

Minecraft 1.0: Data Logging and Visualization

[Plug-in Description]

Andrew Marrero

Data Logging

The data I chose to log is information revolving around the collection and usage of items. The plug-in automatically assigns a metadata value upon collection/creation of an item which stores the "owner" of the item. This is used to log some info regarding sharing of items in a multiplayer setting. Particularly, the ownership values of each item are used to track the following values for each player:

- **Independence:** How many times a player used their own items
- **Dependence:** How many times a player used someone else's items
- **Sharing:** How many times a player's items were used by other people

At the moment, the only things that constitute a "use" is eating food items, or drinking potions. Ideally, you would also want to consider things like using items as ingredients for crafting as falling into this category, but the framework does not provide easy ways to monitor that activity. Thus, unfortunately, that falls outside of the scope of this week-long assignment.

Another area of data logged is in "occupational" data revolving around items. The idea behind this is that certain items are indicative of certain areas of gameplay, so we can get an idea of the tasks the player is performing based on the items they are collecting (although many of these activities can be tracked in more rigid ways, which would be better for a larger scale implementation). I defined the following occupations and associated items:

- **Mining:** Ores, gems, and pickaxes
- **Cooking:** Edible food items
- **Farming:** Crops, seeds, and hoes
- **Fishing:** Fishing rods and raw fish
- **Lumberjacking:** Logs, saplings, and axes
- **Fighting:** Armor, swords, bows, and monster spoils
- **Brewing:** Potions and potion ingredients
- **Building:** Architectural blocks like fences, doors, stairs, etc
- **Engineering:** Redstone devices, levers, buttons, pistons, etc
- **Transportation:** Minecarts, boats, and rails

Collection of any of the above items counts towards the player's perceived involvement with the respective occupational tasks.

Visualization

I created two reusable visualization modules for displaying data via an in-game GUI. One is a pie-chart visualization, which can use any arbitrary array of values for displaying the chart, and also takes a parallel array of text captions for displaying a key for the graph. The other is a 2D line plot, which plots the values of the passed in array in the vertical axis, and the array indices in the horizontal axis. This is especially appropriate for displaying data as a function of time. Multiple arrays can be passed in at once, in which case each will be plotted as a separate line in the graph. The graph scale will automatically adjust itself based on the minimum and maximum values found in the arrays.

These visualizations are demonstrated in the plug-in by visualizing the logged data explained in the previous page. The player's total cumulative occupation values since they started the save file is displayed in a pie-chart at the top of the screen. The recent relative changes in their occupation values within the past 15-20 minutes of play is shown in the line chart. The visualizations can be toggled on/off in-game by pressing the 'O' key.

The occupational data, item ownership, and item usage data is saved server-side as part of the world/players' save files, and so it persists across sessions. The changes in occupation data over time, as seen in the line graph, is just for visual demonstration -- it is logged client side, and the data is lost when the game is closed.

