

Name: Nastazja Laskowski
Website: nastazja.github.io

GEOG5995 Programming for Social Scientists: Core Skills

Assignment/Assessment 2: Planning for drunks **github repository: <https://github.com/nastazja/5995Assignment2>**

This report details the intention of the software, issues during development and how these were overcome, general sources used, the thought processes going into the software design, and the software development process followed. Before starting this module I had no coding experience. Skills for this assessment were learnt from the 1-week intensive course, several readings of the lecture materials and a few run-throughs of the practicals. Taking this into account, I chose from the list of developed ideas and created a programme for 'Planning for drunks'.

Description

There is a group of 25 drunks at an initial set of coordinates which represent the pub. At the pub, the drunks are told their home number. The drunks leave the pub, wandering around town until they stumble upon their homes. They move within the boundaries of the town, provided as `drunk.plan.txt`, and they can only exit the town environment by entering their home.

Assignment criteria

1. Pull in the data file and finds out the pub point and the home points.
2. Draws the pub and homes on the screen.
3. Models the drunks leaving their pub and reaching their homes, and stores how many drunks pass through each point on the map.
4. Draws the density of drunks passing through each point on a map.
5. Saves the density map to a file as text.

Intention

This software is intended to fulfil the criteria of the GEOG5995 Assessment 2 project 'Planning for drunks', as outlined above.

Software: Thought process

With some similarities to the GEOG5995 practicals, the project idea required 'agents' to move around an environment, and for this an agent based model (ABM) was created with a separate class 'Drunks' to practice my newly gained skills in object oriented programming. There were several differences with this project, including that the agents were not only

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changing the environment where they stepped by adding density but also checking if their coordinates matched with a home number that was assigned at the start. The environment file needed to be searched for the pub (starting point) and I found that online documentation suggested that the pandas package was useful for processing data frames in this way (by row and column). It was also important to remove agents that reached their goal state (reached home) from the town so that they did not keep wandering around needlessly. Since the town was made up of areas with values for the pub and houses, I made a separate empty file for the density data. The agents added value to the density environment with each step without the values of the pub/homes interfering. I have commented out variations to the code so the user can in theory choose whether they want static output, an animation or a GUI with animation.

Software: Development process and general sources

The project was written using Python 3.8 script in the Spyder environment downloaded from Anaconda Navigator. As a newbie to coding, I relied on the learning materials (lectures and practicals) from the GEOG5995 module, online documentation for Python programming (via docs.python.org) and for additional packages (via pandas.pydata.org), and Stack Overflow (via stackoverflow.com).

Usage

The user will need to download relevant files from my repository, the model can be modified to include my code for it to run from command line/terminal with two system arguments: for number of drunks and number of iterations eg. 'drunks_model.py 25 1000'. This would need to be uncommented. The model is licensed under the MIT license (details in repository).

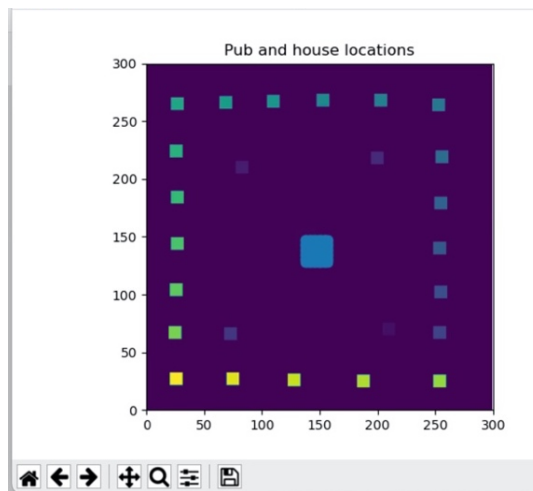
Issues and debugging

An issue that I have found difficult to figure out is: why the densitymap.txt is sometimes not populated when running the ABM using the code needed for an animation to be created. I resolved this by writing a block of code which does not produce an animation and leaving it as a comment in the programme. It can be run instead of the animation when the user does not need to visualise the drunks wandering. This code runs until all agents are home and produces the density data as required. This has two benefits: all the drunks reach home (not dependent on the number of iterations available) and it runs faster than the animation does. Please see the next page for 3 screenshots of the different visual output options from the programme.

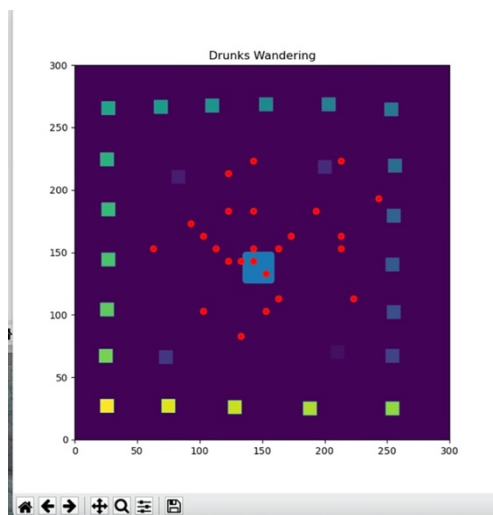
Other resolved issues included AttributeErrors and TypeErrors. For example, the 'move' attribute was not found in the Drunk class because of an indentation error. Also, I had a TypeError due to my formatting using the print function. These were minor issues, relatively easily resolved by proof-reading or checking the documentation.

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Pub and house locations (static figure):



Drunks wandering (dynamic animation, drunks disappear once they reach home):



Alternative output: Drunks all home (static figure):

