Generating Household Electricity Consumption Scenarios Through Sampling

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DTAI Declarative Languages & Artificial Intelligence

Context

The current low-voltage electricity grid **cannot** meet future demand; digging up and replacing all cables is expensive.

Solution simulate the grid to plan reinforcements efficiently
Requires electricity consumption time-series of connected houses
↳ **Unavailable for most houses**, only a few metadata features are known

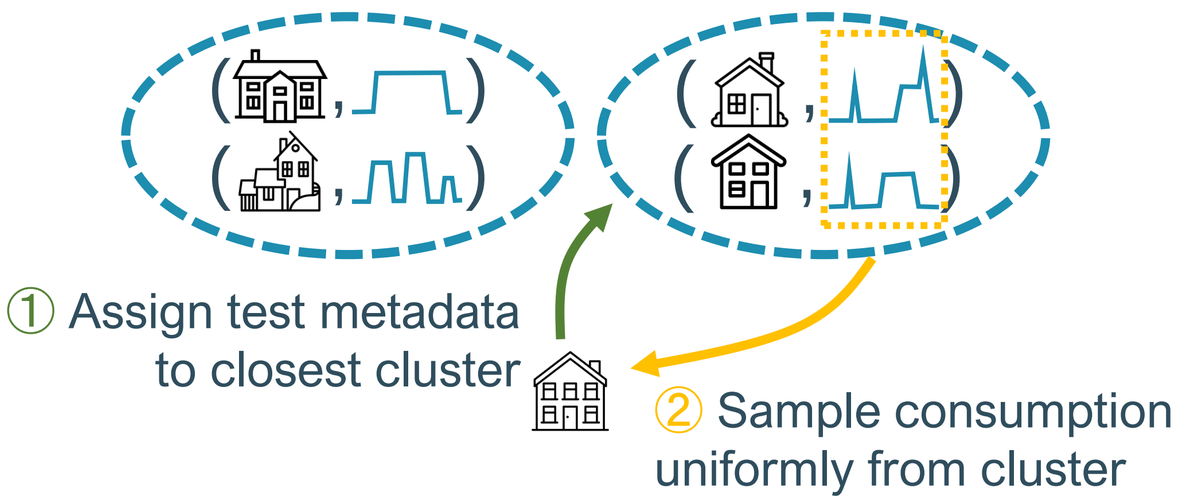
Problem statement

Given household metadata **generate** { , } plausible electricity consumption time-series **using** (,) ⋯ (,) available metadata-consumption pairs

Approach: Sample From Historic Data

BASELINE

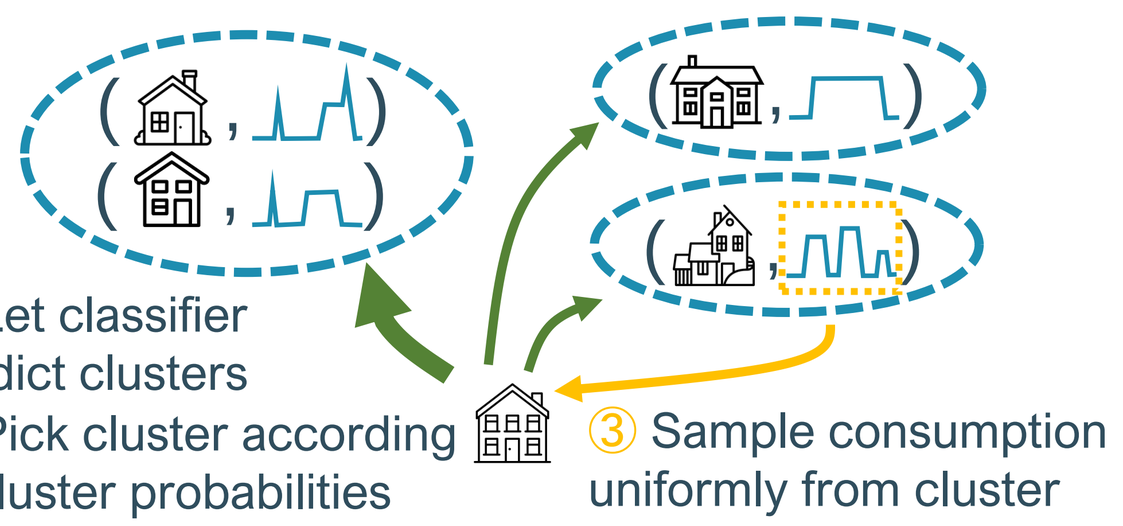
Cluster households based on **metadata**



Assumes similar metadata ⇒ similar consumption

PROPOSED APPROACH

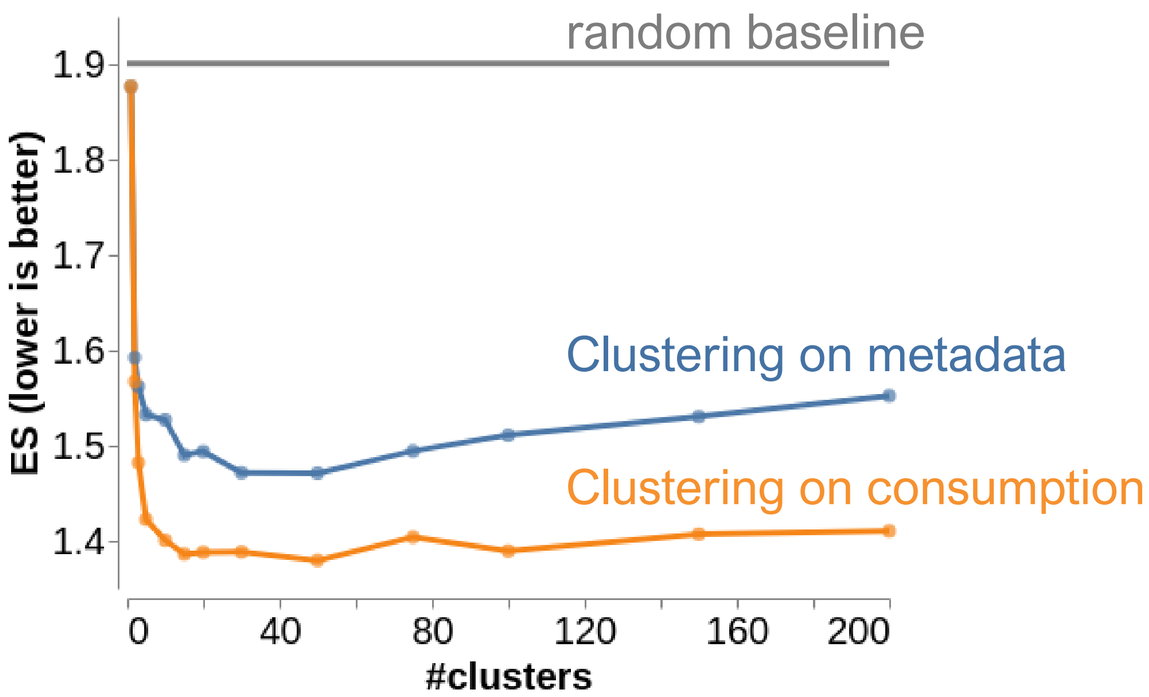
Cluster households based on **consumption**
Learn a classifier to predict the cluster from metadata



Classifier **learns** how metadata relates to consumption

Results

Clustering on consumption generates better scenarios than clustering on metadata.



Next steps

Scale up to full dataset

Add additional attributes

Integrate weather info and calendar info into sampling

Validation

Do better scenarios make the simulation of the grid more accurate?
→ Integrate our sampler into the simulation

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