**User Manual for the Automated Optimizer for MCNP Input**

**Purpose**

The Automated Optimizer for MCNP Input Decks, hence forth referred to as the application, optimizes the specified parameters inside an MCNP input deck. This is accomplished by prioritizing the variables indicated by the user.

**Software Needs**

|  |  |  |
| --- | --- | --- |
| **Operating System** | **Required Software** | **Memory Available** |
| Windows 10 | MCNP6 | 140 MB |
|  | Python 3.0 or Newer |  |

**Files Given by the User**

1. A working Input Deck, with the interested parameters swapped with unique variable names.
2. Experimental data that is being used as the reference the application is trying to duplicate.
3. A Variable Input text file with the interested parameters, their default values, and the amount of iterations wanted to run between the min and max values
4. An Iteration text file with the interested parameter names followed by Min and Max and their associated values.
   1. Example geDensityMin

If wanting to run multiple sources or positions the following must be done

1. The Input deck described above that will be split along its symmetrical data with all of the wanted decks.
   1. The name of this Input deck is what will be used in the Code Alterations described below

**Files Generated for the User**

An MCNP output file for every run is created by the application and the final optimized deck is plotted and an Input Deck is created for future use. Additionally a summary of the data for the given energy bins is extracted for ease of comparison.

**Run Operation**

This application can be run as packaged by simply executing the StartAutomaton batch file; if the user has the aforementioned required software installed on their local drive. Otherwise this application will need to be manually ran by the use of an IDE or inside the command prompt.

In order to run this application the

**Code Alterations**

1. inputEditor
2. StartAutomaton
3. runMCNP

**Notes**

1. The final run is not necessarily the best run.
2. This application assumes the User is only asking it to iterate over possible ranges that won’t break the MCNP geometry
3. This application assumes the