USER MANUAL
OPTICAL CHARACTER RECOGNITION

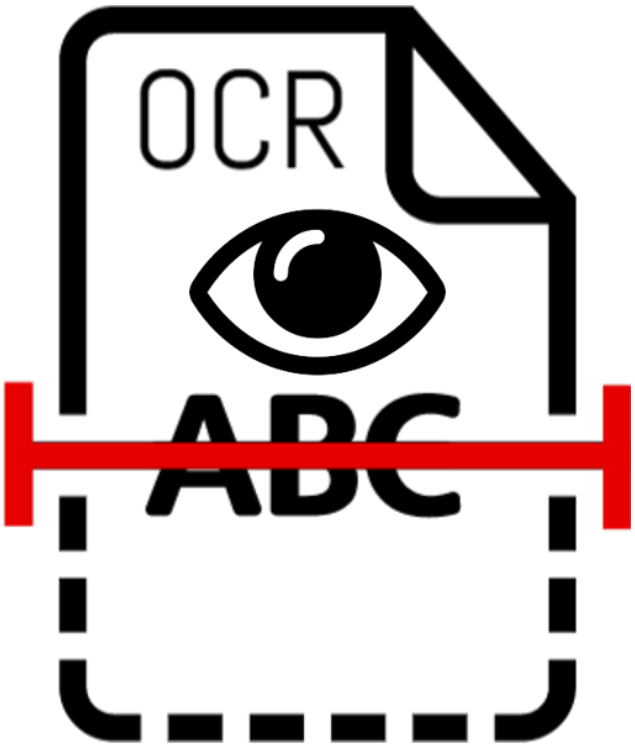

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Table of Contents:

Glossary ……...2
Optical Character Recognition ……3
Usage Scenario ……..3
Goals ……5
Features ……5
Installation ……5
System Requirements ……..5
Setup and Configuration ……..5
Uninstalling ……6
OCR Program Functions and Features ……6
Detailed Description of Image Preprocessing ……..…6
Detailed Description of OCR Functions ……6
Detailed Description of text postprocessing ……..7
Copyright ……...7
Error Messages ……....7
Index ……...7

Glossary of Terms:

Character Cropping - The compartmentalization of the image into smaller images, each the size of one character.

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Pixbuf - Object that stores image data to be processed. Used by GTK library.

Dictionary - Library full of C keywords. Used as a reference when comparing words in the recognized text.

File Type or File Format - Type of file that is being saved to the computer. The file type suffix (i.e. .doc, .bmp, .csv, etc) indicates the type of application that can open the file. Image file types include .bmp, .jpg, .tif, .gif, .pdf. Text file types include .csv, .xls, .txt, .rtf, .doc, .html.The file type suffix (i.e. .doc, .bmp, .csv, etc) indicates the type of application that can open the file. Image file types include .bmp, .jpg, .tif, .gif, .pdf. Text file types include .csv, .xls, .txt, .rtf, .doc, .html.

Image Cropping - The ability to cutout undesired parts of an image

JPEG File - Joint Photographic Experts Group file. A compressed image file. Must be converted to another file type which is not compressed in order to be edited.

Optical Character Recognition (OCR) - Program that allows for the conversion of a JPEG image into a PPM image. The program has features that will allow for the reading of text from the image and the editing of this text.

Text Editor - Interface which allows the user to edit the text that has been recognized.

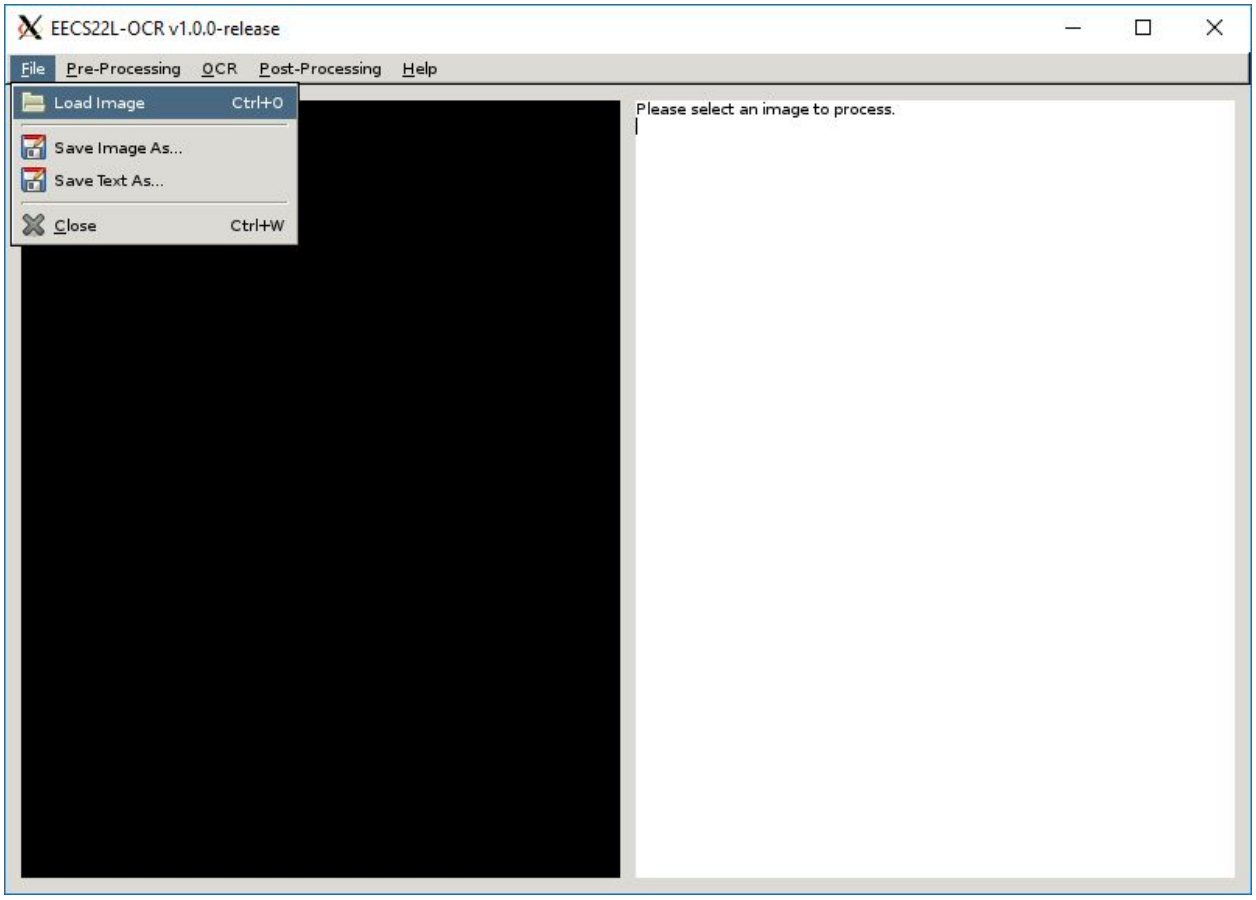
Stain/Wrinkle - Blotch of foreign material or fold on image that may cause readability issues.

Optical Character Recognition (OCR):

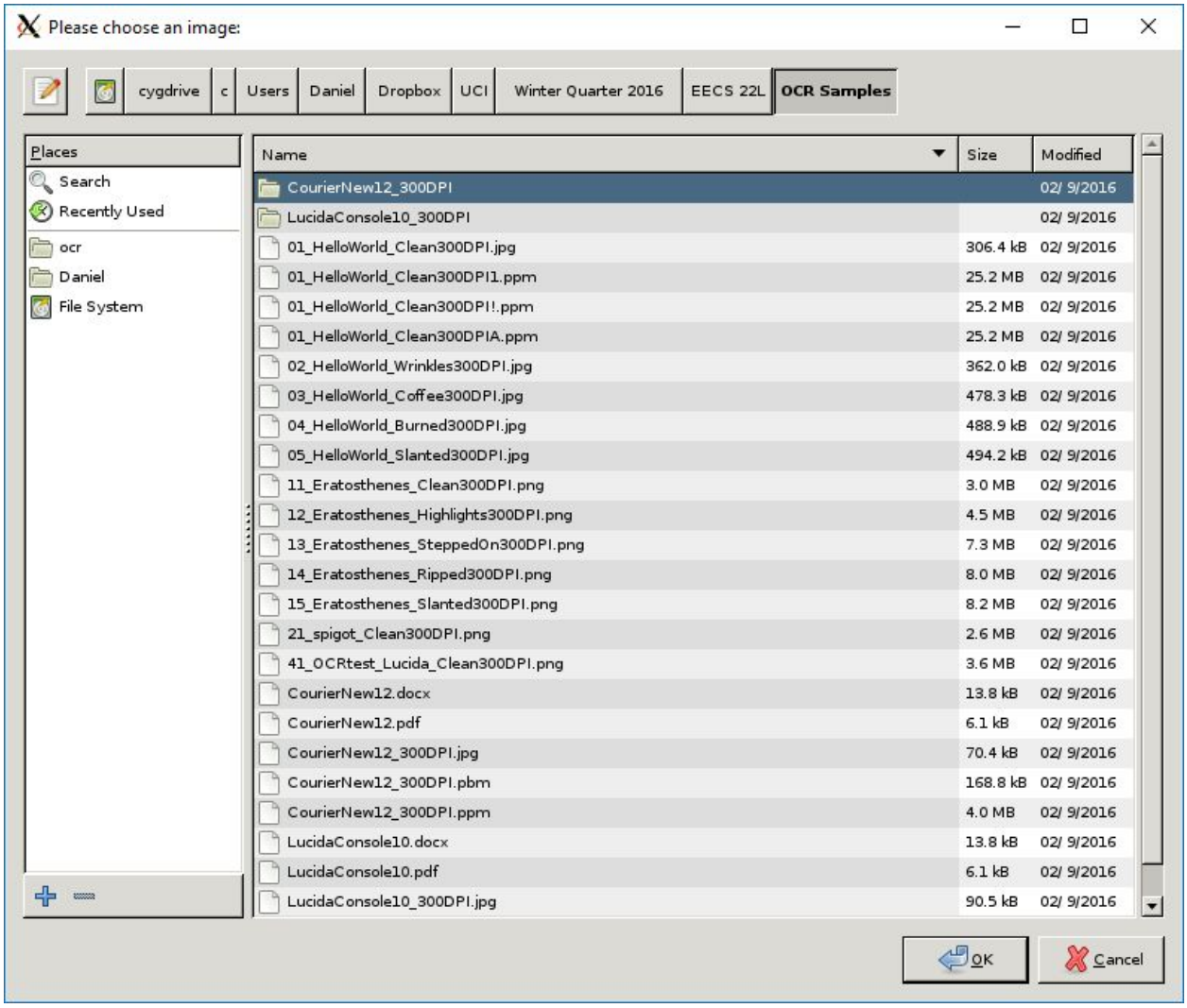
Usage Scenario:

Processing an image:

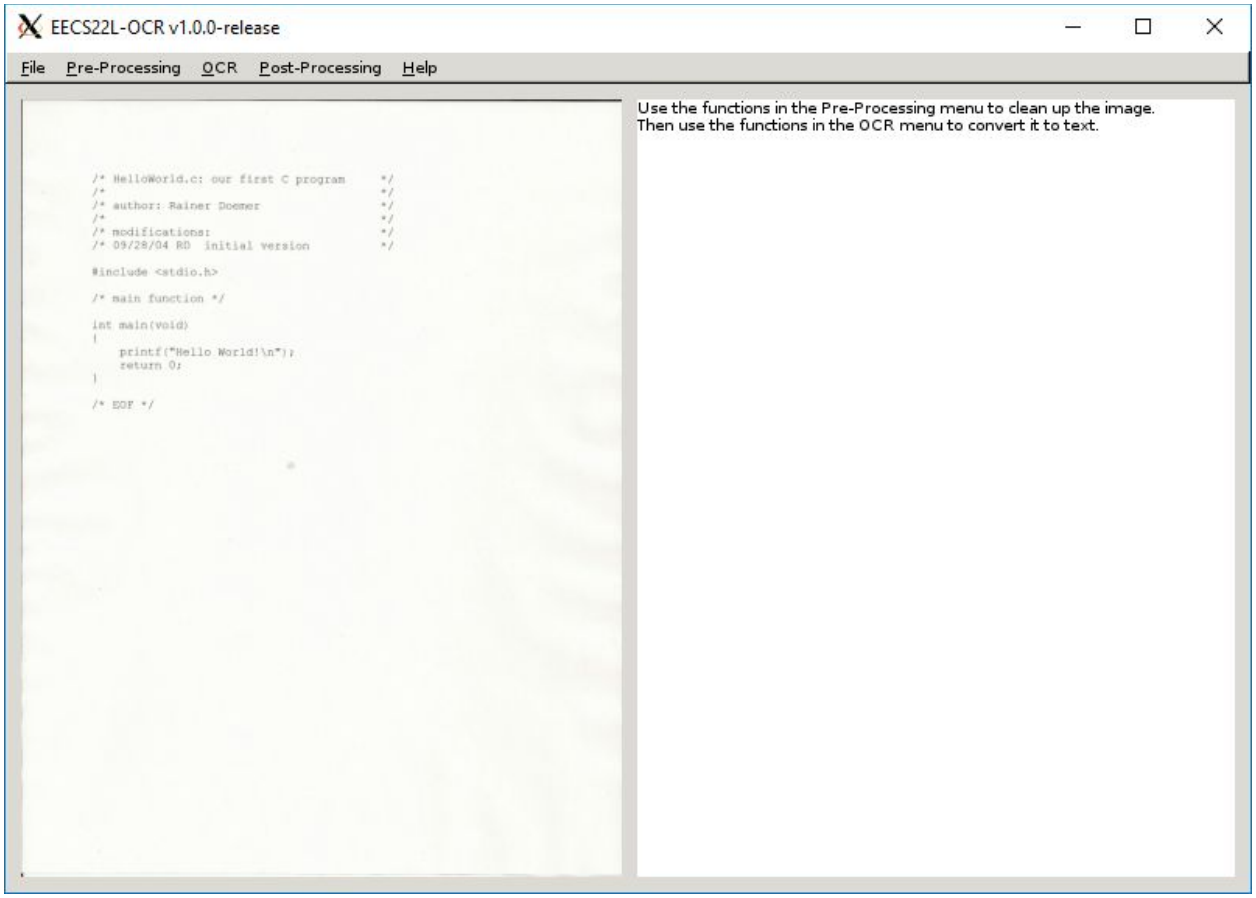
1) Run the executable file. The application window should pop up. Select “Load Image” from the File menu in the menu bar.



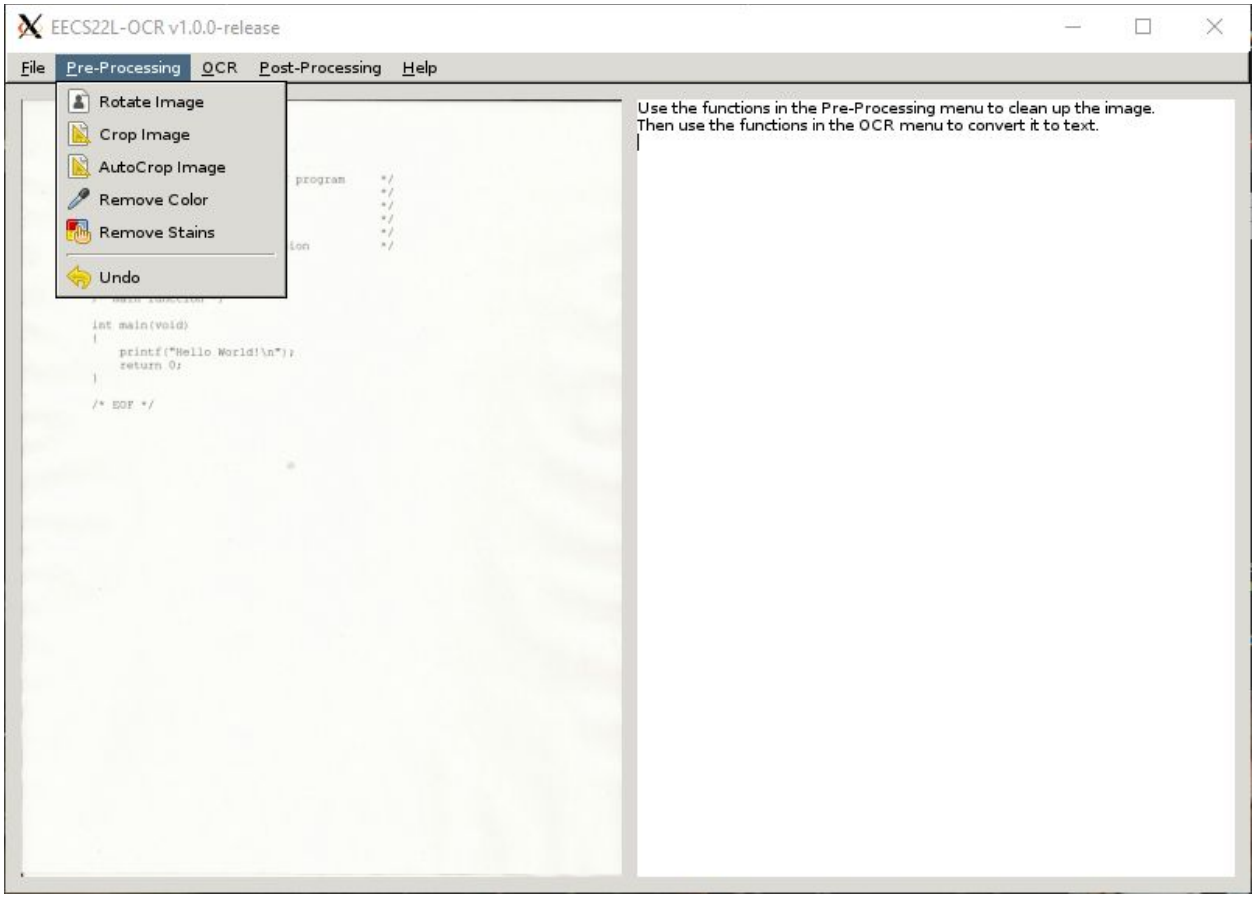
2) Select the image file to be processed and click “OK”.



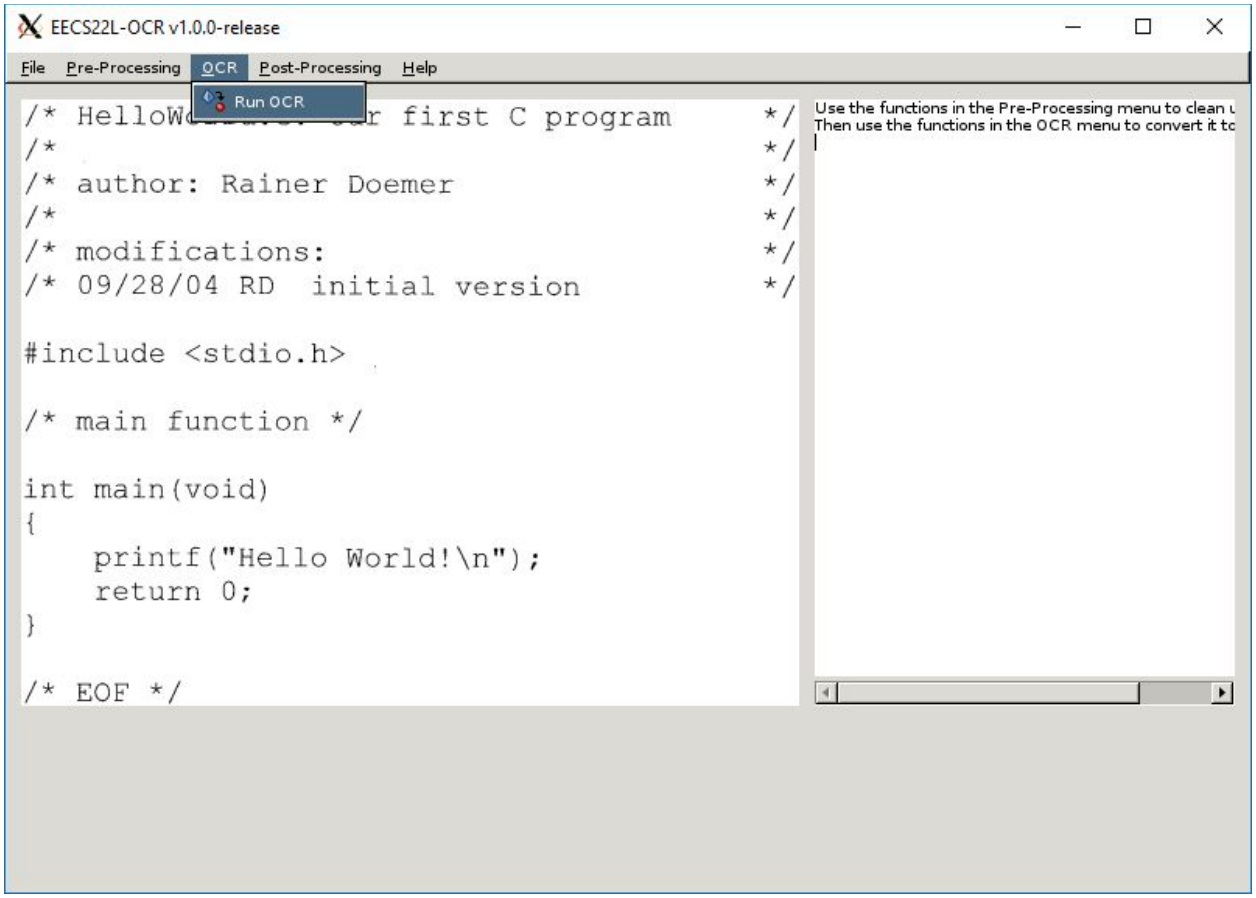
3) Click “OK” to load the image. The image will be located in the “Scanned Image” Window.



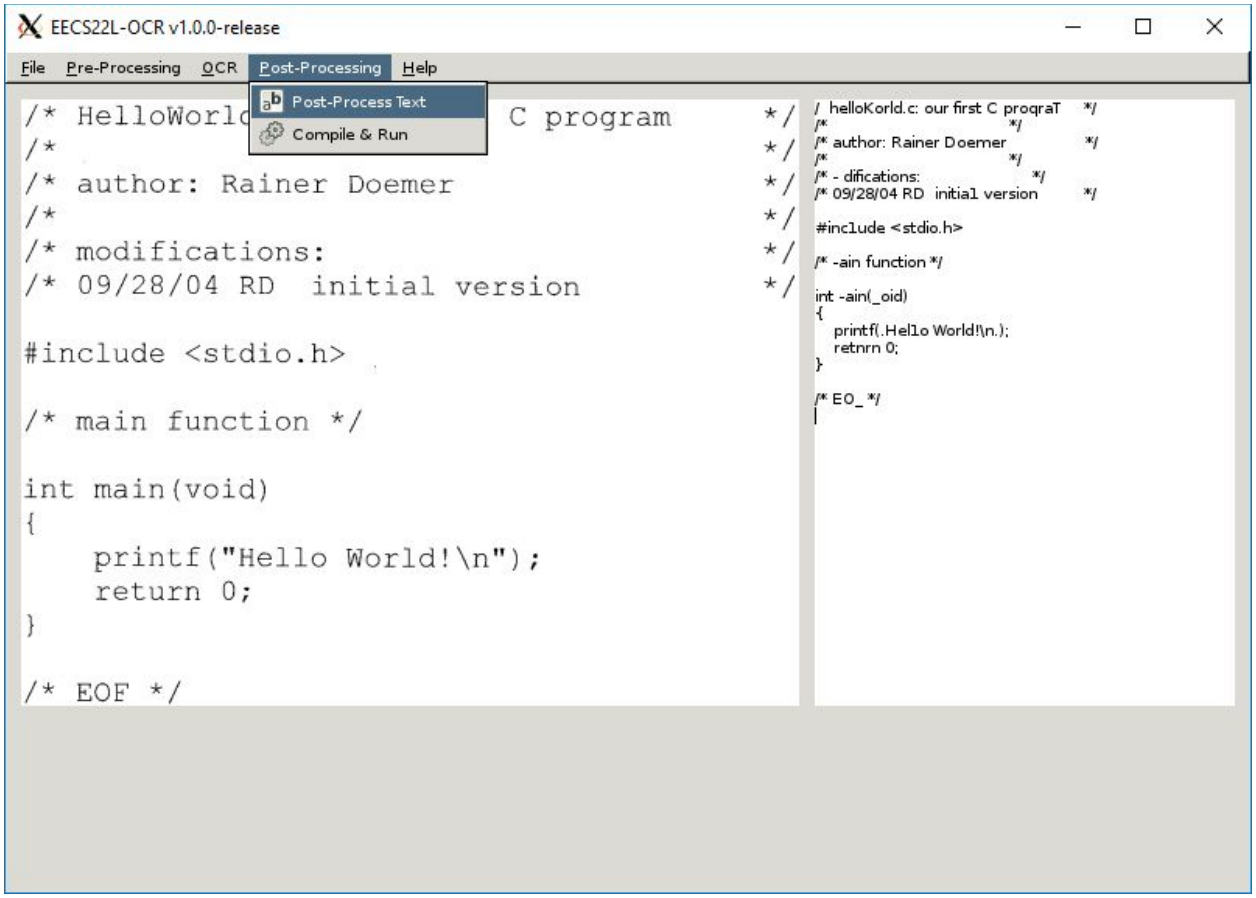
4) Use the tools in the Pre-Processing menu to clean up the image.



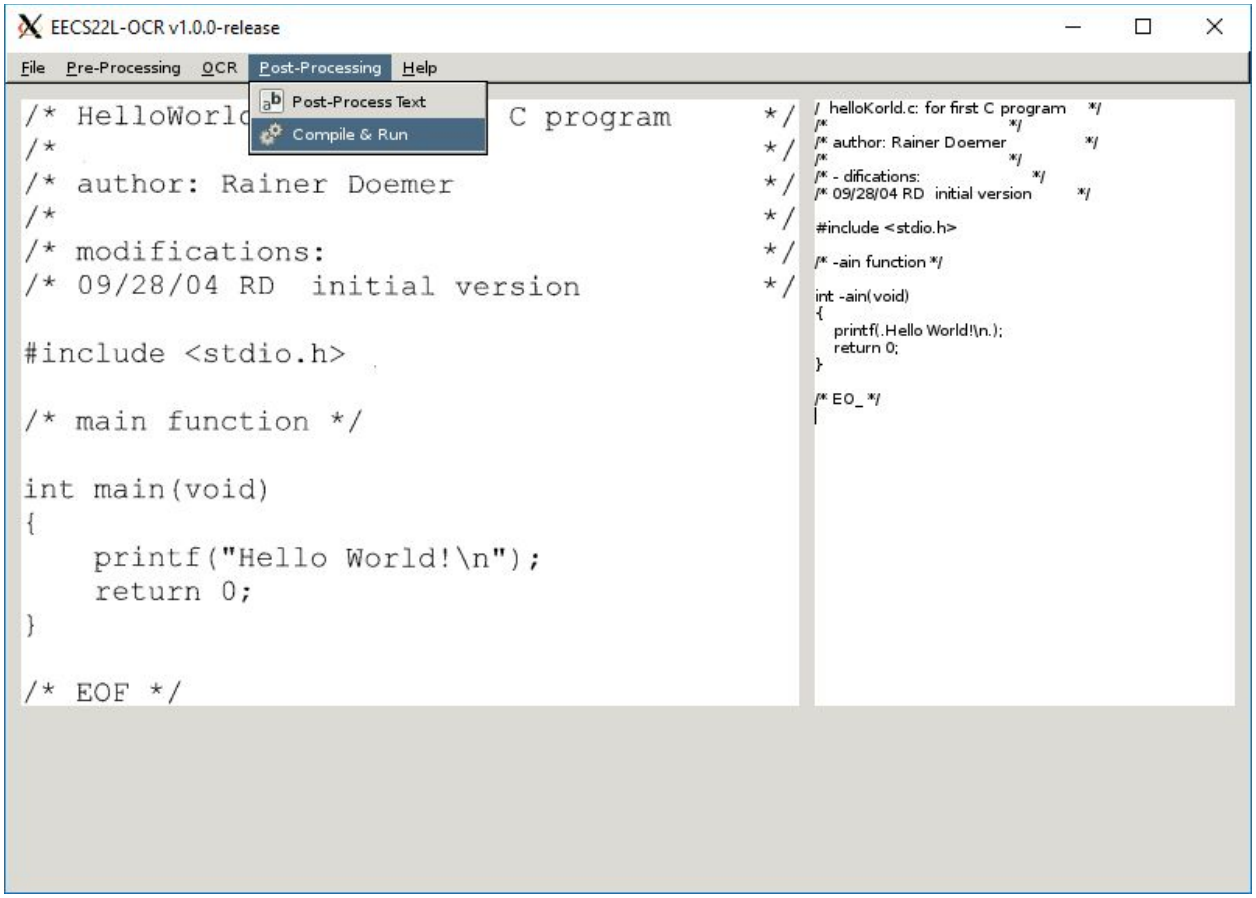
5) Click on “Run OCR” in the OCR menu to process the image. This may take some time to complete.



6) Click on “Post-Process Text in the Post-Processing menu to clean up the output text.



7) Make any further adjustments to the code manually in the text editor, then click on “Compile & Run” in the Post-Processing menu to build and run the code.



Error Messages:

Trying to perform editing operations without a loaded image will prompt the following error message: “Please load an image first!”.

Goals:

The goal of this software is to provide a means to recover C code from a damaged paper copy. Once a scan of the damaged hard copy is made, the user will have access to a variety of tools that will allow for the recovery of the C code from the copy. The user will also have the options to edit the text and compile and run the text.

Features:

- Graphical User Interface (GUI)
- Capability to load and display a scanned image
- Image Preprocessing : Stain/Wrinkle Removal, Black/White Conversion, Rotation, Cropping
- Character Cropping and Character Comparison
- Post Processing: Display of text, text editor, Dictionary for C keywords
- Capability to output processed text into a text file
- Can Compile and Run processed text as C++ code

Installation:

System Requirements:

- Linux-based OS
- x86-compatible processor
- Minimum 4 MB of free disk space
- Minimum 256 MB of RAM
- Monitor and keyboard

Setup and Configuration:

1. Open a terminal window
2. Use the command `cd` to navigate to the correct folder
3. Extract the source code from the archive with the command: `tar xzf OCR_V1.0.tar.gz`
4. Build the software with the `make` command.
5. To begin, run the `OCR` executable in the generated “bin” folder.

Uninstalling:

1. Open a terminal window
2. Use the command line to navigate to the “OCR_V1.0” folder
3. Delete the installation folder with the command: `rm -r OCR_V1.0`

OCR Program Functions and Features:

Graphical User Interface (GUI):

The GUI is the interface that will allow the user to interact with this program. It provides a means for the user to select the desired program features via keyboard or mouse input.

Loading Scanned Image and Text Output:

The program can load a scanned JPEG file and convert it to a Pixbuf file. This allows the loaded file to be edited. Once all the post processing of the image is complete, the image content can be written into a txt file.

Image Preprocessing:

There are four main components of the image preprocessing :

Black/White Conversion -
This will convert the entire image into black and white if colored.

Stain/Wrinkle Removal -
Removes undesirable stains and wrinkles for better readability.

Rotation -
This feature will give the user the ability to rotate an image by a desired number of degrees so that the text in the image is not slanted.

Cropping -
This allows the image to be cropped. That is, the user will able to cut out parts of the image that do not need to be read. I.E, the image read is a blank sheet of paper that has all of the text written in the bottom half. The

top half may simply be cropped. There is also a AutoCrop option that crops the image to the optimal cropping dimensions

Character Cropping and Character Comparison:

This feature will crop the image into multiple squares about the size of a charter. Each square will contain either whitespace or a single character inside. These images will then be referenced to other images in a library which will determine what character is contained in each image.

Image Postprocessing:

There are three main functions that encompass the image post processing.

Display -
Displays the text that has been scanned and processed for the user to view.

Text Editor -
This feature allows the user the edit the text that has been read, such as deleting text and typing text.

Dictionary Support -
This function scans through the text document and identifies characters that have been read incorrectly by matching the words in the text to words in the dictionary. If Identified, the character will be changed to the character that is referenced in the library.

Example of Dictionary Support : " fl0at GPA = 3.14;"
The OCR read the "o" in float as a zero instead. The dictionary support will compare "fl0at" to "float" and change the zero to an "o".

Copywrite:

Index:

Black/White Conversion # 2,11
Cropping # 2,12
Dictionary Support # 2, 12
Display # 7
GUI # 2,11
Installation # 10
Postprocessing # 12
Preprocessing # 11
Rotation # 11

Stain/Wrinkle Removal # 11
Text Editor # 3,12

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