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In[ ]:= (**Input identifying information**)

In[ ]:= date = ToString[Evaluate[Input["Input the date of the experiment"]]]

In[ ]:= mouse = ToString[Evaluate[Input["Input the mouse identity (e.g. Mouse123)"]]]

In[ ]:= sessionNum = Evaluate[Input["Input the session number"]]

In[ ]:= (**For the first movie,
import the neuropil-corrected calcium signal from each ROI chosen for the session**)

In[ ]:= neuropilCorrFsMov1 = Import[
StringJoin["C:/Users/garrett/Desktop/Garrett_Local/", date, "/", mouse, "/Session",
ToString[sessionNum], "/Ftraces/", "Movie1/F_neuropilsubtracted.txt"], "Table"];

In[ ]:= numROIs = Dimensions[neuropilCorrFsMov1][[2]];

In[ ]:= (**Do the same for all the other movies in the session**)

In[ ]:= numAdditionalMovies =
Length[FileNames["*", File[StringJoin["C:/Users/garrett/Desktop/Garrett_Local/",
date, "/", mouse, "/Session", ToString[sessionNum], "/Ftraces/"]]]] - 2;
(*Subtract 2 because the first movie was already imported and the
other file in the directory is an ROI list*)

In[ ]:= Table[Evaluate@ToExpression[StringJoin["neuropilCorrFsMov", ToString[n]]] =
Import[StringJoin["C:/Users/garrett/Desktop/Garrett_Local/",
date, "/", mouse, "/Session", ToString[sessionNum], "/Ftraces/",
If[n ≥ 10, "file_00001_000", "file_00001_0000"], ToString[n], "_moco40_ref1-200",
"/F_neuropilsubtracted.txt"], "Table"]; {n, 2, numAdditionalMovies + 1}];

In[ ]:= (**Extract the calcium trace for each ROI**)

In[ ]:= Table[Table[Evaluate@
ToExpression[StringJoin["neuropilCorrFsMov", ToString[n], "ROI", ToString[m]]] =
(ToExpression[StringJoin["neuropilCorrFsMov", ToString[n]]][[All, m]]];
{n, 1, numAdditionalMovies + 1}], {m, 1, numROIs}];

In[ ]:= (**Concatenate the calcium traces for each ROI**)

In[ ]:= Table[Evaluate@ToExpression[StringJoin["neuropilCorrFsFullSessionROI", ToString[m]]] =
Catenate[Table[(ToExpression[StringJoin["neuropilCorrFsMov", ToString[n], "ROI",
ToString[m]]]), {n, 1, numAdditionalMovies + 1}]], {m, 1, numROIs}];

In[ ]:= (**Import the frame times for the 2P images and calculate the frame rate**)

In[ ]:= tpFrameTimes =
Drop[Drop[(Import[StringJoin["C:/Users/garrett/Desktop/Garrett_Local/", date,
"/", mouse, "/Session", ToString[sessionNum], "/", date, "_", mouse, "_",
"Session", ToString[sessionNum], "_2PFrameTimes.txt"], "List"]), 16], -1];

In[ ]:= tpFrameRate = Length[tpFrameTimes] / (Last[tpFrameTimes] - First[tpFrameTimes]);

(**Verify that length of tpFrameTimes = length of tiff series, +/- 2**)

In[ ]:= Length[tpFrameTimes]

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In[ ]:= Length[neuropilCorrFsFullSessionROI1]

In[ ]:= (**For each ROI,
compute F0 as a 1-minute moving 10th percentile of the fluorescence distribution**)

In[ ]:= window = Round[tpFrameRate * 60];

In[ ]:= Table[Evaluate@ToExpression[StringJoin["f0ROI", ToString[n]]] =
MovingMap[Quantile[#, 1/10] &,
(ToExpression[StringJoin["neuropilCorrFsFullSessionROI", ToString[n]]]),
window, "Reflected"]];, {n, 1, numROIs}];

In[ ]:= (**For each ROI, compute dF/F0**)

In[ ]:= Table[Evaluate@ToExpression[StringJoin["dFoverF0ROI", ToString[n]]] =
((ToExpression[StringJoin["neuropilCorrFsFullSessionROI", ToString[n]]]) -
(ToExpression[StringJoin["f0ROI", ToString[n]])) /
(ToExpression[StringJoin["f0ROI", ToString[n]]]);, {n, 1, numROIs}];

In[ ]:= (**For each ROI, generate dF/F0 time series**)

In[ ]:= Table[Evaluate@ToExpression[StringJoin["dFoverF0ROIIts", ToString[n]]] =
Partition[Riffle[tpFrameTimes, ToExpression[StringJoin["dFoverF0ROI", ToString[n]]]],
2];, {n, 1, numROIs}];

In[ ]:= (**Export dF/F0 time series for each ROI**)

In[ ]:= Table[Export[StringJoin["C:/Users/garrett/Desktop/Garrett_Local/", date, "/", mouse,
"/Session", ToString[sessionNum], "/dFoverF0TimeSeries/", date, "_", mouse, "_",
"Session", ToString[sessionNum], "_dFoverF0ts_", "ROI", ToString[n], ".txt"],
ToExpression[StringJoin["dFoverF0ROIIts", ToString[n]]], {n, 1, numROIs}];

(**Examine full dF/F time series of each ROI**)

In[ ]:= Manipulate[ListLinePlot[ToExpression[StringJoin["dFoverF0ROIIts", ToString[n]]],
PlotRange -> All], {n, 1, numROIs, 1}]

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