AutoVI User Guide

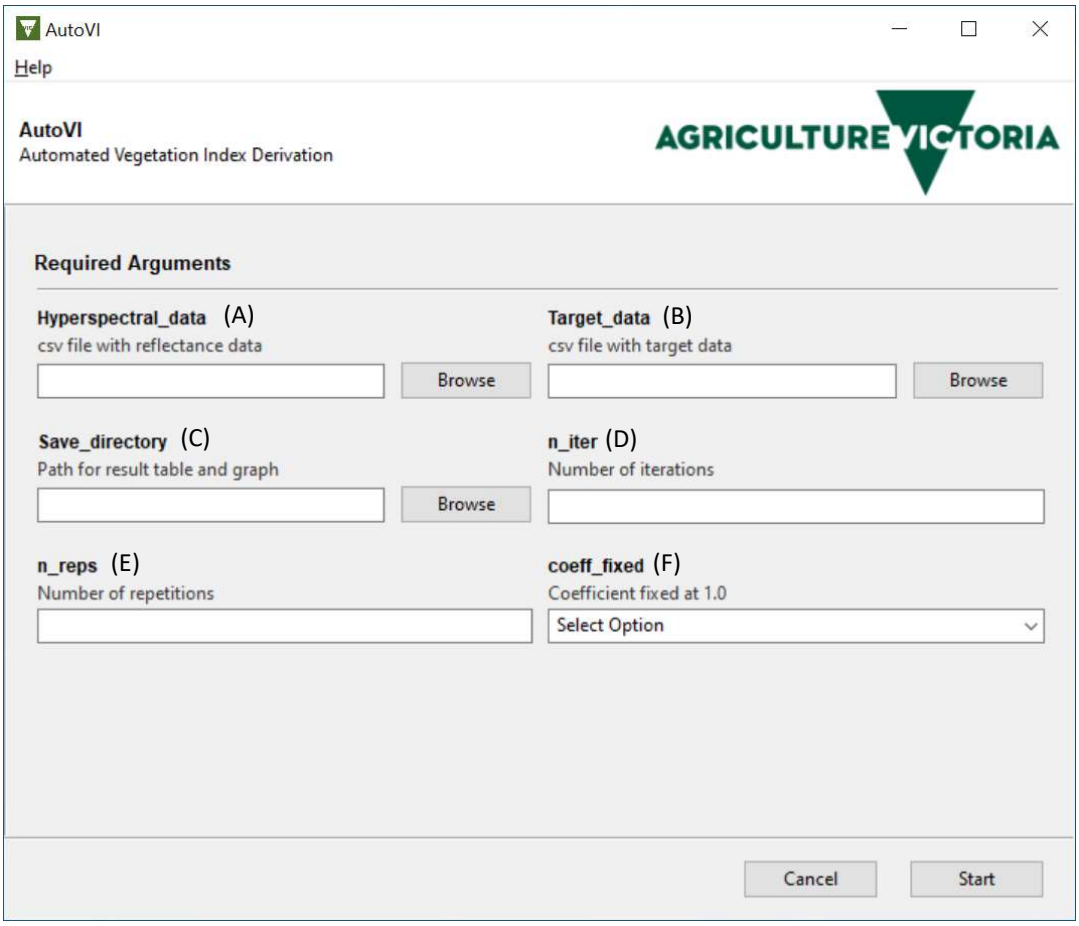
Automated Vegetation Index System | Version 0.10 | Joshua C.O. Koh

AGRICULTURE VICTORIA

AUTOVI INSTALLATION

1. Launch AutoVI_setup. Accept license agreement to proceed.
2. AutoVI installs by default to C:/AutoVI. You may change the installation folder.
3. You may uninstall AutoVI via Uninstall or change a program in Control Panel.

AUTOVI USAGE



1. The main inputs / arguments required by AutoVI are:

   (A) Hyperspectral reflectance dataset in .csv format

   AutoVI accepts reflectance data produced by any hyperspectral sensor in comma separated values (CSV) format. There is no data size or dimension limitation, but we would recommend normalizing the values to a range of 0 – 1. In addition, the columns should correspond to the wavebands and the rows to the reflectance values. There is no strict naming requirement on the waveband columns, except that they must be unique. For example, columns may be named band1, band2, band3…, or B1, B2, B3…, or 435nm, 440nm, 445nm…etc.

   (B) Trait values dataset in .csv format

   AutoVI accepts any numeric values as the trait of interest. The values must be provided in a .csv file with the column named as 'Target'.

   (C) Directory path for saving results

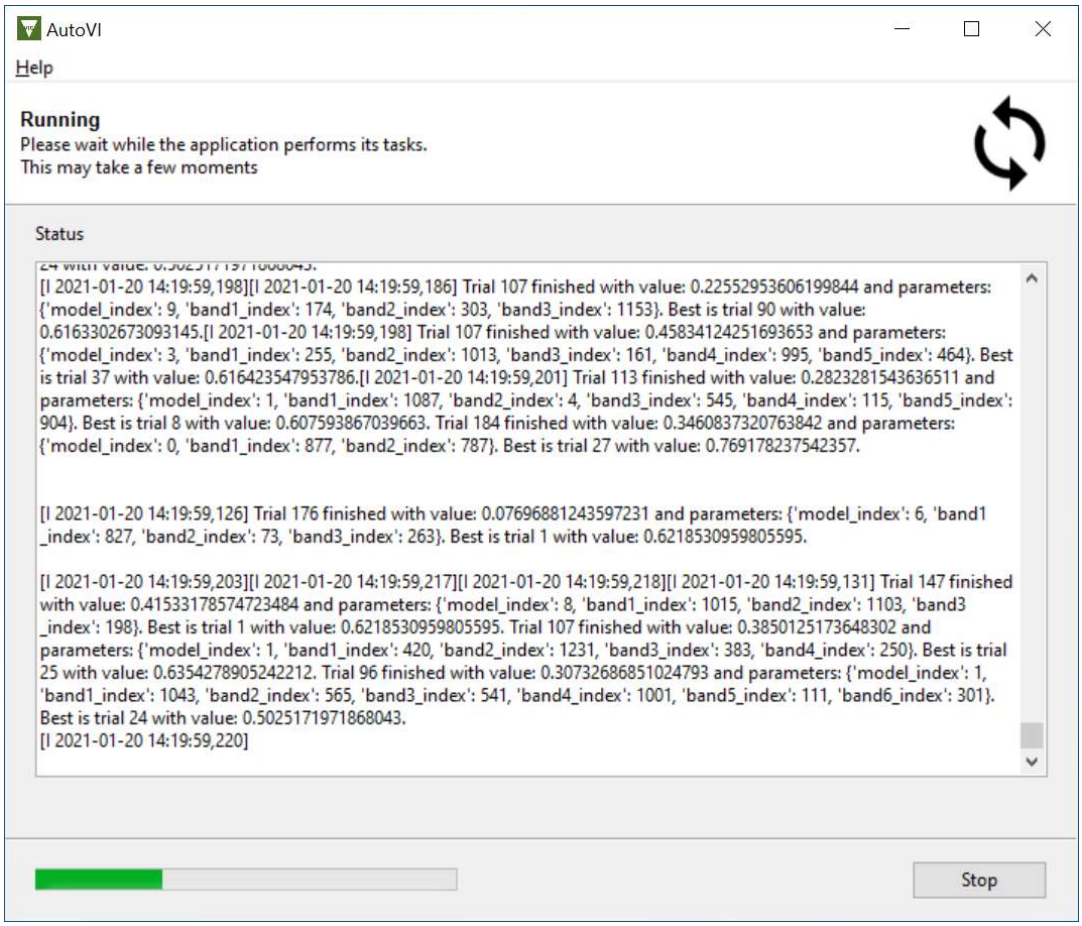
   The folder in which AutoVI will output the results in a table in .csv format and a bar chart figure in jpeg format showing the performance of the best models according to model groups.

(D) Number of iterations
The number of optimization rounds performed by AutoVI. A higher number generally results in better-tuned models. We recommend 1000 – 20000 iterations as a guideline.

(E) Number of repetitions
The number of parallel instances of AutoVI i.e. repetitions. As AutoVI optimization starts with a random seed and results may vary between different runs, it is highly recommended to set this number to 3 – 5. Ideally, the recovered best model should be identified from multiple repetitions.

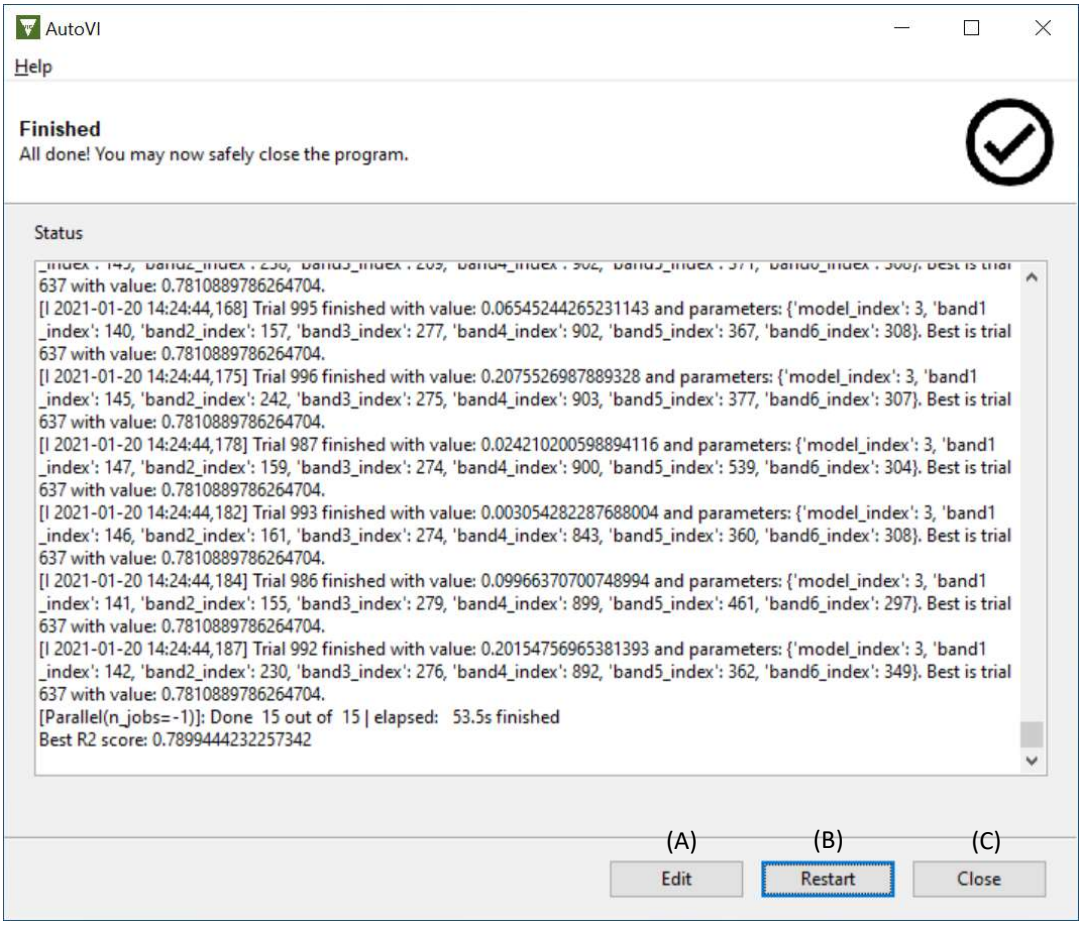
(F) Option to fix coefficient values at 1 (True / False)
If 'True', coefficients will be excluded from the index model equations. Select ' False' to allow coefficients in the model equations.

2. Once inputs are provided, click 'Start' to begin AutoVI optimization. The following screen should appear:



Depending on your hardware and AutoVI settings, the entire process should take minutes to hours.

3. Once completed, you will have the option to (A) Edit, (B) Restart or (C) Close the program. Choosing Edit will bring you back to the main interface of AutoVI to allow changing of settings and Restart simply begins another AutoVI optimization with the same settings as before.



4. AutoVI results will appear under the selected save directory. Result examples are provided below:

	A	B	C	D
1	Model_name	Group	Hyperparameters [[bands],[coefficients]]	R^2
2	model3	M2	[['624', '712']]	0.770230775
3	model15	M3	[['749', '619', '716']]	0.789944423
4	model25	M4	[['1119', '924', '717', '610'], [1.0]]	0.788718285
5	model26	M5	[['852', '1084', '622', '715', '1147'], [1.0, 1.0, 1.0]]	0.765128871
6	model33	M6	[['720', '628', '622', '1706', '1072', '932'], [1.0]]	0.781088979
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