

ICrAData v1.7

InterCriteria Analysis algorithms:

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The name of the application ICrAData means InterCriteria Analysis Data. For information about the algorithms, see `articles` directory, also presentation in `docs` directory.

1 Application

The application is written in the Java programming language and requires software installation from <https://www.java.com/en/download/manual.jsp> or downloading an archive from <http://justmathbg.info/java.html>.

Please use Java 64-bit on Windows 64-bit. Check from Control Panel – Java.

Start the application from `ICrAData.jar`. The basic example is already loaded:

6;5;3;7;6

7;7;8;1;3

4;3;5;9;1

4;5;6;7;8

Click the button Analysis to make the calculations and view the plot.

2 Algorithms

There are Variants and Methods. Variants are the algorithms by which the matrix is processed. Usually that is a single matrix, also known as Standard ICrA Method.

The other methods must be applied to at least three matrices. There is matrix count `MatCnt` option for that.

Standard ICrA Method: applies the base algorithm (ICrA Variant) over a single matrix, and displays the result.

Aggregated ICrA Method: requires at least three matrices, the input matrix is split by the `MatCnt` option. The base algorithm is applied over each matrix. Then is applied an aggregation over the matrix count: average of all elements at each (i, j) index; maximum/minimum of all elements at each index.

Criteria Pair ICrA Method: requires at least three matrices, the input matrix is split by the `MatCnt` option. The base algorithm is applied over each matrix. This result is written as rows of two new matrices, one for μ and one for ν . The intermediary step is two matrices with number of rows equal the matrix count, number of columns equal the number of elements of upper triangular matrix from the base algorithm.

A criteria pair (special method) is applied to these two matrices, which results in a new ICrA matrix, that is displayed. This special method applies the base algorithm over an Ordered Pair (this functionality is used only here).

ICrAData v1.7 has the capability to load data files as Ordered Pair, which is not yet implemented in the 2.x branch.

3 Result

Table view can be changed by the drop down menus. The values for Alpha and Beta refresh the tables and the plot, same applies for Digits – plot tooltips display row, column, μ , ν , distance to $(1, 0)$.

Table and plot colors:

- $\mu > \alpha$ and $\nu < \beta$ – Positive Consonance – green,
- $\mu < \beta$ and $\nu > \alpha$ – Negative Consonance – red,
- all other cases – Dissonance – magenta.

The Export button opens a small window, that allows saving the result matrix in several different ways:

- μ and $\nu - \mu$ data is saved in the upper triangular part of the result matrix, ν data is saved in the lower triangular part of the result matrix, this option saves the result matrix the way it is stored in memory;
- $(\mu; \nu)$ – save the result matrix as a full mirror matrix – values for $(\mu; \nu)$ are repeated in the upper/lower part of the saved matrix file;
- μ full – mirror matrix for μ values;
- ν full – mirror matrix for ν values;
- vector upper – save the result matrix as a vector – headers, values, indexes – per each cell per row; iterate over the upper triangular part of the result matrix;
- vector lower – save the result matrix as a vector – headers, values, indexes – per each cell per row; iterate over the lower triangular part of the result matrix; different ordering of the elements compared to vector upper.

4 Configuration

The configuration file `config.ini` allows for changing the appearance of the user interface. There are three options:

- scale – default is 1.0, if the application looks too small on a HiDPI screen, increase this value to 1.4 for a better experience;
- interface – default is 1, this is the system look and feel (better on Windows), change to 0 for the cross-platform look and feel (better on Linux);
- darkmode – default is 0, enable dark mode by 1, this is an experimental option, please provide feedback on the appearance of the application.

5 Acknowledgements

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Changes in versions from 0.9.6 to 1.2 have been implemented for project **DFNI-I-02-5 “InterCriteria Analysis: A New Approach to Decision Making”**, funded by the National Science Fund of Bulgaria.

6 Changelog

- Version 1.7 (June 10, 2020) [Java]
 - User interface optimized, to reflect the 2.x branch
- Version 2.0 (January 2, 2020) [C/C++]
 - Application rewrite, from the codebase of ICrADData v1.6
- Version 1.6 (June 20, 2019)
 - Panels can be resized all the way by their separators (with the mouse)
 - Plot options changed to check boxes Colors, Ticks, Grid, Text; options also reflected in the PNG/TeX export
 - Added coloring of the plot points
- Version 1.5 (June 7, 2019)
 - Added alternative coloring of the table cell data
- Version 1.4 (July 27, 2018)
 - Button Save File now always asks for the file name
 - Button Save Copy is now Save Draft, and makes a backup of the input data
 - Backup is created every 15 minutes and on application exit
 - Added function Save to the button View Data
- Version 1.3 (July 22, 2018)
 - Importing headers through copy/paste from MS Excel now works
 - Added loading of CSV files
 - Added option for row/column header names
 - Changed the table colors in three main colors
 - Added option for screenshot in Export
- Version 1.2 (May 14, 2018)
 - Table column selection marks all respective plot points in blue color
 - Added headers to all matrices when using the button View Data
 - Export button is now two buttons PNG/TeX
- Version 1.1 (March 16, 2018)
 - Saving the working directory when using Open File, Save File, Export
- Version 1.0.0 (January 25, 2018)
 - Ordered pair comparisons:
 - greater: $(a_1, b_1) > (a_2, b_2)$ when $a_1 \geq a_2, b_1 < b_2$ or $a_1 > a_2, b_1 \leq b_2$
 - less: $(a_1, b_1) < (a_2, b_2)$ when $a_1 \leq a_2, b_1 > b_2$ or $a_1 < a_2, b_1 \geq b_2$
 - Improved the TeX/PNG export of the plot

- Message is displayed for insufficient memory
- Version 0.9.9 (November 12, 2017)
 - Second Order ICrA, with option for matrix count
 - Aggregated ICrA, with option for aggregation and matrix count
 - Saving the parameters of the input data when using Save File/Save Copy
 - Added new plot view – Text, on the left of button Export
 - Added TeX export for the plot
- Version 0.9.8 (September 6, 2017)
 - Added option to export the matrix by rows or columns as a vector
 - Added option for header separator - tab, semicolon, comma
- Version 0.9.7 (August 22, 2017)
 - Ordered pair (μ, ν) for the input data: separate matrices for μ and for ν
 - Added option to transpose the input matrix data
 - Added header to the data export
 - Added TeX & separator for the data export
 - Added option to select the size of the plot points
 - Point selection (with the mouse) on the plot shows the respective cell from the table
- Version 0.9.6 (June 18 2017)
 - Application can calculate the distance from (μ, ν) to $(1,0)$
 - Alternative view: showing table (μ, ν) and distance table
 - Added option to select the number of digits after the decimal point
 - Added option to select the names of the criteria
 - Cell selection (with the mouse) in the table shows the point on the plot
- Version 0.9.5 (June 12, 2017)
 - Application renamed from ICADData to ICrADData
 - Synchronized scrolling of both tables
 - Plot can be dragged by the mouse
- Version 0.9.4 (June 4, 2017)
 - User interface redesigned
- Version 0.9.3 (May 31, 2017)
 - Added fifth algorithm – Weighted
- Version 0.9.2 (July 20, 2016)
 - Added exporting of vectors (elements from the upper triangular matrix)
 - The algorithm Intended is renamed to Unbiased

- Version 0.9.1 (May 21, 2016)
 - Matrix export was too slow for very big input data
- Version 0.9 (April 24, 2016)
 - Added fourth algorithm – Balanced
 - Added plot color – black/white
- Version 0.7 (April 10, 2016)
 - Data can be loaded by copy-paste from another software
 - Added an option to export the matrices
 - Added two more algorithms – ν -biased, Intended
 - Fixed the problems from the initial version
- Version 0.5 (April 3, 2016)
 - Initial version
 - Base algorithm – μ -biased

7 Download

Download the application from these links:

<http://intercriteria.net/software/>

<http://justmathbg.info/icradata.html>