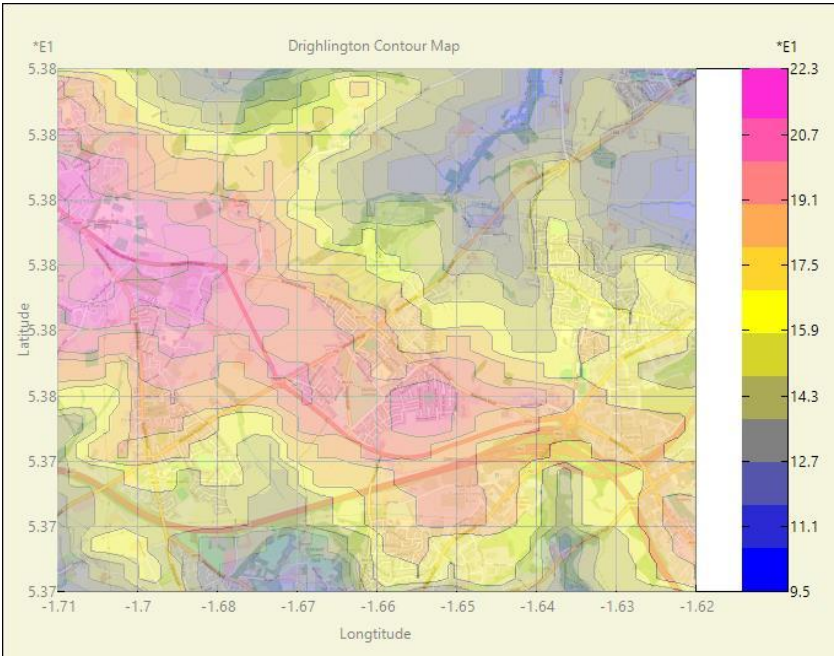
Contents

1 Introduction

This is a manual for the installation and use of the application ‘ImageFormer’. The program is a Windows application, for creating an image of elevation contours superimposed on a street map of an area. A typical output would be a .jpg file such as in the following figure:



2 Pre-requisites.

1. A PC running Windows 7 or above.

2. A USB stick or optical drive containing the program setup files, together with this manual (available online).

3. Access to and use of https://www.openstreetmap.org/ for creating a street map of an area, to be used as a background image on which to superimpose contours.

4. Access to and use of NASA's Shuttle Radar Topographic Mission (SRTM) data at https://srtm.csi.cgiar.org/srtmdata/. You will need to download a ESRI ASCII file of the region you are interested in. The application will then read this file to produce the contour map. It is wise to check that the text file contains 6 lines of header information, in a format, an example of which is:

   ncols 6000

   nrows 6000

   xllcorner -5

   yllcorner 50

   cellsize 0.00083333333333333

   NODATA_value -9999

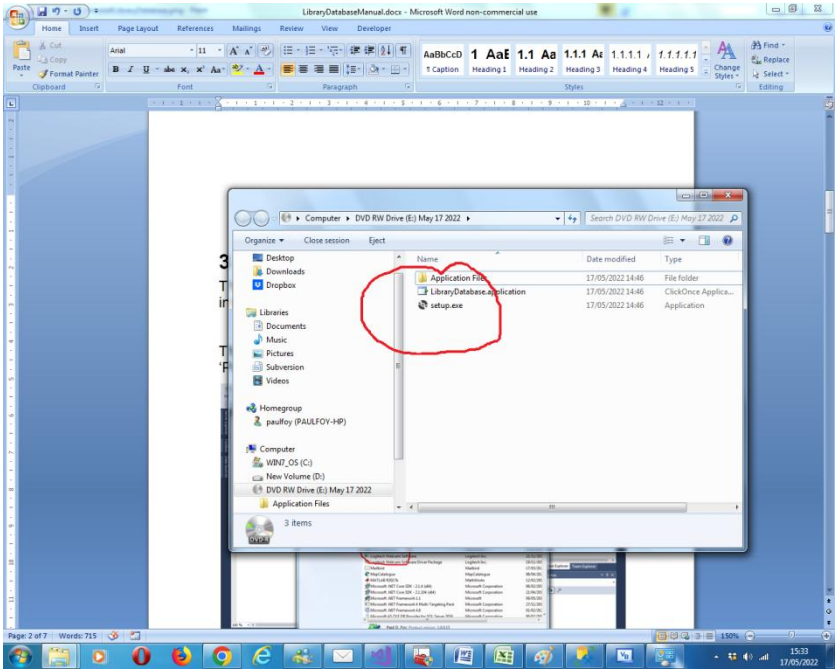
   You can work with either the 5- or 30-degree tile files.

   Here ncols is the number of column data items. nrows is the number of rows data items. Xllcorner is the longitude of the lower left corner. Yllcorner is the latitude of the lower left corner. Cell size is the arc distance between data points both longitudinally and latitudinally. NODATA_value

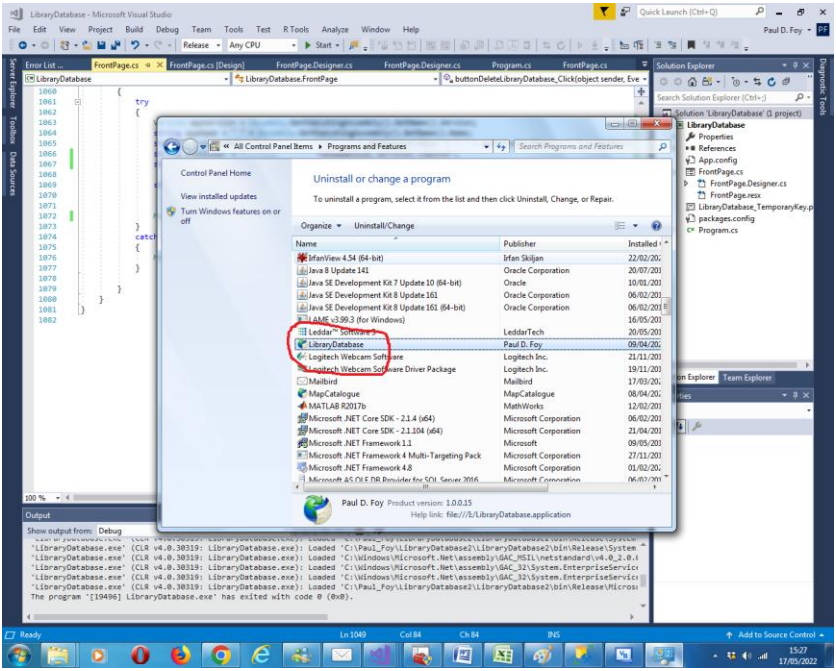
is the integer representing the fact that this point has no data associated with it. The application will now work if this format is not adhered to, so I do not recommend altering the SRTM file.

3 Installation/Removal

The program is installed by inserting the supplied stick or disc into the PC and running the ‘setup.exe’ program on it.



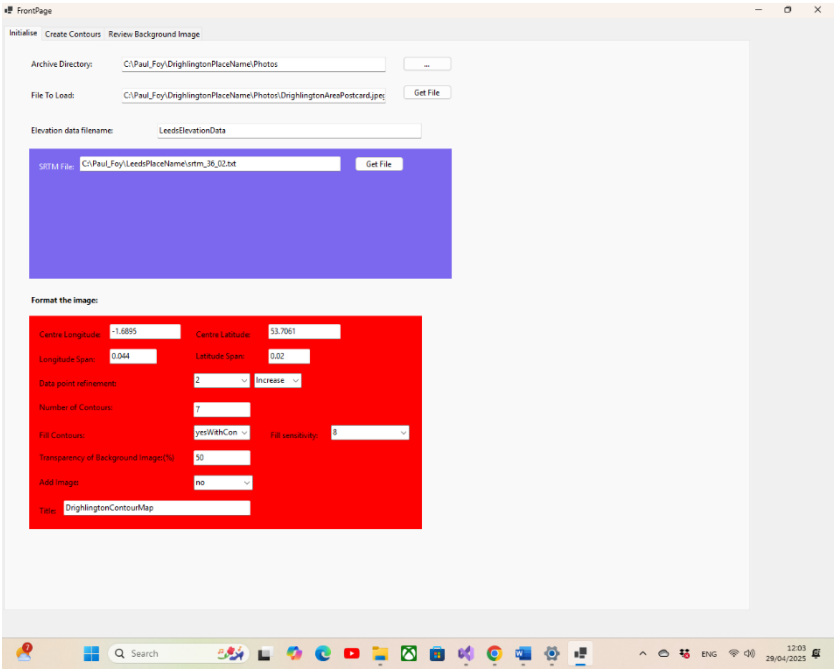
The program can be removed from the PC, by using the ‘Program & Features’ menu from within Control Panel.


LibraryDatabase - Microsoft Visual Studio
Uninstall or change a program
To uninstall a program, select it from the list and then click Uninstall, Change, or Repair.
Control Panel Home
View installed updates
Turn Windows features on or off
Organize
Uninstall/Change
Name
Publisher
LibraryDatabase
Paul D. Foy
Logitech Webcam Software
Logitech Webcam Software Driver Package
Paul D. Foy Product version: 1.0.0.15
Help link: file:///I:/LibraryDatabase.application
Solution Explorer
LibraryDatabase
Properties
References
App.config
FrontPage.cs
FrontPage.Designer.cs
FrontPage.resx
LibraryDatabase_TemporaryKey.p
packages.config
Program.cs
Output
Show output from: Debug
The program '[19496] LibraryDatabase.exe' has exited with code 0 (0x0).
Ready
Add to Source Control

4 Use

The application has 4 tabs:

4.1 Initialise



This tab initialises the names and directories and the settings for creating the image of contours.

Archive Directory: the directory where all files are loaded from or saved to.

File To Load: the file path of the background image on which to superimpose the contours and/or the contour shading.

Elevation Data Filename: the file name (without extension) for archiving the elevation data gathered. A filename with this

name plus the suffix ‘Parameters’ is used for storing the parameters used in gathering the matrix of elevation data points. *This option is not currently used*.

SRTM Data File: This panel contains the text file of the region of interest.

Format the image:

This panel contains the parameters for controlling the contours provided. All have default values except the **Centre Longitude** and **Centre Latitude** of the image which must be provided.

Longitude Span and **Latitude Span** are the differences between the central values and the extremities of the image to the West (longitude) or North (latitude). Defaults of 0.044 and 0.02 respectively.

Number of Contours is the number of contours to be employed (default 12)

Fill Contours describes the contour map and has 3 options: *yesWithContours* colours in the contours, leaving the contours in black; *yesWithoutContours* colours in but does not draw the contours; and *no* just draws contour lines.

Fill Sensitivity is an integer which controls the granularity with which contours are filled in if either of the fill options *yesWithContours* or *yesWithoutContours* is selected. The values permissible are 8, 16, 32, 64 and 128. The default is 8. Higher values significantly effect the time of processing.

Data point refinement. Higher values decrease the granularity of the image. A value of i increases the number of cells in the image by a factor of 2^i, by interpolating the raw data.

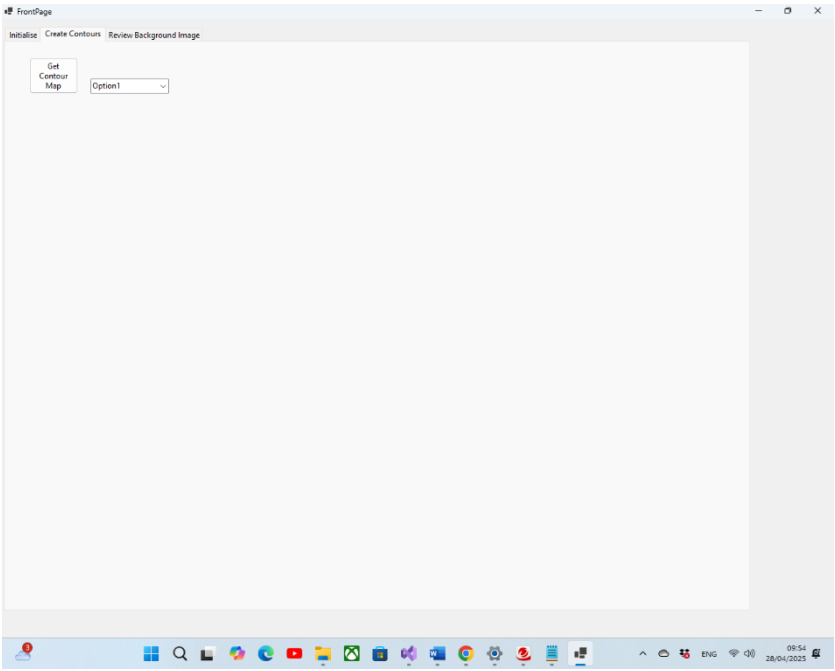
It is also possible to decrease the number of cells in the image, also by a factor of 2^i. This is useful well using the SRTM 30-degree tiles as otherwise the number of data points would make computation very slow.

Increasing or decreasing is selected by the adjacent combo box. The default is 0 – equally no refinement (no interpolation) of input data.

Transparency of Background Image (%) – this indicates how prominent is the background image from (0) not prominent at all to 100 (very prominent). The default of 50 is recommended as a good value.

Title: the title of the resulting image.

4.2 Create Contours



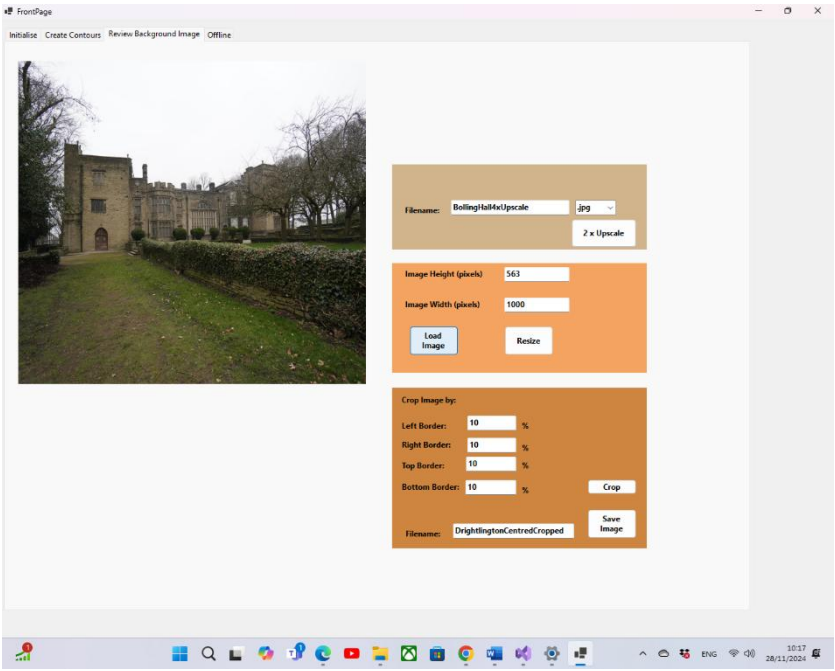
Use https://www.openstreetmap.org/ to select the area for the background image. It is recommended to use the following procedure: Use the marker feature on the right-hand panel to position the map so that the desired coordinates (the ones supplied in this application) are in the centre. Note these values. Then note the feature which is directly to the North and the one that is directly to the East respectively on the edge of the map. Then move the map so that these features are in the centre for each case. Note the coordinates again. Then the latitude and longitude spans are the difference in these two numbers respectively. Then you have the desired coordinate parameters for the map that is obtained by downloading using

the tool in the right-hand panel. Use this downloaded image as the background image.

The button **Get Contour Map** calculates the contours and displays them, together with the background image, on a new form as shown in the introduction. Please wait whilst this operation occurs - it will typically take a few seconds.

Two plot options are available, depending upon the publication requirements. Option 2 allows the image to be resized and either horizontal or vertical legends to be saved separately. Option 1 includes a scale on each axis. Both options permit the image to be saved in various dimensions.

4.3 Review Background Image



This tab allows you to do two things:

(1) (middle panel) to load the background image (button **Load Image**) and test how it looks when it is resized (button **Resize**) with a height and width (in pixels) provided in the upper right panel. The image loaded is the ‘File To Load’ textbox of the preceding section.

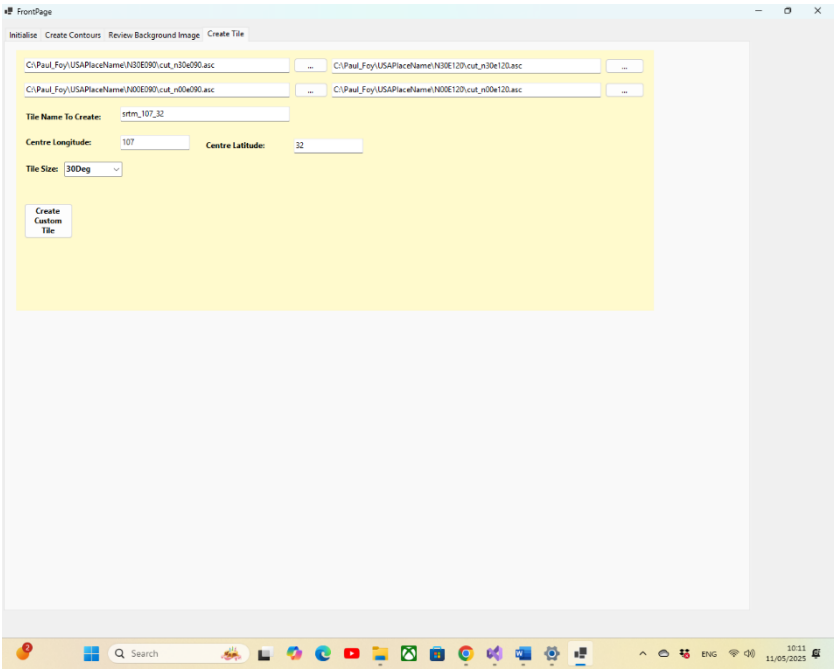
(bottom panel) You can also crop the image using the **Crop** button and save the cropped image to a filename of your supply (no file extension). The saved file goes in the archive directory. The crop is a border within the image the width of which is the **%** supplied with respect to all four edges. The cropped image is displayed with the pertaining size in the left pictureBox.

(2) (top panel) You can increase the resolution 2-fold in each direction by using the **2 x Upscale** button. The procedure works by working on the pixels of the raw image, from the initialise tab, by an interpolated insertion of more pixels. The image is saved with the name and filetype supplied. To increase the resolution another 2-fold simply repeat the procedure on the file produced (there is a limit to being able to do repeatedly caused by limitations on basic calls in the operating system).

I provide some advice on selected the file format: If you are using this software to obtain an image which is to be used in a Microsoft Word document then Word will accept many filetypes for the image. The integrity of the portrayal of the image in a subsequent printed document will depend upon the resolution of the image (that is the number of dots per inch on the hard copy). This is different from the number of pixels (width by height) of the image on a computer screen. The resolution is the *density* of these pixels and not their number in an image. It is recommended to save the image in this section as a raw bitmap file (.bmp) with the greatest pixel width and height that is practical. In this way no data is lost by converting the image to one of the compressed file formats (such as .jpg). This will tend to increase the resolution of the image in a subsequent printed document.

For high quality images use a fill sensitivity of 64 or greater.

4.4 Create Tile



When using the SRTM tiles it is sometimes difficult to home in on the region of interest because it is too near to the boundary of the tile. This tab permits you to create a bespoke tile (either a 5 degree or 30 degree one) in 3 different ways:

4.4.1 Using 4 reference tiles

This option uses four mutually adjacent original SRTM tiles. A proposed new tile, within the 4 reference tiles, is shown in blue in Figure 1.

The upper four textboxes contain the four reference tiles. The **Tile Name To Create** textbox is the provided name of the resulting text file. The **Centre Longitude** and **Centre Latitude**

textboxes contain the proposed centre of the new tile. The **Tile Size** combo box selected either a 30- or 5-degree tile to create.

The button **Create Custom Tile** creates the tile. Note: for a 5-degree tile this will take a minute or so, but for a 30-degree tile several hours – a message of completion will be produced at the end.

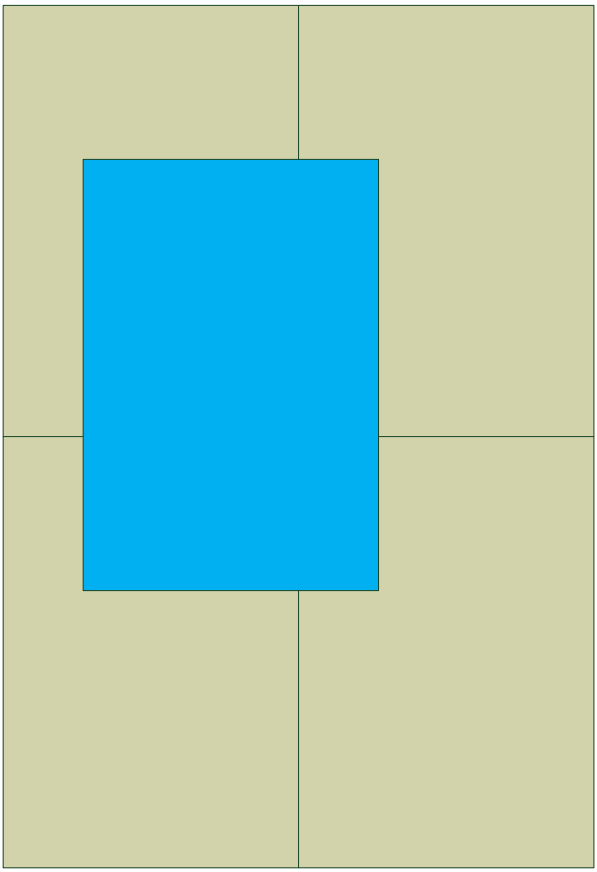


Figure 1 - Creating a bespoke tile.

4.4.2 Specifying longitude only

This option uses two longitudinally adjacent SRTM reference tiles – see Figure 2. SRTM reference tiles must be provided in the lower two text boxes only, and the upper two text boxes must be left blank. Only the **Centre Longitude** of the new tile is provided the latitude is left blank.

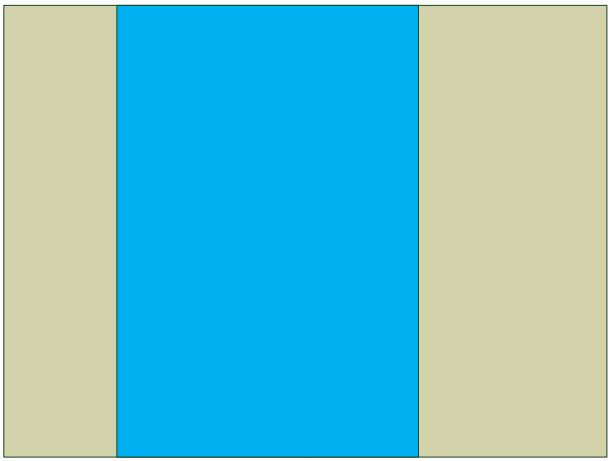


Figure 2 - Specifying longitude only.

4.4.3 Specifying latitude only

This option uses two latitudinally adjacent SRTM reference tiles – see Figure 3. SRTM reference tiles must be provided in the leftmost two text boxes only, and the rightmost two text boxes must be left blank. Only the **Centre Latitude** of the new tile is provided the longitude is left blank.

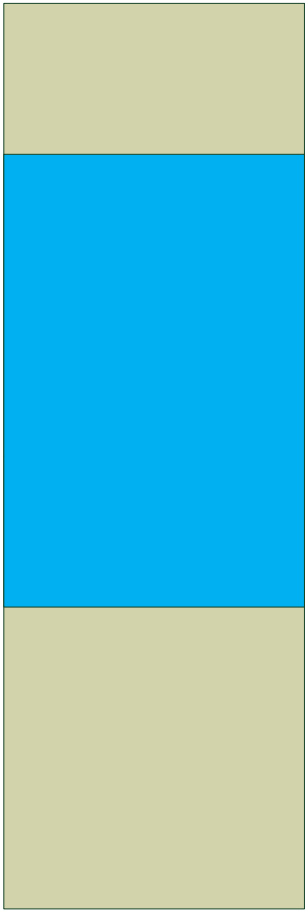


Figure 3 - Specifying latitude only.

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