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(******Calculate pairwise partial correlations between
 ROIs during a session and enumerate putative redundant ROIs
 based on correlations exceeding a threshold of 0.3*******)

(***Input identifying information***)

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

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

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

(***Import the frame times for the 2P images and calculate the frame rate***)

tpFrameTimes =
  Drop[Drop[(Import[StringJoin["S:/Imaging/Garrett/FMB208_2PRig/", date, "/",
       mouse, "/Session", ToString[sessionNum], "/", date, "_", mouse, "_",
       "Session", ToString[sessionNum], "_2PFrameTimes.txt"], "List"]), 16], -1];

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

(***For each ROI picked for the session, upload the extracted dF/F0 time series***)

numROIs =
  Length[FileNames["*", File[StringJoin["S:/Imaging/Garrett/FMB208_2PRig/", date, "/",
      mouse, "/Session", ToString[sessionNum], "/dFOverF0TimeSeries/"]]]];

Table[Evaluate@ToExpression[StringJoin["dFFts", ToString[n]]] =
    ToExpression /@ Import[StringJoin["S:/Imaging/Garrett/FMB208_2PRig/", date,
       "/", mouse, "/Session", ToString[sessionNum], "/dFoverF0TimeSeries/",
       date, "_", mouse, "_Session", ToString[sessionNum], "_",
       "dFoverF0ts_ROI", ToString[n], ".txt"], "List"];, {n, 1, numROIs}];

(***Enumerate ROI pairs***)

pairs = Subsets[sigROIs, {2}];

(***Calculate the cross-correlation and partial
  (mean correlation-subtracted) correlation between all pairs of ROIs***)

allCrossCorrs = Table[{pairs[[i]], Correlation[
     Part[#, 2] & /@ (ToExpression[StringJoin["dFFts", ToString[pairs[[i, 1]]]]]),
     Part[#, 2] & /@ (ToExpression[StringJoin["dFFts", ToString[pairs[[i, 2]]]]])]},
   {i, 1, Length[pairs]}];

meanCrossCorrs = Mean[Part[#, 2] & /@ allCrossCorrs];

allPartCrossCorrs = Table[{allCrossCorrs[[n, 1]], allCrossCorrs[[n, 2]] - meanCrossCorrs},
   {n, 1, Length[allCrossCorrs]}];

(***Axon ROIs whose partial cross correlation value exceeds 0.3 are
 possibly duplicates, and one of them should be discarded from analysis***)

possibleDuplicates =
  DeleteCases[Table[If[allPartCrossCorrs[[n, 2]] > 0.3, allPartCrossCorrs[[n, 1]], Null],
    {n, 1, Length[allPartCrossCorrs]}], Null];
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In[ ]:=
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(***Export the list pairwise cross-correlations for all the ROIs in this session***)

Export[StringJoin["S:/Imaging/Garrett/FMB208_2PRig/", date, "/",
   mouse, "/Session", ToString[sessionNum], "/", date, "_", mouse, "_Session",
   ToString[sessionNum], "_", "pairwiseCrossCorrs", ".txt"], allCrossCorrs];

Export[StringJoin["S:/Imaging/Garrett/FMB208_2PRig/", date, "/",
   mouse, "/Session", ToString[sessionNum], "/", date, "_", mouse, "_Session",
   ToString[sessionNum], "_", "pairwisePartialCrossCorrs", ".txt"], allPartCrossCorrs];

Export[StringJoin["S:/Imaging/Garrett/FMB208_2PRig/", date, "/",
   mouse, "/Session", ToString[sessionNum], "/", date, "_", mouse, "_Session",
   ToString[sessionNum], "_", "axonROIDuplicates", ".txt"], possibleDuplicates];
```