

# AutoVI Software

## USER GUIDE

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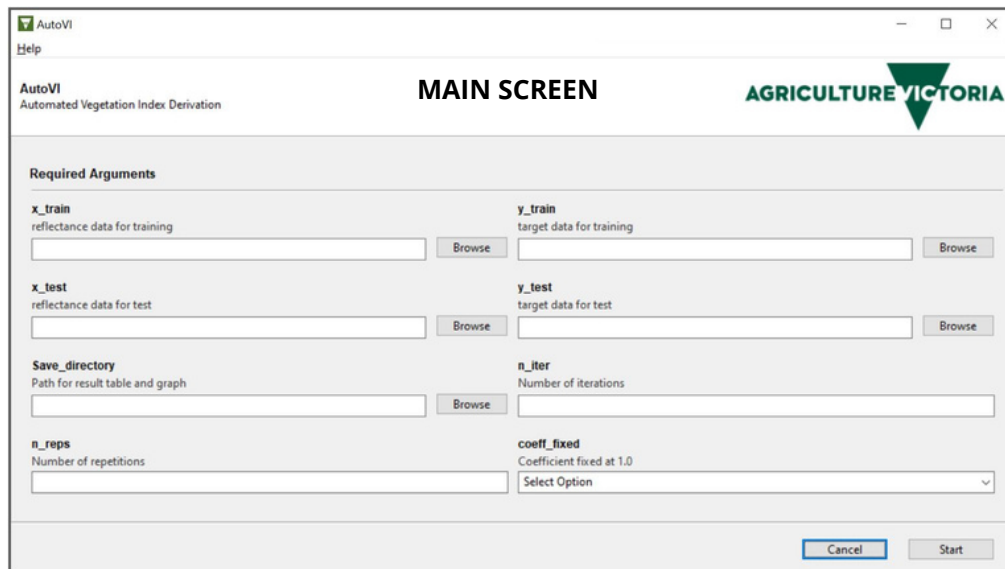
JOSHUA KOH



# 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 Control Panel under uninstall or change a program.

## SETUP



The screenshot shows the 'AutoVI' application window titled 'MAIN SCREEN'. The window has a menu bar with 'AutoVI' and 'Help'. Below the menu bar, the title 'AutoVI' and subtitle 'Automated Vegetation Index Derivation' are on the left, and the 'AGRICULTURE VICTORIA' logo is on the right. The main area is titled 'Required Arguments' and contains several input fields and buttons:

- x\_train**: reflectance data for training. Input field with a 'Browse' button.
- y\_train**: target data for training. Input field with a 'Browse' button.
- x\_test**: reflectance data for test. Input field with a 'Browse' button.
- y\_test**: target data for test. Input field with a 'Browse' button.
- Save\_directory**: Path for result table and graph. Input field with a 'Browse' button.
- n\_iter**: Number of iterations. Input field.
- n\_reps**: Number of repetitions. Input field.
- coeff\_fixed**: Coefficient fixed at 1.0. A dropdown menu with 'Select Option'.

At the bottom right, there are 'Cancel' and 'Start' buttons.

Main arguments required by AutoVI:

**x-train** - reflectance data for AutoVI training normalized to range of 0 - 1 in .csv file. Columns should correspond to wavebands and rows to reflectance values. All columns should have unique naming.

**y-train** - target trait values for AutoVI training in .csv file. Column should be named as "Target".

**x\_test** - reflectance data for AutoVI validation normalized to range of 0 - 1 in .csv file.

**y\_test** - target trait values for AutoVI validation in .csv file.

**Save\_directory** - folder to output result table and graph.

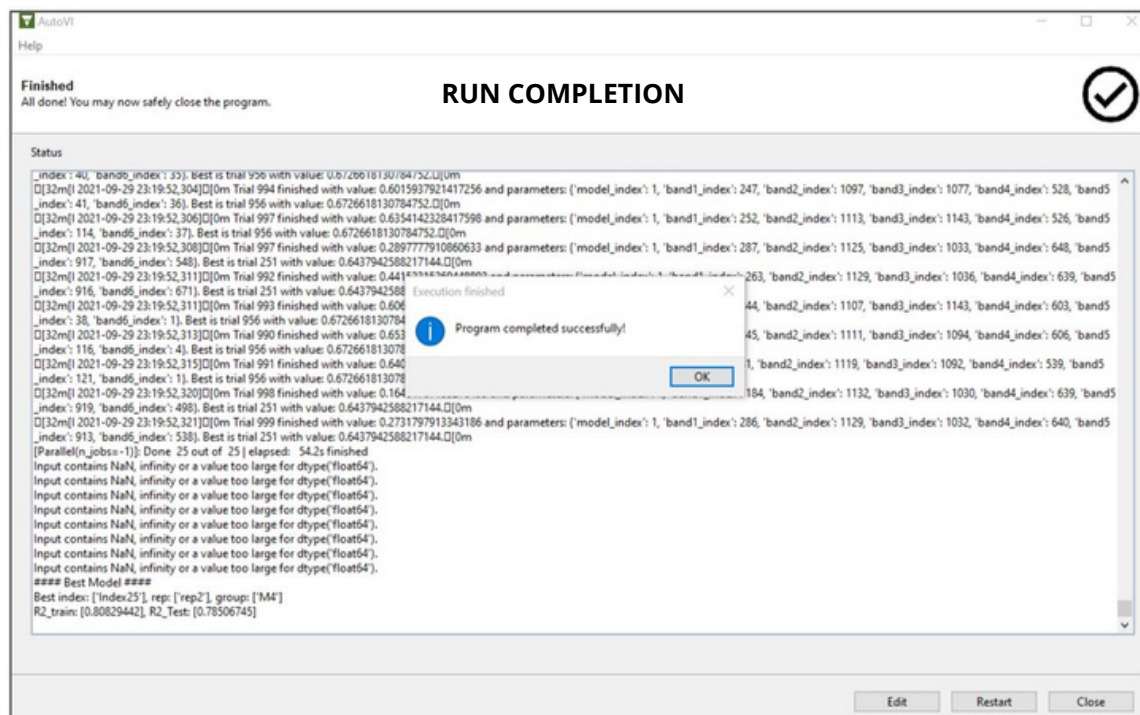
**n\_iter** - number of iterations, with 1,000 to 20,000 iterations as recommended starting point.

**n\_reps** - number of repetitions, with 3 to 5 as recommended starting point.

**coeff\_fixed** - if True, coefficients will be excluded from index model equations.

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1. Once all arguments are provided, click **Start** to begin AutoVI training. Depending on hardware and AutoVI settings, the entire process can take as little as a few minutes to few hours.
2. Upon completion, the best model and  $R^2$  scores for training and test datasets will be displayed.
3. You can choose to either **Edit**, **Restart** or **Close** the program. Choosing **Edit** will bring you back to the main screen and **Restart** simply begins another AutoVI training with the same settings.



# RESULTS

AutoVI results will be saved under the specified save\_directory. Two outputs are provided:

- **AutoVI\_models (.csv)** - table showing best index models across repetitions according to model groups. In addition to  $R^2$  for training (Score), performance metrics such as  $R^2$ , RMSE, MAE and MAPE are shown for the test dataset.
- **AutoVI\_graph (.jpg)** - bar chart showing  $R^2$  scores on the test dataset for the best index models across repetitions according to model groups.

**AutoVI\_models (.csv)**

Model_name	Rep	Group	Hyperparameters [[bands],[coefficients]]	Score	R2	RMSE	MAE	MAPE
Index9	rep1	M2	[[ '719', '761'], [1.0, 1.0]]	0.6149	0.4464	64.1899	51.6181	0.0784
Index8	rep2	M2	[[ '714', '1135'], [1.0, 1.0, 1.0]]	0.5909	0.3804	67.9132	55.0215	0.0841
Index2	rep3	M2	[[ '1391', '1404']]	0.5347	0.2210	76.1477	56.3060	0.0871
Index3	rep4	M2	[[ '1438', '678']]	0.6192	0.3868	67.5589	56.2409	0.0872
Index4	rep5	M2	[[ '1264', '1412'], [1.0, 1.0]]	0.5667	0.2408	75.1709	60.3920	0.0934
Index17	rep1	M3	[[ '1141', '1185', '976']]	0.5431	0.2448	74.9728	57.9585	0.0897
Index16	rep2	M3	[[ '1263', '715', '1201'], [1.0]]	0.5777	0.5311	59.0800	47.9831	0.0724
Index15	rep3	M3	[[ '642', '733', '749']]	0.6989	0.6161	53.4533	43.8691	0.0673

**AutoVI\_graph (.jpg)**

