The image format we use goes back to the ICS format. It’s very similar to ENVI.

(<https://en.wikipedia.org/wiki/Image_Cytometry_Standard>).

We use our own library with floating point for hyperspectral images.

Each image consists in two files, an .ics file with textual meta information and an ids file with the hyperspectral data cube.

The cube is organized as following:

* Dimension 1 contains the wavelength
* Dimension 2 spatial X
* Dimension 3 spatial Y

The data cube is typically compressed using gz. The compressed datacube has the extension .ids.gz.

(<https://de.wikipedia.org/wiki/Gzip>)

# Matlab Example (read ICS)

File: readICSFile.m

function x = readICSFile(icsfile)

[pathstr, name, ext] = fileparts(icsfile);

fid=fopen(icsfile);

c=1;

while 1

tline = fgetl(fid);

if ~ischar(tline), break, end

x.head{c}=tline;

c=c+1;

end

fclose(fid);

x.head';

x.filename=parsekey(x,'filename');

temp=parsekey(x,'layout size');

x.sizes=sscanf(temp,'%d %d %d %d');

x.compfile=[pathstr '\' x.filename '.ids.gz'];

x.uncompfile=[pathstr '\' x.filename '.ids'];

gunzip(x.compfile);

if (exist(x.uncompfile)==2)

x=loadids(x);

% delete(x.uncompfile);

end

function xout=loadids(xin)

fid=fopen(xin.uncompfile);

data=fread(fid,inf,'float32');

xin.data=reshape(data,xin.sizes(2),xin.sizes(3),xin.sizes(4));

fclose(fid);

xout=xin;

function value=parsekey(xin,key)

value='';

for k=1:length(xin.head),

s=strfind(xin.head{k},key);

if s==1,

value=xin.head{k}((2+length(key)):end);

end

end

# Matlab Exmample, write ICS

function writeICSFile(data,icsfile)

[pathstr, name, ext] = fileparts(icsfile);

fid=fopen(icsfile,'w');

fprintf(fid,'ics\_version 1.0\r\n');

fprintf(fid,'filename %s\r\n',name);

fprintf(fid,'layout parameters 4\r\n');

fprintf(fid,'layout order bits x y z\r\n');

fprintf(fid,'layout sizes %d %d %d %d\r\n',32,size(data,1),size(data,2),size(data,3));

fprintf(fid,'layout coordinates video\r\n');

fprintf(fid,'layout significant\_bits 32\r\n');

fprintf(fid,'representation format float\r\n');

fprintf(fid,'representation sign signed\r\n');

fprintf(fid,'representation byte\_order 1 2 3 4\r\n');

fprintf(fid,'representation SCIL\_TYPE g3d\r\n');

fprintf(fid,'SENSOR\_ID 0\r\n');

fprintf(fid,'image\_channels 1\r\n');

fclose(fid)

writeids(data,[pathstr '\' name '.ids'])

function writeids(data,idsfile)

fid=fopen(idsfile,'w');

fwrite(fid,data,'float32');

fclose(fid);

gzip(idsfile);

delete(idsfile);



