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# **Python Heyex Reader Documentation**

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This is a native python implementation for reading Heidelberg Heyex Spectralis files. The current version only supports the Heyex VOL files.

The github repository for this project is located at: <https://github.com/ayl/heyexReader>



# CHAPTER 1

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## Installation

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```
$ pip install heyexReader
```





## CHAPTER 2

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### Requirements

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- Numpy
- Pillow



```
import heyexReader

vol = heyexReader.volFile("test.vol")

vol.renderIRslo("slo.png", renderGrid = True)
vol.renderOCTscans("oct", renderSeg = True)

print(vol.oct.shape)
print(vol.irslo.shape)
```

## 3.1 heyexReader package

### 3.1.1 heyexReader.volReader module

**class** heyexReader.volReader.volFile(*filename*)

**\_\_init\_\_**(*filename*)

Parses Heyex Spectralis \*.vol files.

**Parameters** *filename* (*str*) – Path to vol file

**Returns** volFile class

**oct**

Retrieve OCT volume as a 3D numpy array.

**Returns** 3D numpy array with OCT intensities as 'uint8' array

**irslo**

Retrieve IR SLO image as 2D numpy array

**Returns** 2D numpy array with IR reflectance SLO image as 'uint8' array.

### **grid**

Retrieve the IR SLO pixel coordinates for the B scan OCT slices

**Returns** 2D numpy array with the number of b scan images in the first dimension and `x_0`, `y_0`, `x_1`, `y_1` defining the line of the B scan on the pixel coordinates of the IR SLO image.

### **renderIRslo** (*filename*, *renderGrid=False*)

Renders IR SLO image as a PNG file and optionally overlays grid of B scans

#### **Parameters**

- **filename** (*str*) – filename to save IR SLO image
- **renderGrid** (*bool*) – True will render red lines for the location of the B scans.

**Returns** None

### **renderOCTscans** (*filepre='oct'*, *renderSeg=False*)

Renders OCT images a PNG file and optionally overlays segmentation lines

#### **Parameters**

- **filepre** (*str*) – filename prefix. OCT Images will be named as “<prefix>-001.png”
- **renderSeg** (*bool*) – True will render colored lines for the segmentation of the RPE, ILM, and NFL on the B scans.

**Returns** None

### **fileHeader**

Retrieve vol header fields

#### **Returns**

##### **Dictionary with the following keys**

- **version**: version number of vol file definition
- **numBscan**: number of B scan images in the volume
- **octSizeX**: number of pixels in the width of the OCT B scan
- **octSizeZ**: number of pixels in the height of the OCT B scan
- **distance**: unknown
- **scaleX**: resolution scaling factor of the width of the OCT B scan
- **scaleZ**: resolution scaling factor of the height of the OCT B scan
- **sizeXSlo**: number of pixels in the width of the IR SLO image
- **sizeYSlo**: number of pixels in the height of the IR SLO image
- **scaleXSlo**: resolution scaling factor of the width of the IR SLO image
- **scaleYSlo**: resolution scaling factor of the height of the IR SLO image
- **fieldSizeSlo**: field of view (FOV) of the retina in degrees
- **scanFocus**: unknown
- **scanPos**: Left or Right eye scanned
- **examTime**: Datetime of the scan (needs to be checked)
- **scanPattern**: unknown
- **BscanHdrSize**: size of B scan header in bytes

- ID: unknown
- ReferenceID
- PID: unknown
- PatientID: Patient ID string
- DOB: Date of birth
- VID: unknown
- VisitID: Visit ID string
- VisitDate: Datetime of visit (needs to be checked)
- GridType: unknown
- GridOffset: unknown

**bScanHeader** (*slicei*)

Retrieve the B Scan header information per slice.

**Parameters** **slicei** (*int*) – index of B scan

**Returns**

**Dictionary with the following keys**

- startX: x-coordinate for B scan on IR. (see getGrid)
- startY: y-coordinate for B scan on IR. (see getGrid)
- endX: x-coordinate for B scan on IR. (see getGrid)
- endY: y-coordinate for B scan on IR. (see getGrid)
- numSeg: 2 or 3 segmentation lines for the B scan
- quality: OCT signal quality
- shift: unknown

**saveGrid** (*outfn*)

Saves the grid coordinates mapping OCT Bscans to the IR SLO image to a text file. The text file will be a tab-delimited file with 5 columns: The bscan number, x\_0, y\_0, x\_1, y\_1 in pixel space scaled to the resolution of the IR SLO image.

**Parameters** **outfn** (*str*) – location of where to output the file

**Returns** None



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