# Spectral Tools

## Purpose

This module offers a set of functions for handling spectral data. These functions are:

* Spectrum extraction; this allows the user extract an aggregated spectral profile with a used specified kernel size.

## Installation

Install the .sav files in the save\_add folder (see also [ENVI .sav files: Installation and configuration](http://www.itc.nl/personal/nieuwenh/installations.html).

\_nrsmenu.sav Define NRS menu item in ENVI

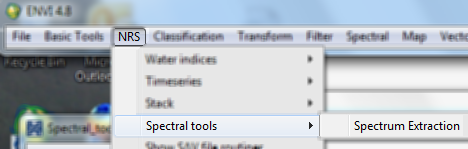
nrs\_Utils.sav Library with utility routines

nrs\_Spectral\_tools.sav The actual software

## Usage (gui)

|  |  |
| --- | --- |
| nrs\_aggregate\_spectrum\_gui | Start the user interface of the spectrum extraction. |

Alternatively the commands can be started from the ENVI menu: ‘NRS | Spectral Tools’:

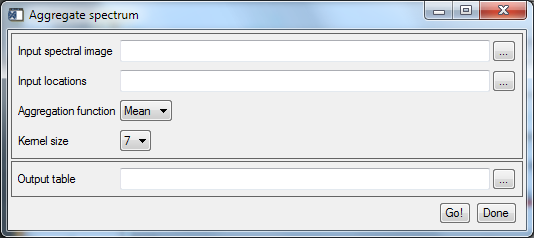


### Spectrum Extraction

Menu option is ‘NRS | Spectral Tools | Spectrum Extraction, the command line is ‘nrs\_aggregate\_spectrum\_gui’. This function reads the coordinates of point features from either a text table or a shape file to get spectral profiles from a spectral image. It uses a square window around the locations in the spectral image, collects the spectra of all these location and applies an aggregation function to these profiles.

The resulting profiles for all locations are then written to a text table. The header line of each column contains the coordinates of that location.

The user interface is shown below:



Explanation of all the fields:

|  |  |
| --- | --- |
| Input spectral image | Select an spectral input image |
| Input locations | Select a point feature table; this can either be a comma-delimited file (\*.csv) or a shape file. In case of a text table file: the file must contain a header line indicating the coordinate columns; the coordinate columns are recognized by the texts *lat*, *lon* or *x* and *y*. |
| Aggregation function | Select the aggregation function. The GUI supports *mean*, *min* and *max*. The command line version also supports *median*. The default is *mean*. |
| Kernel size | The size of the window. Supported are 3 (3 x 3), 5 (5 x 5) and 7 (7 x 7) |
| Output table | The filename of the output profile table. |

An example of the input point table (in csv format); note that extra columns are allowed, here the pixel coordinates are added as well:

lat,lon,px,py

33.70480278,107.8058417,57,12

33.55983889,107.8718278,83,79

33.63168611,107.6789417,7,47

An example of the output table (shortened):

(107.805842:107.871828),(107.678942:33.704803),(33.559839:33.631686)

0.000000,0.000000,0.000000

…

0.000000,0.265542,0.158182

0.000000,0.291248,0.186046

0.000362438,0.315188,0.212810

0.00198509,0.337136,0.238218

0.00639056,0.356875,0.262000

0.0167405,0.374359,0.284187

0.0328529,0.389675,0.304904

0.0537597,0.403032,0.324379

0.0765412,0.414591,0.342639

0.100833,0.424514,0.359708

0.125971,0.432964,0.375612

0.151187,0.440101,0.390374

…