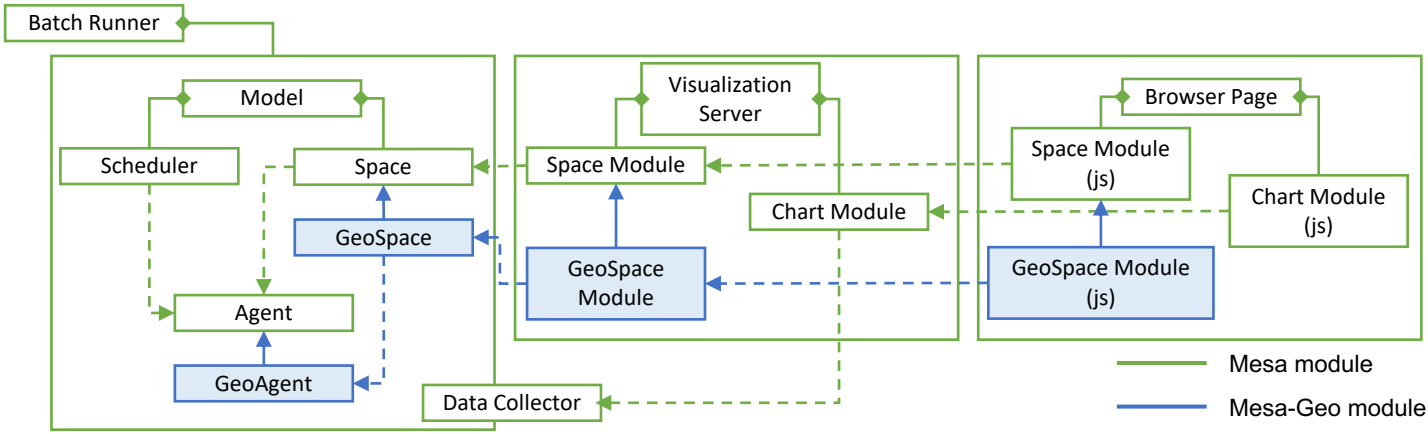


Agent-based Modeling and GIS with Python: The Mesa framework and its Geo extension

Mesa & Mesa-Geo

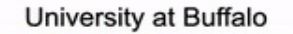
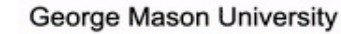
- Mesa is an open-source agent-based modeling (ABM) framework written in Python, allowing users to quickly build and visualize agent-based models.
- Mesa-Geo is its GIS extension. Thanks to the modular design of Mesa, extending its functionalities is relatively straight-forward, without the necessity of modifying its core components.



Why this is important

- There has been a trend of utilizing machine learning methods in and for ABM and GIS.
- Python is currently the dominant programming language for machine learning (ML): NumPy, pandas, scikit-learn, Keras, PyTorch, and of growing interest to GIScience (PySAL, GeoPandas, Rasterio ...).
- Mesa-Geo lacks ABM, GIS and ML integration.

Example: Agents & Networks



Next steps

- Implement more functions into Mesa-Geo
- Improve communication efficiency between backend visualization server and frontend browser page
- Documentation, test cases, issue templates ...