequent rows in the DataFrame and renames their corresponding image/text files sequentially to maintain project integrity.
4. Updates the display to show the next available page or clears the display if it was the last page.

This action cannot be undone.

10.0 Highlighting Features

ArchivePearl includes several highlighting features to aid analysis, accessible via the **Highlights** menu. These apply temporary visual tags to the text in the editor panel.

10.1 Toggling Highlights

The **Highlights** menu contains checkbuttons for different highlight types:

- **Highlight Names:** Toggles highlighting of names found in the People field. (Default tag: lightblue)

- **Highlight Places:** Toggles highlighting of places found in the Places field. (Default tag: wheat1)
- **Highlight Changes:** Toggles highlighting of differences between the currently viewed text version and the previous one (e.g., differences between Corrected_Text and Original_Text). (Default tag: lightgreen)
- **Highlight Errors:** Toggles highlighting of potential errors found in the Errors field. (Default tag: cyan)
- Checking or unchecking these options immediately applies or removes the corresponding highlights from the text currently displayed. Menu options are enabled only if the relevant data (e.g., People data for names) exists for the current page.

10.2 Highlighting Names and Places

When enabled, the program searches the currently displayed text for exact matches (case-insensitive) to the terms listed in the People and/or Places fields (which are populated by the "Get Names and Places" AI function). Matching terms are highlighted with their respective background colors. The matching accounts for multi-word names/places and attempts to handle hyphenated words split across lines.

10.3 Highlighting Changes (Diff View)

When enabled, this feature compares the currently displayed text version with the logically preceding version (e.g., Corrected_Text vs Original_Text, or Formatted_Text vs Corrected_Text). It uses an advanced difference algorithm (AdvancedDiffHighlighting) to identify and highlight specific words or short phrases that have been added, deleted, or modified, rather than just highlighting entire lines. This makes it easier to spot specific corrections or formatting changes. Whitespace-only changes are generally ignored.

10.4 Highlighting Errors

When enabled, the program highlights terms listed in the Errors field (populated by the "Identify Errors" AI function) within the currently displayed text. This only applies if the currently displayed text version matches the Errors_Source field (i.e., the version that was analyzed for errors), ensuring errors are highlighted in the correct context.

11.0 Names and Places Collation

This tool helps standardize variations in names and places extracted by the AI.

11.1 Initiating Collation

Select **Tools > Edit Names & Places**. This triggers a two-step process:

1. **AI Collation:** The program first automatically gathers all unique names from the People column and all unique places from the Places column across the *entire project*. It then sends these unique lists to an LLM (using the Collation job type internally, configured via AIFunctionsHandler) with instructions to group variations of the same entity and suggest a standard spelling.

2. **User Editing Window:** After the AI responds, a window appears displaying the AI's suggestions in two text boxes: one for names and one for places. The format is typically Standard Spelling = Variant1; Variant2; Variant3... on each line.

11.2 Editing Collated Lists

In the "Collate Names & Places" window, you can manually review and edit the AI's suggestions in both the Names and Places text boxes.

- Correct the proposed standard spellings (the part before =).
- Add or remove variants (the parts after =, separated by semicolons).
- Merge or split lines as needed.
- Ensure every original variant appears on the right side of *exactly one* equals sign.

11.3 Applying Replacements

Once satisfied with the edited lists:

- Click **Replace Names** to apply the name changes. The program parses the Names text box, creates a dictionary mapping standard names to their variants, and then performs a find-and-replace operation across *all pages* for the *currently active text version* (selected in the main window dropdown), replacing all found variants with the corresponding standard spelling.
- Click **Replace Places** to apply the place changes similarly, using the content of the Places text box.
- Click **Cancel** to close the window without applying any replacements.

A confirmation message indicates how many pages were affected by the replacements.

12.0 Document Separation Workflow

This workflow allows you to automatically identify logical document breaks (like new letters or diary entries) within your transcribed pages and then reorganize your project based on these breaks.

12.1 Identifying Separators (Chunk Text)

- Select the desired processing scope (**Process > Processing Mode > Current Page** or **All Pages**).
- Select **Process > Identify Document Separators**.
- In the "Select Document Type" window that appears:

  1. Choose a **Document Type** preset (e.g., "Letterbook", "Diary") that best matches your material. These presets contain prompts specifically designed to help the AI recognize the start of new documents based on typical formatting and content cues (dates, salutations, etc.).
  2. Select the **Text Source** (e.g., Corrected_Text) that the AI should analyze.
  3. Click **OK**.

- The program sends the selected text (formatted with temporary line numbers) to the AI.
- The AI returns the line numbers where it believes new documents begin.
- The program inserts a ***** separator marker *before* each identified line in the original text.
- The resulting text (original text plus ***** separators) is saved in the **Separated_Text** field for the processed pages. The Text_Toggle is automatically switched to Separated_Text.
- Review the Separated_Text to ensure the separators are placed correctly. You can manually edit the Separated_Text to add, remove, or move ***** markers as needed.

12.2 Applying Document Separation

- Once you are satisfied with the placement of ***** separators in the Separated_Text (or another chosen text version containing separators), select **Process > Apply Document Separation**.
- Confirm the action in the warning dialog (this action cannot be undone).
- The program performs the following:
    - It iterates through all pages, concatenating the text specified by the Text_Toggle (usually Separated_Text).
    - It splits this combined text wherever a ***** marker occurs.
    - It creates a *new* internal data structure (compiled_df temporarily, then replaces main_df) where each row represents one document (the text between separators).
    - The Text field of the new structure contains the combined text for that document.
    - The Image_Path field becomes a *list* containing the paths of all original images that contributed text to that document.
    - Metadata fields (like Author, Date, etc., if they exist) from the *first* original page contributing to the document are copied over.
    - The main navigation (<<, <, >, >>) now moves between these *compiled documents*.
    - The Document Page Navigation controls (bottom-right) become active, allowing you to view the multiple original images associated with the current compiled document.

After applying separation, the project structure changes significantly. Saving the project will save this new document-based structure.

13.0 Exporting Files

ArchivePearl provides several options for exporting your work, accessible via the **File** menu.

13.1 Export Menu Overview

Selecting **File > Export Text...** opens a submenu or dialog allowing you to choose the desired export format. **File > Export CSV...** directly opens the CSV Export Options window.

13.2 Exporting as a Single Text File

- **Menu:** File > Export Text... > Single Text File (Combined)
- **Shortcut:** Ctrl+E (May trigger this or the menu depending on context)
- **Function:** Combines the text content from *all* pages/documents into a single .txt file.

- **Process:** It uses the text version currently selected by the Text_Toggle for each page/document (i.e., the text visible if you scrolled through). Appropriate spacing (usually double newlines) is added between text from different original pages. Excessive blank lines are automatically removed.
- **Output:** A single .txt file saved to the location you choose.

13.3 Exporting as Separate Text Files

- **Menu:** File > Export Text... > Separate Text Files (One per page)
- **Function:** Creates an individual .txt file for each page/document in the project.
- **Process:** Prompts for a directory and a base filename. It then saves the text specified by Text_Toggle for each page/document into sequentially numbered files (e.g., basename_0001.txt, basename_0002.txt).
- **Output:** Multiple .txt files in the chosen directory.

13.4 Exporting as PDF with Searchable Text

- **Menu:** File > Export Text... > PDF with Images and Searchable Text
- **Function:** Creates a PDF document where each page displays the document image, overlaid with an invisible, searchable text layer.
- **Process:** Prompts for a save location. It iterates through each page/document, inserts the corresponding image (the *first* image if multiple are associated after separation), and adds the text specified by Text_Toggle as a hidden layer.
- **Output:** A single .pdf file.

13.5 Exporting as CSV (Metadata Export)

- **Menu:** File > Export CSV...

- **Function:** Exports metadata associated with each document (or page) into a Comma Separated Values (.csv) file, suitable for import into databases or spreadsheets. This is highly configurable via the CSV Export Options window.

- **13.5.1 CSV Export Options Window**
  This window appears when selecting "Export CSV..." and allows customization:

- **Page Filtering:**

  o Export All Pages: Exports a row for every item in the current project view.

  o Export Only Relevant/Partially Relevant Pages: Exports only rows marked as "Relevant" or "Partially Relevant" (requires Relevance Analysis to have been run). Disabled if no relevance data exists.

- **Text Source:** Selects which text version (Current Display, Original_Text, Corrected_Text, etc.) will be exported into the Original_Text column of the CSV. Current Display uses the text currently shown based on Text_Toggle for each row.

- **Metadata and Analysis:**

  - Generate/Include Metadata (Checkbox): If checked, allows configuration of metadata extraction and inclusion.

    - Metadata Preset (Dropdown): Selects the Metadata Preset (from Settings) defining which fields to extract/include and how. The + button opens Settings to the Metadata Presets tab.

    - Single Author (Checkbox & Entry): If checked, overrides any extracted Author field with the text entered here for all exported rows.

    - Citation (Entry): Text entered here will populate the Citation column for all exported rows.

  - Analyze Sequential Dates/Places (Checkbox): If checked, performs an additional AI step (using the selected Sequential Preset) to analyze dates and places based on the sequence of documents, potentially improving accuracy for diaries or letterbooks. Enabled only if Generate/Include Metadata is checked.

    - Sequential Preset (Dropdown): Selects the Sequential Metadata Preset (from Settings) to use for the analysis. The + button opens Settings to the Sequential Metadata Presets tab.

13.5.2 Relevance Filtering

As described above, allows exporting only items marked relevant.

13.5.3 Text Source Selection

As described above, determines which text version populates the main text column in the CSV (renamed to Original_Text in the output).

13.5.4 Metadata Generation Options

If Generate/Include Metadata is checked:

- The selected **Metadata Preset** determines *which* columns are included in the CSV (based on its Metadata Headers setting) and *how* metadata is potentially generated/extracted using AI if existing fields are empty.
- The AI generation uses the text specified by the **Text Source** selection.
- **Single Author** and **Citation** provide overrides or additions to the metadata columns.

13.5.5 Sequential Date/Place Analysis

If Analyze Sequential Dates/Places is checked:

- An additional AI step runs *after* initial metadata generation (if any).

- It uses the selected **Sequential Preset** to analyze the text (from the chosen **Text Source**) in sequence, leveraging context from the previous document to infer dates and places more accurately.
- This overwrites the Date and Creation_Place (and potentially Author or other fields defined in the preset's Required Headers) obtained from the standard metadata step.

13.5.6 CSV Output Structure

The final CSV file will contain columns determined by the selected Metadata Preset's headers, plus essential columns like Page and the main text column (always named Original_Text in the output CSV). The order of columns is generally Page, Author (if included), followed by other headers from the Metadata Preset, then Original_Text, and finally Citation (if provided).

14.0 Keyboard Shortcuts

Project Management

- Ctrl+N: Create new project
- Ctrl+O: Open existing project
- Ctrl+S: Save current project
- Ctrl+E: Export project (Opens Export menu)

Navigation

- Ctrl+Home: Go to first page/document
- Ctrl+Left: Go to previous page/document
- Ctrl+Right: Go to next page/document
- Ctrl+End: Go to last page/document
- Alt+Left: Go to previous image within the current document (Doc Page Nav)
- Alt+Right: Go to next image within the current document (Doc Page Nav)

Image Controls

- Ctrl+MouseWheel: Zoom image in/out
- MouseWheel: Scroll image up/down
- Left Mouse Button (hold): Pan image
- Ctrl+]: Rotate image clockwise 90 degrees
- Ctrl+[: Rotate image counter-clockwise 90 degrees

Text Editing

- Ctrl+Z: Undo
- Ctrl+Y: Redo
- Ctrl+X: Cut
- Ctrl+C: Copy
- Ctrl+V: Paste

- Ctrl+F or Ctrl+H: Find and replace
- Ctrl+R: Revert current page text version
- Ctrl+Shift+R: Revert all pages text versions
- Ctrl+Tab: Toggle through available text versions (Original, Corrected, etc.)

AI Processing

- Ctrl+1: Recognize Text (HTR) on current page
- Ctrl+Shift+1: Recognize Text (HTR) on all pages
- Ctrl+2: Correct Text on current page
- Ctrl+Shift+2: Correct Text on all pages
- Ctrl+T: Translate Text on current page
- Ctrl+Shift+T: Translate Text on all pages
- Ctrl+5: Format Text on current page
- Ctrl+Shift+5: Format Text on all pages
- Ctrl+3: Identify Document Separators on current page
- Ctrl+Shift+3: Identify Document Separators on all pages
- Ctrl+4: Apply Document Separation (Project-wide)

Other

- Ctrl+D: Delete current image/page
- Ctrl+I: Edit current image (Opens Image Preprocessing Tool)
- Ctrl+Shift+I: Edit all images (Opens Image Preprocessing Tool)
- Alt+N: Toggle visibility of bottom bar controls (Relevance, Doc Page Nav)

15.0 Image Preprocessing Tool

The Image Preprocessing Tool is a separate interface designed for preparing document images before AI processing. While modern LLMs handle varied image quality well, preprocessing steps like splitting multi-page spreads, cropping excessive margins or unwanted areas, and straightening skewed images can improve results and reduce processing costs.

15.1 Accessing the Tool

Access the tool via the main ArchivePearl window:

- **Tools > Edit Current Image** (Ctrl+I): Opens the tool with only the currently displayed image.
- **Tools > Edit All Images** (Ctrl+Shift+I): Opens the tool with all images currently loaded in the project.

The tool opens in a new window, hiding the main ArchivePearl window. Changes made in this tool are performed on temporary copies of the images. They are only permanently applied to the project if you explicitly save them before closing the tool.

15.2 Interface

The tool features:

- **Central Canvas:** A large area displaying the current image, supporting zoom (Ctrl+Mouse Wheel) and pan (Click-and-drag Left Mouse Button).
- **Menu Bar (Top):**
    - File: Save (Commit changes), Quit (Discard changes or Save & Quit).
    - Edit: Revert Current Image, Revert All Images.
    - View: Navigation commands (First, Back, Forward, Last).
    - Process: Image manipulation tools (Split Image, Split All, Crop Image, Auto Crop Active/All, Straighten by Line, Rotate Clockwise/Counter-Clockwise, Rotate by Angle, Rotate All).
- **Navigation Bar (Bottom):**
    - Batch Process (Checkbox): Enables streamlined processing for certain manual operations (see 15.7).
    - Rotation Buttons (↻, ↺): Quick 90-degree rotations.
    - Navigation Buttons (|<, <--, -->, >|): Move between images loaded in the tool.

Visual guides (red lines for splitting/cropping, blue line for straightening) appear on the canvas when tools are active.

15.3 Splitting Images (Vertical, Horizontal, Angled)

Useful for separating two-page spreads (like open books or ledgers) or distinct columns into individual images.

- **Activate:**
    - Process > Split Image (defaults to vertical).
    - Ctrl+V: Activate Vertical split tool.
    - Ctrl+H: Activate Horizontal split tool.
- **Operation:** A red guide line appears, following the mouse.
- **Vertical/Horizontal:** The line is fixed vertically or horizontally. Click on the image where you want the split to occur.
- **Angled:** Press [or] keys to rotate the red guide line by 1-degree increments. Click to split along the angled line.
- **Result:** The image is split into two new images (Left/Right for vertical/angled, Top/Bottom for horizontal). The original image is replaced by the first part (Left/Top), and the second part (Right/Bottom) is inserted immediately after it in the sequence. The tool updates internal numbering and subsequent image filenames upon saving.
- **Split All Images (Menu Option):** When Split All Images in the Process menu is checked, clicking to split automatically applies the *same relative split position* to all subsequent images in the tool until unchecked or the end is reached. Useful for consistently formatted materials like microfilm.
- **Batch Processing Checkbox:** When checked, clicking to split automatically advances to the *next* image in the sequence, keeping the split tool active with the same orientation/angle. This allows quickly splitting multiple images with different split points using minimal clicks.

- **Cancel:** Press Escape to deactivate the split tool without splitting.

15.4 Cropping Images (Manual)

Removes unwanted margins or focuses on specific areas.

- **Activate:** Process > Crop Image (Ctrl+Shift+C).
- **Operation:** The cursor changes to a crosshair. Click and drag to draw a red rectangular selection box over the desired area. Adjust the box by dragging its edges or corners.
- **Apply:**
    - If Batch Process is **unchecked**: Press Enter.
    - If Batch Process is **checked**: Release the mouse button after drawing the box.
- **Result:** The image is cropped to the selected area.
- **Batch Processing Checkbox:** When checked, applying the crop (by releasing the mouse) automatically advances to the next image with the crop tool still active.
- **Cancel:** Press Escape to deactivate the crop tool without cropping.

15.5 Straightening Images (Manual and by Angle)

Corrects skewed or tilted images.

- **Straighten by Line (Ctrl+L):**
    - Activate: Process > Straighten Image by Line.
    - Operation: Cursor becomes a crosshair. Click and drag to draw a blue line along an edge that *should* be perfectly horizontal or vertical (e.g., the top edge of the text block).
    - Result: The image is automatically rotated to make the drawn line align with the nearest axis (horizontal or vertical).
- **Rotate by Angle:**
    - Activate: Process > Rotate Image by Angle.
    - Operation: A dialog prompts for a specific rotation angle in degrees (positive for clockwise, negative for counter-clockwise).
    - Result: The image is rotated by the specified angle.
- **Quick 90-Degree Rotation:** Use the ↻ and ↺ buttons or Ctrl+] / Ctrl+[.

All rotation methods use high-quality resampling to maintain image clarity.

15.6 Auto-Cropping (Threshold-Based)

Automatically detects the main content area of a document and removes surrounding blank margins. This works best when the document content contrasts clearly with the background (e.g., dark text on light paper, microfilm scans).

- **Activate:**
    - Process > Auto Crop Active Image: Applies to the currently viewed image.
    - Process > Auto Crop All Images: Applies to all images loaded in the tool.
- **Operation:** A ThresholdAdjuster window appears, showing a preview.

- Adjust the Threshold slider (0-255) until the green contour accurately outlines the main document content.
- Adjust the Margin slider (0-100 pixels) to add padding around the detected content.
- Click Apply.
- **Result:** The image(s) are cropped based on the detected content boundaries plus the specified margin. If applying to all images, the same threshold and margin are used for every image.

15.7 Batch Processing Feature

The **Batch Process checkbox** in the bottom navigation bar streamlines applying *manual* operations (Splitting, Cropping, Straightening by Line) sequentially across multiple images.

- **Splitting:** When checked, clicking to split an image immediately advances to the next image, keeping the split tool active with the same orientation (vertical, horizontal, or angled).
- **Cropping:** When checked, releasing the mouse button after drawing the crop rectangle applies the crop *and* immediately advances to the next image with the crop tool active.
- **Straightening by Line:** When checked, completing the line draw (second click) applies the straightening *and* immediately advances to the next image with the straightening tool active.

This feature significantly reduces clicks needed for repetitive manual adjustments on a series of images. It does *not* apply the same *parameters* (like split position or crop box) automatically; it only advances the image and keeps the tool active. For applying the same *parameters*, use the "All Images" options in the Process menu (e.g., Split All Images, Auto Crop All Images).

15.8 Reverting Image Changes

- **Edit > Revert Current Image:** Undoes all modifications (splits, crops, rotations) made to the currently displayed image within this editing session, restoring it to the state it was in when the tool was opened.

- **Edit > Revert All Images:** Reverts *all* images loaded in the tool back to their original state.

- **15.9 Saving or Discarding Changes**

- **File > Save:** Commits all changes made in the tool. The modified images (including any newly created split images) are saved to a temporary pass_images directory. The tool then closes, and the main ArchivePearl application processes these saved images, updating the project's DataFrame and image files accordingly. This might involve re-indexing and renaming files.

- **File > Quit** or **Closing Window (X button):** Prompts the user:

  - Yes: Save changes (same as File > Save).

  - No: Discard all changes made in the tool. The temporary images are deleted, and the project remains unmodified. The tool closes.

    o   Cancel: Remain in the Image Preprocessing Tool.

15.10 Image Preprocessing Tool Keyboard Shortcuts

Splitting

- Ctrl+V: Activate vertical split tool
- Ctrl+H: Activate horizontal split tool
- [and]: Rotate cursor line (when splitting tool active)
- Escape: Cancel current split operation/deactivate tool

Cropping

- Ctrl+Shift+C: Activate crop tool
- Enter: Apply current crop selection (if Batch Process unchecked)
- Escape: Cancel current crop operation/deactivate tool

Rotation and Straightening

- Ctrl+L: Activate straighten by line tool
- Ctrl+]: Rotate image 90 degrees clockwise
- Ctrl+[: Rotate image 90 degrees counter-clockwise
- Escape: Cancel current straighten operation/deactivate tool

Navigation

- Left Arrow: Go to previous image
- Right Arrow: Go to next image
- Ctrl+Mouse Wheel: Zoom in/out
- Mouse Drag (Left Button): Pan image when zoomed

General

- Ctrl+S: Save changes (equivalent to File > Save)