Welcome to the rave

System Requirements:

Rave requires MATLAB 2009a or a newer version. Rave should work on both 32 and 64 bit versions of MATLAB. Rave should work on PCs and Macs, although you may see minor bugs on Macs like buttons being the wrong color. We have not tested Rave on Linux or on any student version of MATLAB, so it may or may not work.

Rave requires java to be enabled in MATLAB (it is by default).

Certain Rave optimizers require the MATLAB Optimization Toolbox, and others require the Global Optimization Toolbox. Certain surrogate models require the Neural Network Toolbox.

You must have a screen resolution of at least 1100x700 pixels. If your screen is smaller than that some things might get cut off at the edges. We recommend a screen size of at least 1440x900 pixels.

How to contact me:

Whenever something says "contact me" it means email mdaskilewicz@asdl.gatech.edu

What's included in the Rave Install package:

1. This file
2. Another file that contains a user manual
3. The main install file, named "rave install <ver>.zip". This contains the rave toolbox folder structure.
4. A sample data folder that contains some data sets and functions you can use in Rave.

How to install Rave:

RAVE is installed by simply unzipping the Rave folder to your regular MATLAB working directory.

1. Start MATLAB.
2. Look near the top of your MATLAB window for the "Current Folder". This is indicated by the green arrow below:
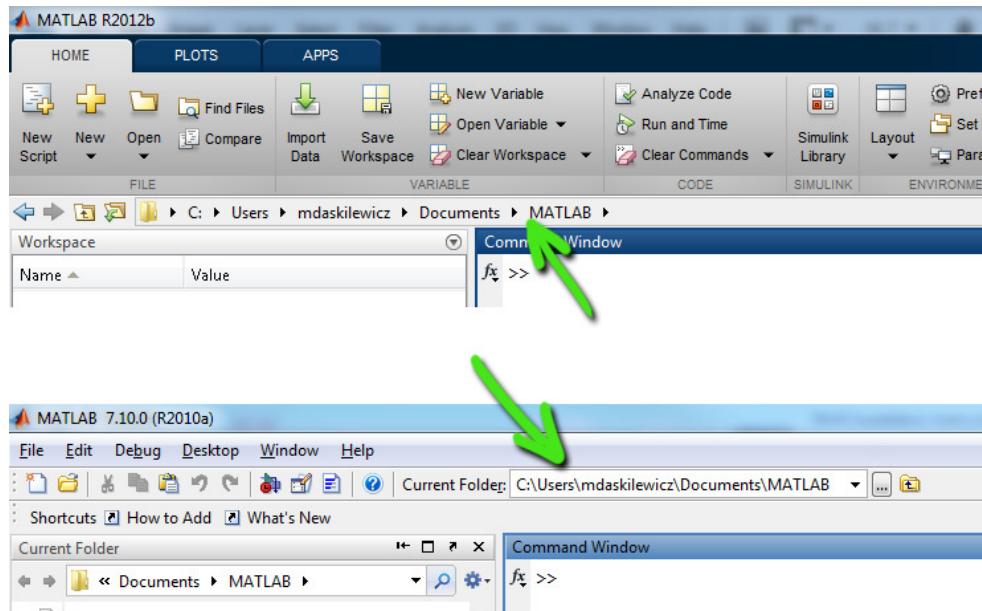
3. Unzip the rave folder in the rave zip file to the directory in Step 2.
4. In MATLAB, browse the the new rave directory you just unzipped by using the browse button next to the "Current Folder". The browse button is circled below:
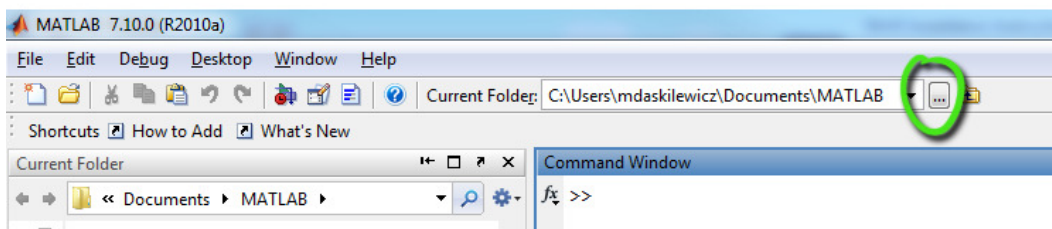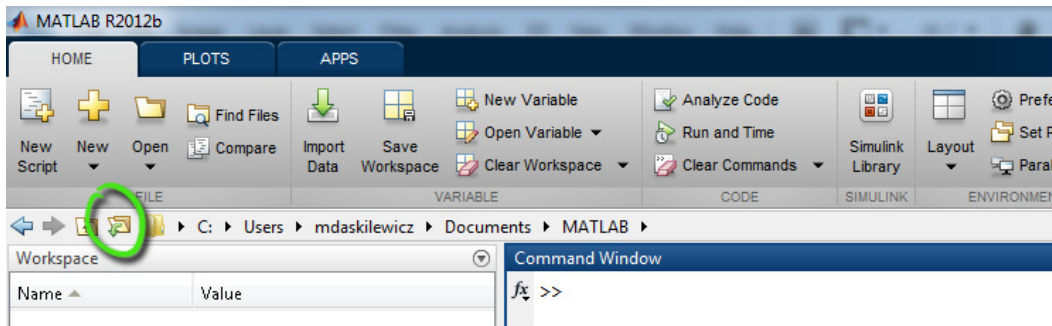
5. Now type "rave" at the MATLAB command prompt, and hit enter. If you get the error message ??? Undefined function or variable 'rave' then you have done something wrong in steps 1-4.
6. An installer will start. Follow the steps of the installer to set up rave.

7. When the installer finishes, rave will open. In the future, start rave by simply entering "rave" at the MATLAB prompt. If you have the correct user permissions to modify your MATLAB path, the rave installer will modify it so that you won't need to navigate to the rave folder before starting rave (i.e. you don't need to repeat step 4 above each time you want to use rave). The installer will not re-run unless you delete your raveprefs.mat file (or you stored it in a location that isn't on your MATLAB path).

Note: To install RAVE to a different directory, just follow the above steps, but in step 3 unzip rave to the desired directory.

Setting Preferences

Many aspects of Rave's operation are controlled by the preferences stored in the raveprefs.mat file that gets created when the Rave installer runs. Most of these preferences can be changed from within Rave

Installing additional components:

RAVE currently uses some controls that must be installed on your system for certain features to work. You may already have these installed, if not, follow the directions below. If you're not sure, install them again; it won't hurt.

Setting up PDF export:

(Note, I've only done this once, so I might be missing a step in this process. If it spits out a blank pdf file instead of your graph, let me know and I'll see what I can do.)

To export files as PDFs, you must have ghostscript installed. Also you must have the ghostscript path on your system path. To do this in Windows:

1. Install ghostscript from the internet.
2. From the desktop right-click My Computer and click properties.
3. In the System Properties window, click on the Advanced tab.
4. In the Advanced section, click the Environment Variables button.
5. Finally, in the Environment Variables window, highlight the PATH variable in the Systems Variable section and click edit. It will contain a list of paths, separated by semicolons. Make sure your GS bin folder is listed. If not, add it to the path (put a semicolon after the last item and just append it). It should look something like: "C:\Program Files\gs\gs9.02\bin"

(If you know how to set this up for a different operating system, please send me the steps.)

Setting up rave File Types in Windows

This is optional, but if you'd like, you can register the rave file types, which will allow you to open saved rave projects and metadata files by double clicking them, and will also give them the rave icons instead of the default "unknown file type" icon. If MATLAB is not already running, double clicking a .rve file will start MATLAB.

To set up file types, click the appropriate button in the rave installer.

If you update your MATLAB version in the future, you will need to re-register the files types to reflect the new version. To do this:

1. Rename your raveprefs.mat file to anything you like.
2. Start Rave. Since it can't find the raveprefs.mat file, the installer will run.
3. At the end of the installer, re-register the file types.
4. After the installer finishes, delete the raveprefs.mat file it created
5. Rename the file in step 1 so that it is once again called raveprefs.mat

How to use RAVE:

Some instructions are in the User Manual located at: http://www.rave.gatech.edu/help/index.php

…and some very basic instructions to get you started are included here:

To start Rave, simply type "rave" at the MATLAB command line.

Loading Data Sets

The first thing you should do when you start Rave is load a data set. **Most functions (including changing tabs) will be disabled until you load a data set**. To load a data set, click the "manage data sets" button on the manage tab, and then click the browse button in the window that pops up. Select the file you want to use and hit "Create this Data Set."

Supported file types are tab-delimited text, csv, and xls files. Sufficiently new versions of MATLAB can also load .xlsx files. Data files must be "flat file" formatted (Google it).

After a second, the data set name should appear in the lower half of the window under the words "Manage Data Sets". You can hit "Done" or use the buttons on the right to modify the data set if necessary. For example, you can use the Define Data Types button to make some variables discrete.

When you close the Manage Data Sets window (by hitting "Done"), you are ready to create a graph.

Creating Graphs

After you have loaded a data set, you can create a graph. Click on the "Create New" button under "Graph" on the Manage tab. Select the type of graph you would like to create by clicking its button. The pop up window will disappear, and you must place the graph on the workspace by clicking and dragging the mouse to size the graph. When you release the mouse button, the graph will appear.

You can resize the currently selected graph (the one with the colored border) by clicking and dragging the small squares at each corner.

You can move a graph without resizing it by holding CTRL and clicking in the empty space between the graph and the colored border, then dragging the graph to the desired position. (Note: Tables cannot be moved in this way)

You can select a graph by clicking the empty space between the graph itself and solid colored rectangle that surrounds the graph and its axis labels. This gives it the (usually orange) resizing border and makes the tabs update to show the information related to this graph.

Sample Data sets:

Some sample Rave data sets can be found at the bottom of the page at:
 http://www.rave.gatech.edu/download.shtml

Turbofan Demo.txt is a DOE of inputs for a turbofan design. By itself it isn't much to look at (a two-level full factorial). But there is also a folder "Turbofan Functions" that contains several response surface equations saved as text files. These are the "outputs" and you can load them on the model tab by selecting "load folder of functions" and then you can do function-dependent things like optimizers, prediction profilers, surface profilers, and the many scatterplot explore methods. Alternatively, the RSEs are also contained in the tfrses4rave.m function, which can be loaded as a matlab function from the model tab. (same equations, just in a different format – so don't load them twice!) This data set can be used to demonstrate almost any of RAVE's capabilities.

Combustion.txt is a 1-D data set. It is a calculation of (mostly) mole fractions of different molecules across a flame sheet. The independent variable is "distance" and all the other variables are responses. This is useful for playing around with line graphs and histograms.

A note about updating RAVE:

To update an older version to a newer version, just delete your existing rave folder and replace it with the new version. This generally needs to be done while MATLAB is not running because Window's won't let you delete these folders while MATLAB is running.

If you make changes to individual files that Rave uses, you can usually make these changes while Rave is running and the changes will take place immediately. You can even delete/replace individual files while Rave is running. The exceptions are any java files, which can only be replaced while Rave is not running, and any new directories (and their contents), which Rave only checks for at certain times depending on the folder location:

- A new folder in rave/graphics/ - will be recognized the next time you click the "Create New" button on the Manage tab
- A new folder in rave/optimizers/ - will be recognized the next time you completely refresh the optimize tab by entering/exiting full screen mode
- A new folder in rave/modeling/ - will be recognized the next time you click the "Create New Model" button on the Model tab.
- A new folder in rave/exploremethods/ - will be recognized the next time you click on the "Specialize" tab.

If you create a new folder that isn't in one of the above locations, it will not be recognized until the next time you start Rave.

A note about updating MATLAB:

If you update to a new version of MATLAB, your existing Rave installation should get carried over. In general you won't need to do anything and Rave will still work. However, see the note above about updating your file type associations to work with your new version.

A warning about file names:

Rave contains lots of files. On the off chance you have another file with the same name, things will break. I've tried to make the names rather obscure, but some might have a conflict. Rave also uses a lot of MATLAB functions that you may not have even known about. If you have created a function with the same name as a builtin matlab function, things might not work.

Release Notes

Bugs:

There will be bugs. Most of them can just be ignored though. (Think of these as features yet to be implemented.) The only real killer is if you get an error about "invalid handle"… then you'll probably need to restart Rave. If you get an error that causes the tab's on the left side of the screen to break, try entering/existing full screen mode (hit the "no tabs" button at the top left of the screen, then hit Esc to exit). This will reset the tabs and should fix the error.

I recommend you have your sound turned on so you can hear errors happen, as that is often the only immediate notification you'll get. (Rave does not display error messages; they'll appear in your main MATLAB window.)

If you find a bug, please let me know and describe what you were doing as best you can. Almost all bugs are really simple and take <5 minutes to fix, so don't be shy, I might be able to send you a fix right away.

Things to Know:

If you try to load a regression/function that takes a string as an input, it will convert the string to an integer value (j=1 to n where n is the number of possible strings and j is the index of this string when all n of them are listed alphabetically) and send that value as the input to your function.

Currently no optimizers support discrete variables!

Every data set must at least contain at least two non-identical rows. (If you're just running an optimizer or profilers, use a 2-row data table that just contains the high and low limits of each input variable.)

I have not tested for bugs when two variables have the same name, but I'm almost sure something will break. If your variable name contains a common function name, like "sin" or "exp" it might also break if it is used with a function, as MATLAB won't know if you mean the variable name or the function name.

If you save a .rve file that uses functions that you have loaded on the model tab, you must copy those functions along with the .rve file when you are moving between computers. If you loaded a .m file, be sure to distribute a copy of that file with the .rve file. If you loaded txt files, or created new models on the model tab, then Rave created a .m file version of those functions and stored it in your default Rave directory (which can be viewed by clicking the button at the top of the Setup tab). You will need to find these files and distribute them with your .rve file.

There is no undo button. This shouldn't surprise you because making an undo button is one of the hardest jobs in all of coding. Luckily though there isn't much you can screw up. But be aware that all changes are final.

Several buttons exist but don't yet do anything. If you click and nothing happens, don't feel bad. Notable among these:

- The Specialize Tab is currently under construction and is empty for almost all workspace objects.

Data set size limit

Rave (well, MATLAB really) can only really graph about 10,000 pts at a time. If you have a giant data set, creating graphics that show individual points (such as scatter plots or parallel coordinates), Rave will be very slow. If you're just making static graphs to export, this might be fine for you.

If you have a "serious" graphics card, you may get better performance by switching to the OpenGL renderer, which you can do by clicking the "clock" button at the top left of the screen (click twice to get to OpenGL). But note that OpenGL has many bugs and generally decreases the quality of the entire Rave window. None of these bugs are permanent though; just click the clock button again to go back to "Painters Mode" and everything will look nice again.

Related to this: making scatterplot matrices that are colored according to an additional variable is VERY slow and I recommend you avoid it if your data set has more than 1000 pts.

Acknowledgements:

RAVE includes several BSD licensed files from the Mathworks file exchange. You can find a list of these files here:

http://www.rave.gatech.edu/help/index.php?title=Acknowledgements

Please! Contact me with your feedback:

While I may not be able to respond to every email, I ALWAYS read them. I am VERY interested to hear about:

- How you use Rave. What functions do you use most often?
- Why you do or do not like Rave
- What other programs you use for visualization, optimization, etc… and why you like them
- Anything that gives an error or does not work the way you expected it to (even if it is working correctly)
- What other data formats you use that you would like to see supported in Rave
- What other visualizations, optimizers, surrogate models, exploremethods, etc. you use that you would like to see supported in Rave
- Ideas for how to improve user interfaces
- Ideas for how to make user-supplied function interfaces less restrictive (e.g. allowing the function to take individual variables as inputs instead of taking in the whole data set)
- Additional capabilities you'd like to see implemented, regardless of how simple or complex they are.

Rave is still a fairly new program, and up until now has been coded based on my personal view of the world. I am interested in hearing about what your data "looks like" (file formats, nature of data, etc…), how you interact with it, and how Rave can be improved to better support your needs.

But please understand that I am unable to provide real "customer support" for Rave. It is just a hobby for me.

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