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                                predict_best_fit_tree
function [category_index predicted_z final_delta] =
predict_best_fit_tree(anchor_tree, delta_tree, new_data_item, predict_z_toggle)

[width depth] = size(anchor_tree);
new_data_vector = new_data_item{1};

%We initialize the return values to indicate a failure to categorize
min_difference = Inf;
final_delta = Inf;

i = 0;
break_loop = 0;

while(i < depth && break_loop == 0)

    j = 0;

    while(j < width && break_loop == 0)

        anchor_vector = anchor_tree{width - j, depth - i};
        delta = delta_tree{width - j, depth - i};

        if(isempty(anchor_vector) == 0)

            if(predict_z_toggle == 1)

                new_data_vector(3) = anchor_vector(3);

            endif

            difference = norm(new_data_vector - anchor_vector);

            %Either it's within delta, or we've reached the top of the tree
            if(difference <= delta || anchor_vector(3) == Inf)

                category_index = [(width - j) (depth - i)];

                if(anchor_vector(3) != Inf)

                    predicted_z = new_data_vector(3);

                else

                    predicted_z = Inf;

                endif

                final_delta = delta;

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                                predict_best_fit_tree
    break_loop = 1;
    endif
    endif
    j = j + 1;
endwhile
    i = i + 1;
endwhile
endfunction
```