

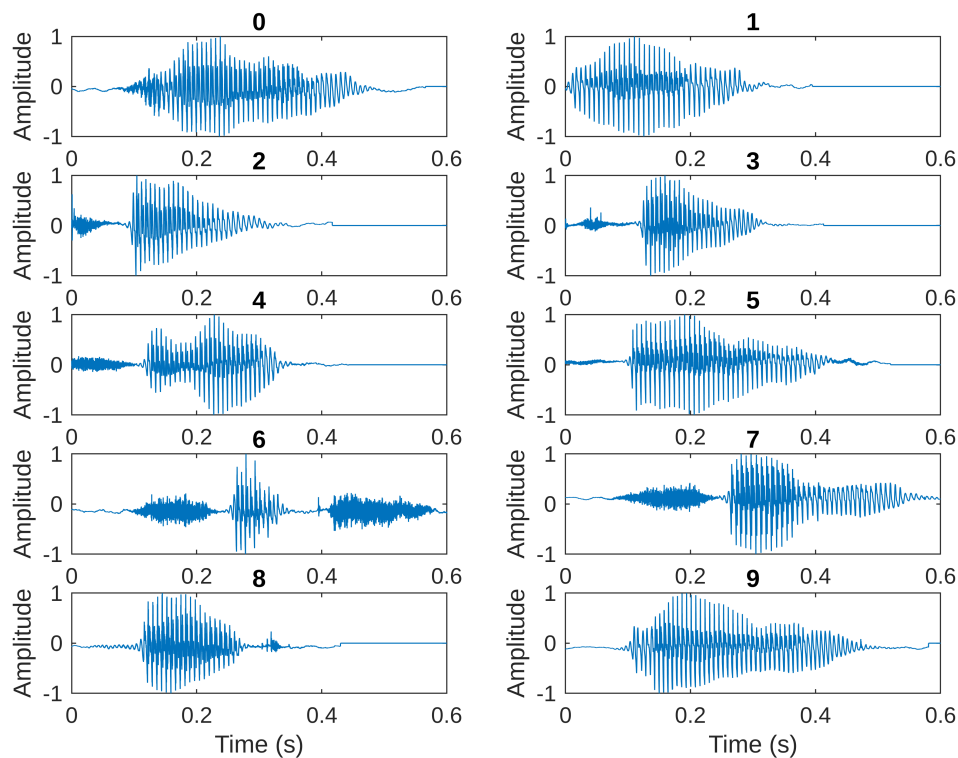
```

% audioFeatures[x, y, z] is the feature z, of the (x-1)th sample of digit y-1
% Features:
% 1 - Total energy
% 2 - Standard deviation
% 3 - Max amplitude
% 4 - Zero crossing rate
% 5 - Duration
audioFeatures = zeros(50, 10, 5);

% Start by plotting the first sample of each digit (id = 0)
figure(1);
audioFeatures(1, :, :) = getFeatures(1, 1);
sgtitle('Signal examples');

```

### Signal examples



```

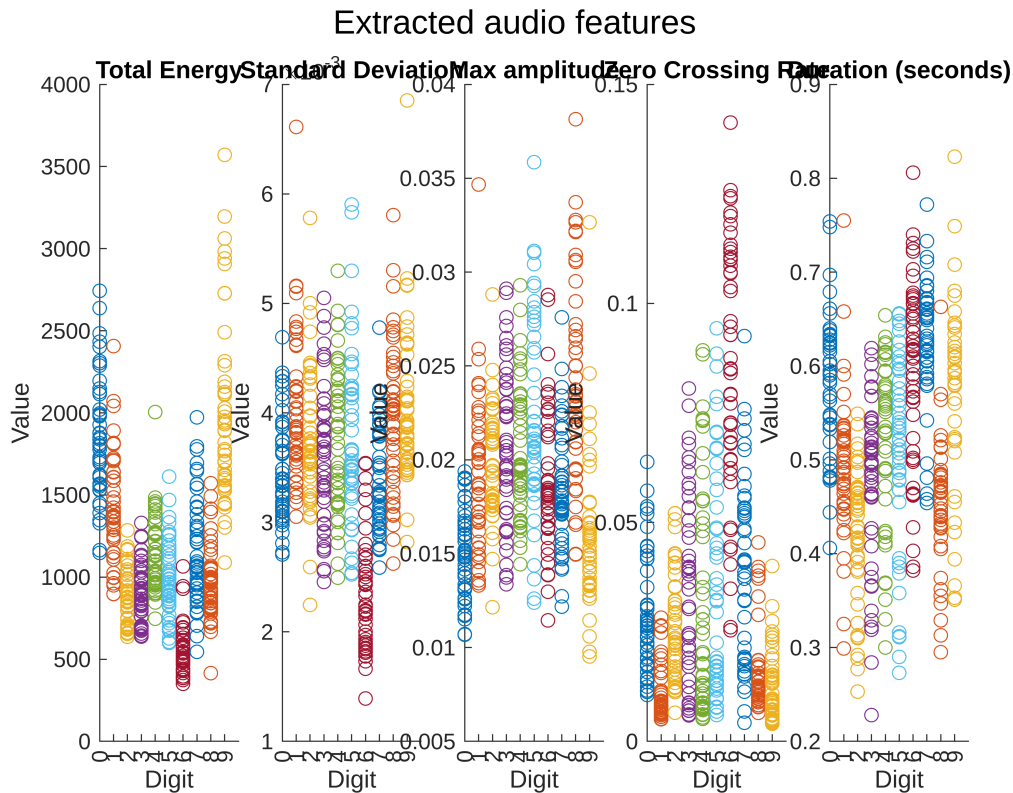
% i + 1 because MATLAB uses 1-based indexing but the audio file names use
0-based indexing
for i = 1:49
    audioFeatures(i+1, :, :) = getFeatures(i, 0);
end
audioFeatures;
% Scatter plot the 5 chosen audio features
figure(2);
featureStrings = {'Total Energy', 'Standard Deviation', 'Max amplitude',
'Zero Crossing Rate', 'Duration (seconds)'};
for feature = 1:5
    subplot(1, 5, feature);

```

```

% Iterate through every digit
for digit = 1:10
    % The repmat function is used to create a 1x50 vector with repeated
    values of the current digit
    % Plot every value of the current digit and the current feature
    in the x value given by the repmat array (always the same digit in this
    iteration)
    scatter(repmat(digit-1, 1, 50), audioFeatures(:, digit, feature));
    % Retain current plot
    hold on;
end
title(featureStrings{feature});
xlabel('Digit');
ylabel('Value');
% Make the x axis go from 0 to 9
xticks(0:9);
hold off;
end
sgtitle('Extracted audio features');

```



```

figure(3);
% Select the 3 best features for digit discrimination
bestFeatures = [1, 4, 5];
for i = 1:length(bestFeatures)
    feature = bestFeatures(i);
    subplot(1, length(bestFeatures), i);
    % Prepare data for boxplot

```

```

data = [];
group = [];
for digit = 1:10
    % The data vector stores the feature values and the group vector
    stores the corresponding digit
    % i.e. data(n) is the value of the current feature of the nth sample
    of digit group(n)
    data = [data; audioFeatures(:, digit, feature)];
    group = [group; repmat(digit, 50, 1)];
end
% Plot each one of the boxes associated with it's corresponding digit
boxplot(data, group-1);
title(featureStrings{bestFeatures(i)});
xlabel('Digit');
ylabel('Value');
xticklabels(0:9);
end
sgtitle('Best features for digit differentiation');

```

Best features for digit differentiation

