

Exsys Corvid® Core for Apple Macintosh
Application How-To

Selection Expert Systems

Albuquerque Hiking Trails



Exsys Corvid Core Application “How-To”

One very effective way to use Corvid expert systems is to select the “Best” item(s) from a group of similar items based on the end user’s preferences. An expert system approach is particularly well suited to cases where in some cases it may not be possible to meet all user’s requests and the system must balance competing factors to find the best overall recommendation(s).

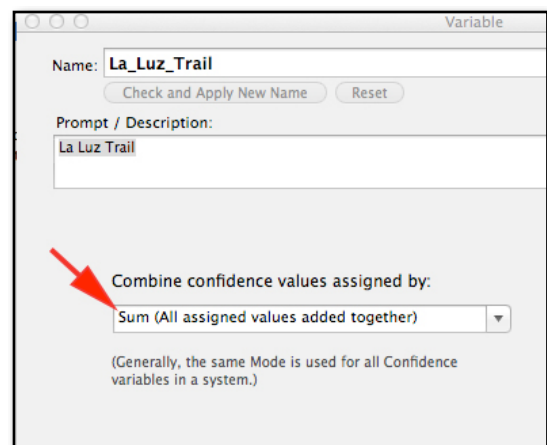
This can be used to help customers find the best product to buy based on their needs, the best option based on technical requirements, or anywhere there are a group of related items and multiple selection criteria that need to be balanced.

Here the system recommends the best hiking trail for the user, based on various criteria.

The key to a system like this is to use Confidence variables for the possible items being selected among with the “Sum” method of combining confidence values. This makes it easy to treat each factor in the decision independently, with each adding or subtracting “points” to the Confidence variables based on how well they match the users requests.

1. A Confidence variable was created for each of the trails and set to use the default “Sum” method to combine values.

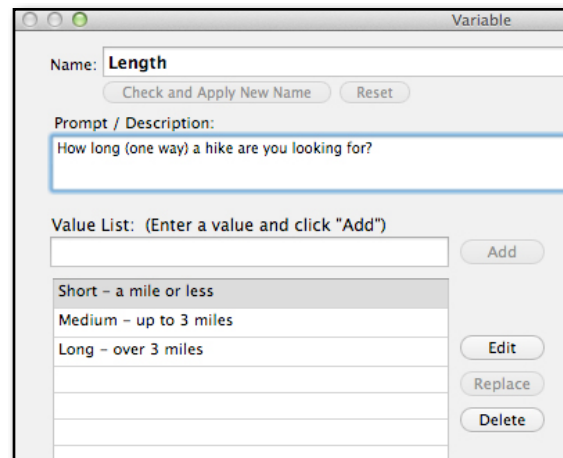
Using “Sum” allows multiple rules to all contribute independently to the overall final value for the variable. This makes it easy to incorporate as many factors into the decision as needed without the system growing too large.



The screenshot shows a window titled 'Variable' with the following fields and controls:

- Name:** La_Luz_Trail
- Buttons:** Check and Apply New Name, Reset
- Prompt / Description:** La Luz Trail
- Combine confidence values assigned by:** A dropdown menu showing 'Sum (All assigned values added together)' with a red arrow pointing to it.
- Footnote:** (Generally, the same Mode is used for all Confidence variables in a system.)

2. Other variables are added for each of the factors that will be included in the decision. Here this includes length and difficulty of the hike, what type of scenery the user would prefer, season, etc.



The screenshot shows a window titled 'Variable' with the following fields and controls:

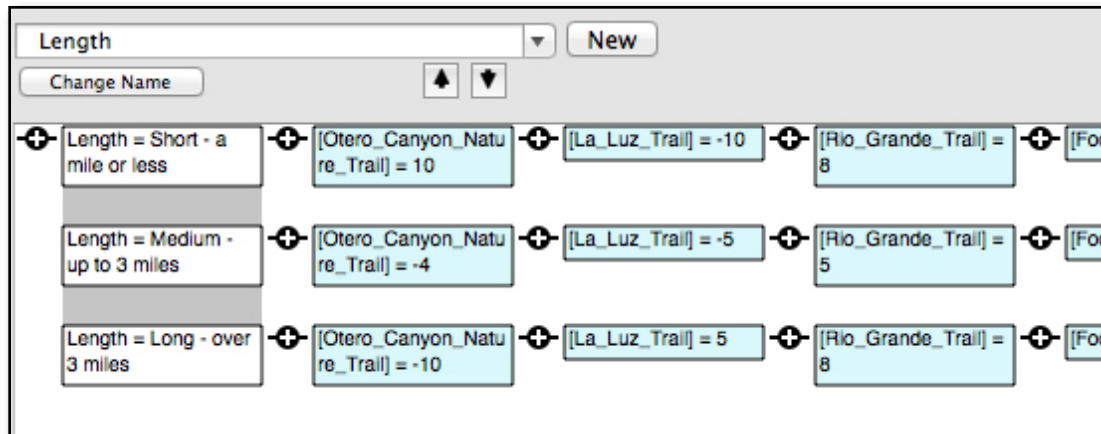
- Name:** Length
- Buttons:** Check and Apply New Name, Reset
- Prompt / Description:** How long (one way) a hike are you looking for?
- Value List:** (Enter a value and click "Add")
- Value List Table:**

Short - a mile or less
Medium - up to 3 miles
Long - over 3 miles
- Buttons:** Add, Edit, Replace, Delete

3. A Logic Block is added for each “aspect” of the selection. An aspect may be a single factor or may combine several factors as needed. The THEN part of each rule assigns a value to the various Confidence variables (trails) based on how well they meet the IF criteria for the rule. It is the user’s input that will determine which IF part is true and determine which rule’s THEN values will be set for the trails.

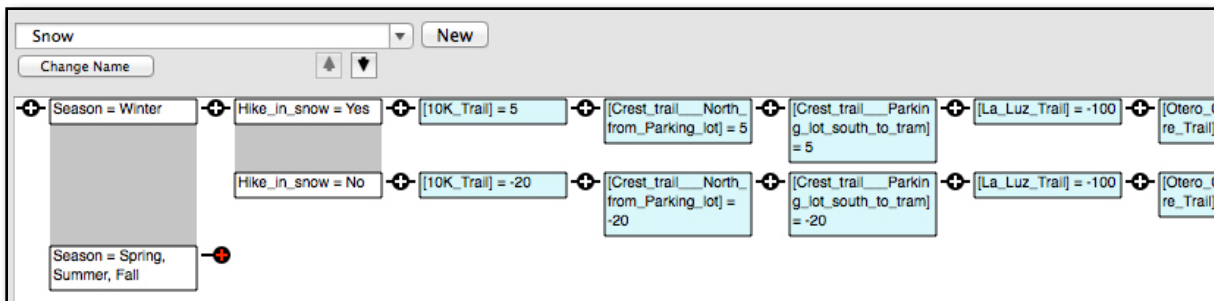
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The values assigned are in the -10 to 10 range, with 10 indicating the trail is a good choice based on this criteria and -10 indicating it is a very poor choice based on the criteria.



Here, if the user selects they want a “short” trail, the Otero Canyon trail gets a value 10 since it is a short trail and La Luz trail gets -10 since it is a long trail. Each of the trails is assigned a value based on that factor alone. Since there are multiple Logic Blocks, each covering a different aspect of the decision, all of the various factors will be combined since Confidence variables add up all the values assigned to them in the individual rules that fire for their final value.

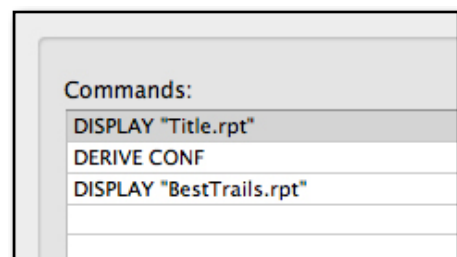
Other logic blocks can consider factors only in certain cases. The “Snow” Logic Block considers if the user wants to hike in snow. However, this is only an issue in the winter, so the “Snow” question is under the “Season” question and only used when the season is winter. If the user selects a season other than Winter, they will not be asked about snow and it will have no effect on the trail selected.



4. As many Logic Blocks are added as there are factors in the decision. The values assigned to the trail Confidence variables can be scaled so that more important factors assign more points and less important “nice to have” factors assign smaller numbers of points, but they will still be factored into the decision.

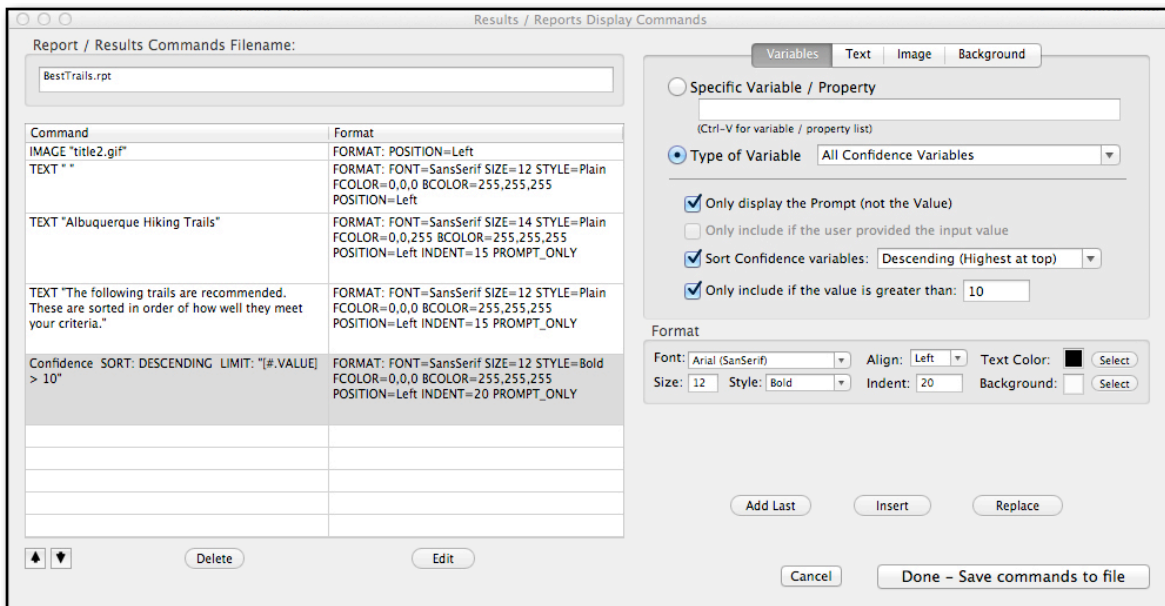
5. The Command Block is modified to:

- Display a title screen.
- Use backward chaining to derive the final value for all the Confidence variables.
- Display the results using the “BestTrails.rpt” custom screen.



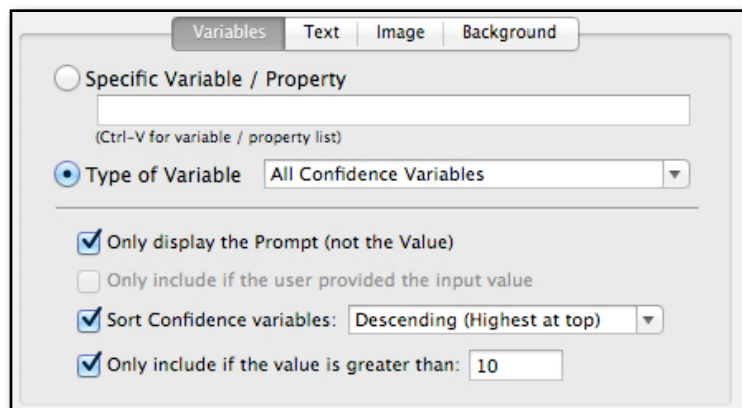
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6. The “BestTrails.rpt” custom screen uses a command to display an image, some text and then the advice.



You want the Confidence variables displayed in order with the “best” ones at the top. Also, since the final value may not have much real meaning to the end user, we only want the Prompt (trail name) displayed, and in this system, trails that got a final score of less than 10 and not good recommendations and should not be displayed.

To do this select to display All Confidence variables, but limit is with the options below to only include ones with a value over 10. Then select to only display the prompt and sort “descending”.

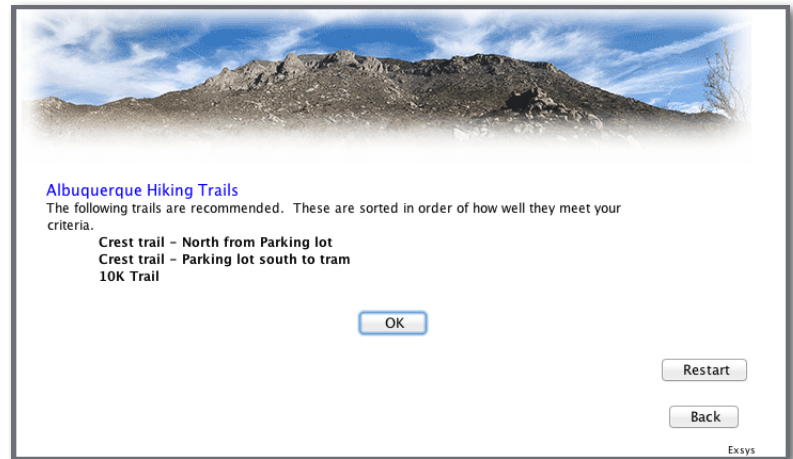


When the system runs it asks the user for their preferences.



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Based on their input it recommends the best trails. Here these are just listed, but they could include HTML links to web pages providing details on each of the selected trails.



Using the Corvid Core expert system approach to a selection problem, it is easy to incorporate as many factors as desired while still keeping the system small and easy to maintain. Incorporating a new trail only requires adding a new Confidence variable and assigning it a value in each of the THEN sections of relevant rules.

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