Experimental Design V1.0

Documentation

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Revision History

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# Introduction

## Scope and objectives

This model is an analytical tool that will supply the building blocks to design the choice experiments. A choice experiment is a survey approach designed to draw consumer preferences based on a hypothetical scenario. Thus, the respondents are required to choose between multiple options. This choice is expected by the researcher to occur by the trade-off of the individual attributes of the different goods available and choosing the good (or alternative) that provides the most utility.

The results will help in forecasting decisions, suggesting to respondents’ questions about their possible choices in hypothetical situations given a specific set of conditions created thanks to experimental design. The level of distinctiveness of the alternatives is nothing more than the representation of goods or services that differ from each other. Alternatives are offered to individuals, and they are asked to express their choices by declaring their preference.

The code exemplified here allows to create an experimental design matrix, for then to be able build the blocks used in a stated preference data collection.

# Requirements.

## Software requirements

The simulators have been built using Rstudio version 1.4

The following R libraries need to be installed:

1. library(readxl)
2. library(choiceDes)

## Input/Outputs

### Inputs

An excel file with the following columns: attributes columns, choice sets, alternatives and blocks. The experiment can have as many attributes as is necessary, but the order of the columns should be the same as is shown in Table 1.

Table 1 Example of the excel input for the experimental design

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Attribute 1** | **Attribute 2** | **Attribute 3** | **Attribute 4** | **Choice sets** | **Alts** | **Blocks** |
| **Price of Delivery** | **Delivery time** | **Date of the delivery** | **CO2 emission** |
| 10 | 1 | Yes | 10 | 10 | 2 | 4 |
| 20 | 2 | No | 100 |  |  |  |
| 30 | 3 |  | 1000 |  |  |  |
| 40 | 4 |  | 10000 |  |  |  |
|  | 5 |  |  |  |  |  |

Table 2 below contain the description of the file.

Table 2 Experimental design– Inputs

|  |  |
| --- | --- |
| Inputs | Description |
| attributes.xml | Excel file containing the attributes to be tested |

### Outputs

As an output for this model, the code will provide an csv file with the attribute’s levels, structured via orthogonal coding

Table 3 – Experimental design output example

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Version/Block** | **Task** | **Alternative** | **Attribute 1** | **Attribute 2** | **Attribute 3** | **Attribute 4** |
| **Price of Delivery** | **Delivery time** | **Date of the delivery** | **CO2 emission** |
| 1 | 1 | 1 | 1 | -2 | 2 | -3 |
| 1 | 1 | 2 | 1 | 0 | -2 | -1 |
| 1 | 2 | 1 | -3 | 2 | 1 | 3 |
| 1 | 2 | 2 | 3 | -1 | 0 | 1 |
| 1 | 3 | 1 | 3 | 1 | -1 | -3 |
| 1 | 3 | 2 | -1 | -2 | 0 | -3 |
| 1 | 4 | 1 | 3 | -1 | 2 | 3 |
| 1 | 4 | 2 | -3 | -1 | -1 | 3 |

## Paths’ structure

The directory where the model is located has the following structure:

── Root

├── Input Folder

│

└── Output folder

# Model Description

This section describes the different files and scripts present in the model

Table 4

|  |  |  |
| --- | --- | --- |
| File name | Location | Description |
| ED.R | Root | Main script |
| requirements.txt | Root | R packages required |

# Instructions to run the model

## Environment preparation

### Environment

### Use of the code

Once created the file, r code can be easily run typing “name\_of\_the\_file.xlsx”, namely the file path of the excel file, in the function called design:



## Command line execution of the model

### Execution command