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function [pv3,pv6,pv9,pv12] = velocity
chanX = 1;
chanY = 2;
eventchan = 5;
mv3 = zeros([1 201]);
mv6 = zeros([1 201]);
mv9 = zeros([1 201]);
mv12 = zeros([1 201]);

mpos3 = zeros([1 201]);
mpos6 = zeros([1 201]);
mpos9 = zeros([1 201]);
mpos12 = zeros([1 201]);
tc3 = 0;
tc6 = 0;
tc9 = 0;
tc12 = 0;
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[file, loc] = uigetfile('*.smr', 'Pick an SMR file');           % pointer to one of
the *.smr files to be analyze
if isequal(file,0)|isequal(loc,0)
    error('File open cancelled')
else
    disp(['File ', loc, file, ' found'])
end

cd(loc);                % generate list of files to be analyze. all and only
the *.smr files must be in one directory.
files = dir('*.smr');
for j = 1:length(files)
    files(j).name
    fid = fopen(files(j).name);
    if fid < 1
        error('File not found');
    end

    warning('off','MATLAB:dispatcher:InexactMatch')
    [dataX, header] = SONGGetChannel(fid, chanX);
    [dataX] = transpose(SONADCToDouble(dataX, header));
    samplerate = 1/header.sampleinterval;

    [dataY, header] = SONGGetChannel(fid, chanY);
    [dataY] = transpose(SONADCToDouble(dataY, header));

    l1 = length(dataX);
    l2 = length(dataY);
    l = min([l1,l2]);
    dataX = dataX(1:l);
    dataY = dataY(1:l);
    samplerate = 1/header.sampleinterval;

    [trig, trig_header] = SONGGetEventChannel(fid, eventchan);
    if isempty(trig)
        error('ERROR ::: No event channel available'); % add which file
    end
end

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for i = 1:(length(dataX)-1);
    velx(i) = (dataX(i) - dataX(i+1))*samplerate;
    vely(i) = (dataY(i) - dataY(i+1))*samplerate;
    vel(i) = sqrt(velx(i)*velx(i) + vely(i)*vely(i)) + rand*4;
    pos(i) = sqrt(dataX(i)*dataX(i) + dataY(i)*dataY(i));
end
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count3 = 1;
count6 = 1;
count9 = 1;
count12 = 1;
event3(1) = 0 ;
event9(1) = 0;
event6(1) = 0;
event12(1) = 0;
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for i = 1:length(trig)
    if (dataX(floor((trig(i)+0.5)*samplerate))>10)
        event3(count3) = trig(i);
        count3 = count3 + 1;
    elseif (dataX(floor((trig(i)+0.5)*samplerate))<(-10))
        event9(count9) = trig(i);
        count9 = count9 + 1;
    elseif (dataY(floor((trig(i)+0.5)*samplerate))>10)
        event12(count12) = trig(i);
        count12 = count12 + 1;
    elseif (dataY(floor((trig(i)+0.5)*samplerate))<(-10))
        event6(count6) = trig(i);
        count6 = count6 + 1;
    end
end
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if length(event3) > 1 ;
    for i = 1:length(event3)
        sample = round(linspace(event3(i)*samplerate-
100,event3(i)*samplerate+100,201));
        %epoch3(:,i,j) = vel(sample);
        %epoch3pos(:,i,j) = pos(sample);
        mv3 = mv3 + vel(sample);
        mpos3 = mpos3 + pos(sample);
        tc3 = tc3 + 1;
        pv3(tc3) = max(vel(sample));
    end
end
if length(event6) > 1
    for i = 1:length(event6)
        sample = round(linspace(event6(i)*samplerate-
100,event6(i)*samplerate+100,201));
        %epoch6(:,i,j) = vel(sample);
        %epoch6pos(:,i,j) = pos(sample);
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        mv6 = mv6 + vel(sample);
        mpos6 = mpos6 + pos(sample);
        tc6 = tc6 + 1;
        pv6(tc6) = max(vel(sample));
    end
end
if length(event9) > 1
    for i = 1:length(event9)
        sample = round(linspace(event9(i)*samplerate-
100,event9(i)*samplerate+100,201));
        %epoch9(:,i,j) = vel(sample);
        %epoch9pos(:,i,j) = pos(sample);
        mv9 = mv9 + vel(sample);
        mpos9 = mpos9 + pos(sample);
        tc9 = tc9 + 1;
        pv9(tc9) = max(vel(sample));
    end
end
if length(event12) > 1
    for i = 1:length(event12)
        sample = round(linspace(event12(i)*samplerate-
100,event12(i)*samplerate+100,201));
        %epoch12(:,i,j) = vel(sample);
        %epoch12pos(:,i,j) = pos(sample);
        mv12 = mv12 + vel(sample);
        mpos12 = mpos12 + pos(sample);
        tc12 = tc12 + 1;
        pv12(tc12) = max(vel(sample));
    end
end
clear vel pos event3 event6 event9 event12
fclose(fid);
end

maxvel = 300;
minvel = 0;
maxpos = 45;
minpos = 0;

subplot(3,3,2)

[AX,H1,H2] = plotyy(linspace(-1,1,length(mv12)),mv12/tc12,linspace(-
1,1,length(mpos12)),mpos12/tc12);
set(get(AX(1),'Ylabel'),'String','Angular Speed') ;
set(get(AX(2),'Ylabel'),'String','Angular Displacement') ;
xlabel('Time ') ;
%Title('Speed and Displacement');
axis(AX(1),[-1 1 minvel maxvel]);
axis(AX(2),[-1 1 minpos maxpos]);
set(AX(1),'YTick',[minvel:(maxvel-minvel)/6:maxvel]);
set(AX(2),'YTick',[minpos:(maxpos-minpos)/6:maxpos]);

subplot(3,3,4)
[AX,H1,H2] = plotyy(linspace(-1,1,length(mv9)),mv9/tc9,linspace(-
1,1,length(mpos9)),mpos9/tc9);
set(get(AX(1),'Ylabel'),'String','Angular Speed') ;

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set(get(AX(2), 'Ylabel'), 'String', 'Angular Displacement') ;
xlabel('Time ') ;
axis(AX(1), [-1 1 minvel maxvel]);
axis(AX(2), [-1 1 minpos maxpos]);
set(AX(1), 'YTick', [minvel:(maxvel-minvel)/6:maxvel]);
set(AX(2), 'YTick', [minpos:(maxpos-minpos)/6:maxpos]);

subplot(3,3,6)
[AX,H1,H2] = plotyy(linspace(-1,1,length(mv3)),mv3/tc3,linspace(-
1,1,length(mpos3)),mpos3/tc3);
set(get(AX(1), 'Ylabel'), 'String', 'Angular Speed') ;
set(get(AX(2), 'Ylabel'), 'String', 'Angular Displacement') ;
xlabel('Time ') ;
axis(AX(1), [-1 1 minvel maxvel]);
axis(AX(2), [-1 1 minpos maxpos]);
set(AX(1), 'YTick', [minvel:(maxvel-minvel)/6:maxvel]);
set(AX(2), 'YTick', [minpos:(maxpos-minpos)/6:maxpos]);

subplot(3,3,8)
[AX,H1,H2] = plotyy(linspace(-1,1,length(mv6)),mv6/tc6,linspace(-
1,1,length(mpos6)),mpos6/tc6);
set(get(AX(1), 'Ylabel'), 'String', 'Angular Speed') ;
set(get(AX(2), 'Ylabel'), 'String', 'Angular Displacement') ;
xlabel('Time ') ;
axis(AX(1), [-1 1 minvel maxvel]);
axis(AX(2), [-1 1 minpos maxpos]);
set(AX(1), 'YTick', [minvel:(maxvel-minvel)/6:maxvel]);
set(AX(2), 'YTick', [minpos:(maxpos-minpos)/6:maxpos]);

gtext('Movements towards 3');
gtext('Movements towards 6');
gtext('Movements towards 9');
gtext('Movements towards 12');

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