

Discrete Choice Model with Sampling of Alternatives

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Sampling of alternatives in MNL

- McFadden, 1977
 - Produces consistent estimation results

Implemented Alternative Samplers

- Weighted sampler (uniform sampler as a special case):

`opus_core.samplers.weighted_sampler`

- Stratified sampler

`opus_core.samplers.weighted_sampler`

- Importance sampling

`opus_core.samplers.weighted_sampler_by_category`

When and how many to sample

- When the universal choice set is too large to fit into the memory
- To balance performance and precision
- No theoretical guidance regarding how many alternatives to sample; empirical testing suggests 25% (Nerella and Bhat, 2004)

weighted_sampler

- filter: returns binary values, 0 or 1
- estimation_weight_string and simulation_weight_string in init method
 - uni-variate weight on choice set: `building.non_residential_sqft>0`
 - weights by submodel (with 'SUBMODEL' keyword):
`has_space_for_avg_size_business =
building.non_residential_sqft >
(numpy.sum(business_sqft*(business.activity_id==SUBMODEL))
/float(numpy.sum(business.activity_id==SUBMODEL)))`
 - Individual-specific weight:
`numpy.logical_and(sanfrancisco.parcel.remaining_non_residential_sqft_capacity > building.non_residential_sqft,
sanfrancisco.parcel.remaining_residential_units_capacity >
building.residential_units)`

stratified_sampler

- stratum: define stratum, stratum_id
- sample_rate: percentage to sample

OR

- sample_size_from_each_stratum
sample_size_from_chosen_stratum

weighted_sampler_by_category

- agent_category_definition
- choice_category_definition

Outputs from Sampler

- An Interaction Dataset object
- `__sampling_probability` attribute, can be used for sampling adjustment

Export choice model data

- ```
<argument name="estimate_config" type="string">
 Resources({
 'export_estimation_data':True,
 'estimation_data_file_name':r'C:/urbansim_cache/hh_est.csv',
 'use_biogeme_data_format':False
 })
</argument>
```
- Similarly, export\_simulation\_data switch for run\_config

# Import / export data

- <http://www.urbansim.org/Documentation/GetDataIntoandOutOfOPUS>