

autogluon-1

November 17, 2024

1 Using AWS Autogluon to predict rent prices in Canada based on city, province, latitude, longitude, lease_term, type, price, beds, baths, sq_feet, furnishing, availability_date, smoking, and whether cats and dogs are allowed

```
[ ]: !pip install autogluon
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Collecting autogluon
  Downloading autogluon-1.1.1-py3-none-any.whl.metadata (11 kB)
Collecting autogluon.core==1.1.1 (from autogluon.core[all]==1.1.1->autogluon)
  Downloading autogluon.core-1.1.1-py3-none-any.whl.metadata (11 kB)
Collecting autogluon.features==1.1.1 (from autogluon)
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Collecting autogluon.multimodal==1.1.1 (from autogluon)
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Requirement already satisfied: numpy<1.29,>=1.21 in
/usr/local/lib/python3.10/dist-packages (from
autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon) (1.26.4)
Requirement already satisfied: scipy<1.13,>=1.5.4 in
/usr/local/lib/python3.10/dist-packages (from
autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon) (1.11.4)
Collecting scikit-learn<1.4.1,>=1.3.0 (from
autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon)
  Downloading scikit_learn-1.4.0-1-cp310-cp310-manylinux_2_17_x86_64.manylinux20
14_x86_64.whl.metadata (11 kB)
Requirement already satisfied: networkx<4,>=3.0 in
/usr/local/lib/python3.10/dist-packages (from
autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon) (3.4.2)
Requirement already satisfied: pandas<2.3.0,>=2.0.0 in
/usr/local/lib/python3.10/dist-packages (from
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Requirement already satisfied: tqdm<5,>=4.38 in /usr/local/lib/python3.10/dist-packages (from autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon) (4.66.6)

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Requirement already satisfied: matplotlib in /usr/local/lib/python3.10/dist-packages (from autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon) (3.7.5)

Requirement already satisfied: boto3<2,>=1.10 in /usr/local/lib/python3.10/dist-packages (from autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon) (1.35.63)

Collecting autogluon.common==1.1.1 (from autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon)
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Collecting ray<2.11,>=2.10.0 (from ray[default,tune]<2.11,>=2.10.0; extra == "all"->autogluon.core[all]==1.1.1->autogluon)
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Collecting lightning<2.4,>=2.2 (from autogluon.multimodal==1.1.1->autogluon)
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Collecting transformers<4.41.0,>=4.38.0 (from transformers[sentencepiece]<4.41.0,>=4.38.0->autogluon.multimodal==1.1.1->autogluon)
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 138.0/138.0

kB 8.7 MB/s eta 0:00:00

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Preparing metadata (setup.py) ... done

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Collecting timm<0.10.0,>=0.9.5 (from autogluon.multimodal==1.1.1->autogluon)
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Collecting torchvision<0.19.0,>=0.16.0 (from
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kB)
Collecting scikit-image<0.21.0,>=0.19.1 (from
autogluon.multimodal==1.1.1->autogluon)
  Downloading scikit_image-0.20.0-cp310-cp310-manylinux_2_17_x86_64.manylinux201
4_x86_64.whl.metadata (16 kB)
Requirement already satisfied: text-unidecode<1.4,>=1.3 in
/usr/local/lib/python3.10/dist-packages (from
autogluon.multimodal==1.1.1->autogluon) (1.3)
Collecting torchmetrics<1.3.0,>=1.2.0 (from
autogluon.multimodal==1.1.1->autogluon)
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Collecting pytorch-metric-learning<2.4,>=1.3.0 (from
autogluon.multimodal==1.1.1->autogluon)
  Downloading pytorch_metric_learning-2.3.0-py3-none-any.whl.metadata (17 kB)
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Requirement already satisfied: nltk<4.0.0,>=3.4.5 in
/usr/local/lib/python3.10/dist-packages (from
autogluon.multimodal==1.1.1->autogluon) (3.9.1)
Collecting openmim<0.4.0,>=0.3.7 (from autogluon.multimodal==1.1.1->autogluon)
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Requirement already satisfied: defusedxml<0.7.2,>=0.7.1 in
/usr/local/lib/python3.10/dist-packages (from
autogluon.multimodal==1.1.1->autogluon) (0.7.1)
Requirement already satisfied: jinja2<3.2,>=3.0.3 in
/usr/local/lib/python3.10/dist-packages (from
autogluon.multimodal==1.1.1->autogluon) (3.1.4)
Requirement already satisfied: tensorboard<3,>=2.9 in
/usr/local/lib/python3.10/dist-packages (from
autogluon.multimodal==1.1.1->autogluon) (2.17.1)
Collecting pytesseract<0.3.11,>=0.3.9 (from
autogluon.multimodal==1.1.1->autogluon)
  Downloading pytesseract-0.3.10-py3-none-any.whl.metadata (11 kB)
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  Preparing metadata (setup.py) ... done
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  Downloading pdf2image-1.17.0-py3-none-any.whl.metadata (6.2 kB)
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  Downloading xgboost-2.0.3-py3-none-manylinux2014_x86_64.whl.metadata (2.0 kB)
Requirement already satisfied: fastai<2.8,>=2.3.1 in

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/usr/local/lib/python3.10/dist-packages (from
autogluon.tabular[all]==1.1.1->autogluon) (2.7.18)
Collecting lightgbm<4.4,>=3.3 (from autogluon.tabular[all]==1.1.1->autogluon)
  Downloading lightgbm-4.3.0-py3-none-manylinux_2_28_x86_64.whl.metadata (19 kB)
Requirement already satisfied: catboost<1.3,>=1.1 in
/usr/local/lib/python3.10/dist-packages (from
autogluon.tabular[all]==1.1.1->autogluon) (1.2.7)
Requirement already satisfied: joblib<2,>=1.1 in /usr/local/lib/python3.10/dist-
packages (from
autogluon.timeseries==1.1.1->autogluon.timeseries[all]==1.1.1->autogluon)
(1.3.2)
Collecting pytorch-lightning<2.4,>=2.2 (from
autogluon.timeseries==1.1.1->autogluon.timeseries[all]==1.1.1->autogluon)
  Downloading pytorch_lightning-2.3.3-py3-none-any.whl.metadata (21 kB)
Collecting gluonts==0.15.1 (from
autogluon.timeseries==1.1.1->autogluon.timeseries[all]==1.1.1->autogluon)
  Downloading gluonts-0.15.1-py3-none-any.whl.metadata (9.9 kB)
Collecting statsforecast<1.5,>=1.4.0 (from
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  Downloading statsforecast-1.4.0-py3-none-any.whl.metadata (19 kB)
Collecting mlforecast<0.10.1,>=0.10.0 (from
autogluon.timeseries==1.1.1->autogluon.timeseries[all]==1.1.1->autogluon)
  Downloading mlforecast-0.10.0-py3-none-any.whl.metadata (11 kB)
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  Downloading utilsforecast-0.0.10-py3-none-any.whl.metadata (7.0 kB)
Requirement already satisfied: orjson~=3.9 in /usr/local/lib/python3.10/dist-
packages (from
autogluon.timeseries==1.1.1->autogluon.timeseries[all]==1.1.1->autogluon)
(3.10.11)
Collecting optimum<1.19,>=1.17 (from optimum[onnxruntime]<1.19,>=1.17; extra ==
"all"->autogluon.timeseries[all]==1.1.1->autogluon)
  Downloading optimum-1.18.1-py3-none-any.whl.metadata (18 kB)
Requirement already satisfied: psutil<6,>=5.7.3 in
/usr/local/lib/python3.10/dist-packages (from autogluon.common==1.1.1->autogluon
.core==1.1.1->autogluon.core[all]==1.1.1->autogluon) (5.9.5)
Requirement already satisfied: setuptools in /usr/local/lib/python3.10/dist-
packages (from autogluon.common==1.1.1->autogluon.core==1.1.1->autogluon.core[al
l]==1.1.1->autogluon) (75.1.0)
Requirement already satisfied: pydantic<3,>=1.7 in
/usr/local/lib/python3.10/dist-packages (from gluonts==0.15.1->autogluon.timeser
ies==1.1.1->autogluon.timeseries[all]==1.1.1->autogluon) (2.9.2)
Requirement already satisfied: toolz~=0.10 in /usr/local/lib/python3.10/dist-
packages (from gluonts==0.15.1->autogluon.timeseries==1.1.1->autogluon.timeserie
s[all]==1.1.1->autogluon) (0.12.1)
Requirement already satisfied: typing-extensions~=4.0 in
/usr/local/lib/python3.10/dist-packages (from gluonts==0.15.1->autogluon.timeser
ies==1.1.1->autogluon.timeseries[all]==1.1.1->autogluon) (4.12.2)

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Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.10/dist-packages (from accelerate<0.22.0,>=0.21.0->autogluon.multimodal==1.1.1->autogluon) (24.2)

Requirement already satisfied: pyyaml in /usr/local/lib/python3.10/dist-packages (from accelerate<0.22.0,>=0.21.0->autogluon.multimodal==1.1.1->autogluon) (6.0.2)

Requirement already satisfied: boto3<1.36.0,>=1.35.63 in /usr/local/lib/python3.10/dist-packages (from boto3<2,>=1.10->autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon) (1.35.63)

Requirement already satisfied: jmespath<2.0.0,>=0.7.1 in /usr/local/lib/python3.10/dist-packages (from boto3<2,>=1.10->autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon) (1.0.1)

Requirement already satisfied: s3transfer<0.11.0,>=0.10.0 in /usr/local/lib/python3.10/dist-packages (from boto3<2,>=1.10->autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon) (0.10.3)

Requirement already satisfied: graphviz in /usr/local/lib/python3.10/dist-packages (from catboost<1.3,>=1.1->autogluon.tabular[all]==1.1.1->autogluon) (0.20.3)

Requirement already satisfied: plotly in /usr/local/lib/python3.10/dist-packages (from catboost<1.3,>=1.1->autogluon.tabular[all]==1.1.1->autogluon) (5.24.1)

Requirement already satisfied: six in /usr/local/lib/python3.10/dist-packages (from catboost<1.3,>=1.1->autogluon.tabular[all]==1.1.1->autogluon) (1.16.0)

Collecting datasets>=2.0.0 (from evaluate<0.5.0,>=0.4.0->autogluon.multimodal==1.1.1->autogluon)

Downloading datasets-3.1.0-py3-none-any.whl.metadata (20 kB)

Requirement already satisfied: dill in /usr/local/lib/python3.10/dist-packages (from evaluate<0.5.0,>=0.4.0->autogluon.multimodal==1.1.1->autogluon) (0.3.9)

Requirement already satisfied: xxhash in /usr/local/lib/python3.10/dist-packages (from evaluate<0.5.0,>=0.4.0->autogluon.multimodal==1.1.1->autogluon) (3.5.0)

Requirement already satisfied: multiprocessing in /usr/local/lib/python3.10/dist-packages (from evaluate<0.5.0,>=0.4.0->autogluon.multimodal==1.1.1->autogluon) (0.70.17)

Requirement already satisfied: fsspec>=2021.05.0 in /usr/local/lib/python3.10/dist-packages (from fsspec[http]>=2021.05.0->evaluate<0.5.0,>=0.4.0->autogluon.multimodal==1.1.1->autogluon) (2024.10.0)

Requirement already satisfied: huggingface-hub>=0.7.0 in /usr/local/lib/python3.10/dist-packages (from evaluate<0.5.0,>=0.4.0->autogluon.multimodal==1.1.1->autogluon) (0.26.2)

Requirement already satisfied: pip in /usr/local/lib/python3.10/dist-packages (from fastai<2.8,>=2.3.1->autogluon.tabular[all]==1.1.1->autogluon) (24.1.2)

Requirement already satisfied: fastdownload<2,>=0.0.5 in /usr/local/lib/python3.10/dist-packages (from fastai<2.8,>=2.3.1->autogluon.tabular[all]==1.1.1->autogluon) (0.0.7)

Requirement already satisfied: fastcore<1.8,>=1.5.29 in /usr/local/lib/python3.10/dist-packages (from

fastai<2.8,>=2.3.1->autogluon.tabular[all]==1.1.1->autogluon) (1.7.19)
Requirement already satisfied: fastprogress>=0.2.4 in
/usr/local/lib/python3.10/dist-packages (from
fastai<2.8,>=2.3.1->autogluon.tabular[all]==1.1.1->autogluon) (1.0.3)
Requirement already satisfied: spacy<4 in /usr/local/lib/python3.10/dist-
packages (from fastai<2.8,>=2.3.1->autogluon.tabular[all]==1.1.1->autogluon)
(3.7.5)
Requirement already satisfied: future in /usr/local/lib/python3.10/dist-packages
(from hyperopt<0.2.8,>=0.2.7->autogluon.core[all]==1.1.1->autogluon) (1.0.0)
Requirement already satisfied: cloudpickle in /usr/local/lib/python3.10/dist-
packages (from hyperopt<0.2.8,>=0.2.7->autogluon.core[all]==1.1.1->autogluon)
(3.1.0)
Requirement already satisfied: py4j in /usr/local/lib/python3.10/dist-packages
(from hyperopt<0.2.8,>=0.2.7->autogluon.core[all]==1.1.1->autogluon) (0.10.9.7)
Requirement already satisfied: MarkupSafe>=2.0 in
/usr/local/lib/python3.10/dist-packages (from
jinja2<3.2,>=3.0.3->autogluon.multimodal==1.1.1->autogluon) (2.1.5)
Requirement already satisfied: attrs>=22.2.0 in /usr/local/lib/python3.10/dist-
packages (from jsonschema<4.22,>=4.18->autogluon.multimodal==1.1.1->autogluon)
(24.2.0)
Requirement already satisfied: jsonschema-specifications>=2023.03.6 in
/usr/local/lib/python3.10/dist-packages (from
jsonschema<4.22,>=4.18->autogluon.multimodal==1.1.1->autogluon) (2024.10.1)
Requirement already satisfied: referencing>=0.28.4 in
/usr/local/lib/python3.10/dist-packages (from
jsonschema<4.22,>=4.18->autogluon.multimodal==1.1.1->autogluon) (0.35.1)
Requirement already satisfied: rpds-py>=0.7.1 in /usr/local/lib/python3.10/dist-
packages (from jsonschema<4.22,>=4.18->autogluon.multimodal==1.1.1->autogluon)
(0.21.0)
Collecting lightning-utilities<2.0,>=0.10.0 (from
lightning<2.4,>=2.2->autogluon.multimodal==1.1.1->autogluon)
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Requirement already satisfied: numba in /usr/local/lib/python3.10/dist-packages
(from mlforecast<0.10.1,>=0.10.0->autogluon.timeseries==1.1.1->autogluon.timeser
ies[all]==1.1.1->autogluon) (0.60.0)
Collecting window-ops (from mlforecast<0.10.1,>=0.10.0->autogluon.timeseries==1.
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Requirement already satisfied: gdown>=4.0.0 in /usr/local/lib/python3.10/dist-
packages (from nlpaug<1.2.0,>=1.1.10->autogluon.multimodal==1.1.1->autogluon)
(5.2.0)
Requirement already satisfied: click in /usr/local/lib/python3.10/dist-packages
(from nltk<4.0.0,>=3.4.5->autogluon.multimodal==1.1.1->autogluon) (8.1.7)
Requirement already satisfied: regex>=2021.8.3 in
/usr/local/lib/python3.10/dist-packages (from
nltk<4.0.0,>=3.4.5->autogluon.multimodal==1.1.1->autogluon) (2024.9.11)
Collecting antlr4-python3-runtime==4.9.* (from
omegaconf<2.3.0,>=2.1.1->autogluon.multimodal==1.1.1->autogluon)

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Downloading antlr4-python3-runtime-4.9.3.tar.gz (117 kB)
117.0/117.0

kB 10.4 MB/s eta 0:00:00
Preparing metadata (setup.py) ... done
Collecting colorama (from
openmim<0.4.0,>=0.3.7->autogluon.multimodal==1.1.1->autogluon)
Downloading colorama-0.4.6-py2.py3-none-any.whl.metadata (17 kB)
Collecting model-index (from
openmim<0.4.0,>=0.3.7->autogluon.multimodal==1.1.1->autogluon)
Downloading model_index-0.1.11-py3-none-any.whl.metadata (3.9 kB)
Collecting opendatalab (from
openmim<0.4.0,>=0.3.7->autogluon.multimodal==1.1.1->autogluon)
Downloading opendatalab-0.0.10-py3-none-any.whl.metadata (6.4 kB)
Requirement already satisfied: rich in /usr/local/lib/python3.10/dist-packages
(from openmim<0.4.0,>=0.3.7->autogluon.multimodal==1.1.1->autogluon) (13.9.4)
Requirement already satisfied: tabulate in /usr/local/lib/python3.10/dist-
packages (from openmim<0.4.0,>=0.3.7->autogluon.multimodal==1.1.1->autogluon)
(0.9.0)
Collecting coloredlogs (from
optimum<1.19,>=1.17->optimum[onnxruntime]<1.19,>=1.17; extra ==
"all"->autogluon.timeseries[all]==1.1.1->autogluon)
Downloading coloredlogs-15.0.1-py2.py3-none-any.whl.metadata (12 kB)
Requirement already satisfied: sympy in /usr/local/lib/python3.10/dist-packages
(from optimum<1.19,>=1.17->optimum[onnxruntime]<1.19,>=1.17; extra ==
"all"->autogluon.timeseries[all]==1.1.1->autogluon) (1.13.1)
Collecting transformers<4.41.0,>=4.38.0 (from transformers[sentencepiece]<4.41.0
,>=4.38.0->autogluon.multimodal==1.1.1->autogluon)
Downloading transformers-4.39.3-py3-none-any.whl.metadata (134 kB)
134.8/134.8

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Collecting onnx (from optimum[onnxruntime]<1.19,>=1.17; extra ==
"all"->autogluon.timeseries[all]==1.1.1->autogluon)
Downloading
onnx-1.17.0-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata
(16 kB)
Collecting onnxruntime>=1.11.0 (from optimum[onnxruntime]<1.19,>=1.17; extra ==
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Downloading onnxruntime-1.20.0-cp310-cp310-manylinux_2_27_x86_64.manylinux_2_2
8_x86_64.whl.metadata (4.4 kB)
Requirement already satisfied: protobuf>=3.20.1 in
/usr/local/lib/python3.10/dist-packages (from optimum[onnxruntime]<1.19,>=1.17;
extra == "all"->autogluon.timeseries[all]==1.1.1->autogluon) (4.25.5)
Requirement already satisfied: python-dateutil>=2.8.2 in
/usr/local/lib/python3.10/dist-packages (from pandas<2.3.0,>=2.0.0->autogluon.co
re==1.1.1->autogluon.core[all]==1.1.1->autogluon) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.10/dist-

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packages (from pandas<2.3.0,>=2.0.0->autogluon.core==1.1.1->autogluon.core[all]=
=1.1.1->autogluon) (2024.2)
Requirement already satisfied: tzdata>=2022.1 in /usr/local/lib/python3.10/dist-
packages (from pandas<2.3.0,>=2.0.0->autogluon.core==1.1.1->autogluon.core[all]=
=1.1.1->autogluon) (2024.2)
Requirement already satisfied: filelock in /usr/local/lib/python3.10/dist-
packages (from ray<2.11,>=2.10.0->ray[default,tune]<2.11,>=2.10.0; extra ==
"all"->autogluon.core[all]==1.1.1->autogluon) (3.16.1)
Requirement already satisfied: msgpack<2.0.0,>=1.0.0 in
/usr/local/lib/python3.10/dist-packages (from
ray<2.11,>=2.10.0->ray[default,tune]<2.11,>=2.10.0; extra ==
"all"->autogluon.core[all]==1.1.1->autogluon) (1.1.0)
Requirement already satisfied: aiosignal in /usr/local/lib/python3.10/dist-
packages (from ray<2.11,>=2.10.0->ray[default,tune]<2.11,>=2.10.0; extra ==
"all"->autogluon.core[all]==1.1.1->autogluon) (1.3.1)
Requirement already satisfied: frozenlist in /usr/local/lib/python3.10/dist-
packages (from ray<2.11,>=2.10.0->ray[default,tune]<2.11,>=2.10.0; extra ==
"all"->autogluon.core[all]==1.1.1->autogluon) (1.5.0)
Requirement already satisfied: aiohttp>=3.7 in /usr/local/lib/python3.10/dist-
packages (from ray[default,tune]<2.11,>=2.10.0; extra ==
"all"->autogluon.core[all]==1.1.1->autogluon) (3.10.10)
Collecting aiohttp-cors (from ray[default,tune]<2.11,>=2.10.0; extra ==
"all"->autogluon.core[all]==1.1.1->autogluon)
  Downloading aiohttp_cors-0.7.0-py3-none-any.whl.metadata (20 kB)
Collecting colorful (from ray[default,tune]<2.11,>=2.10.0; extra ==
"all"->autogluon.core[all]==1.1.1->autogluon)
  Downloading colorful-0.5.6-py2.py3-none-any.whl.metadata (16 kB)
Collecting py-spy>=0.2.0 (from ray[default,tune]<2.11,>=2.10.0; extra ==
"all"->autogluon.core[all]==1.1.1->autogluon)
  Downloading py_spy-0.4.0-py2.py3-none-
manylinux_2_5_x86_64.manylinux1_x86_64.whl.metadata (16 kB)
Collecting opencensus (from ray[default,tune]<2.11,>=2.10.0; extra ==
"all"->autogluon.core[all]==1.1.1->autogluon)
  Downloading opencensus-0.11.4-py2.py3-none-any.whl.metadata (12 kB)
Requirement already satisfied: prometheus-client>=0.7.1 in
/usr/local/lib/python3.10/dist-packages (from ray[default,tune]<2.11,>=2.10.0;
extra == "all"->autogluon.core[all]==1.1.1->autogluon) (0.21.0)
Requirement already satisfied: smart-open in /usr/local/lib/python3.10/dist-
packages (from ray[default,tune]<2.11,>=2.10.0; extra ==
"all"->autogluon.core[all]==1.1.1->autogluon) (7.0.5)
Collecting virtualenv!=20.21.1,>=20.0.24 (from ray[default,tune]<2.11,>=2.10.0;
extra == "all"->autogluon.core[all]==1.1.1->autogluon)
  Downloading virtualenv-20.27.1-py3-none-any.whl.metadata (4.5 kB)
Requirement already satisfied: grpcio>=1.42.0 in /usr/local/lib/python3.10/dist-
packages (from ray[default,tune]<2.11,>=2.10.0; extra ==
"all"->autogluon.core[all]==1.1.1->autogluon) (1.67.1)
Requirement already satisfied: tensorboardX>=1.9 in
/usr/local/lib/python3.10/dist-packages (from ray[default,tune]<2.11,>=2.10.0;

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extra == "all"->autogluon.core[all]==1.1.1->autogluon) (2.6.2.2)
Requirement already satisfied: pyarrow>=6.0.1 in /usr/local/lib/python3.10/dist-packages (from ray[default,tune]<2.11,>=2.10.0; extra == "all"->autogluon.core[all]==1.1.1->autogluon) (17.0.0)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests->autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon) (3.4.0)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests->autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon) (3.10)
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.10/dist-packages (from requests->autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon) (1.26.20)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.10/dist-packages (from requests->autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon) (2024.8.30)
Requirement already satisfied: imageio>=2.4.1 in /usr/local/lib/python3.10/dist-packages (from scikit-image<0.21.0,>=0.19.1->autogluon.multimodal==1.1.1->autogluon) (2.36.0)
Requirement already satisfied: tifffile>=2019.7.26 in /usr/local/lib/python3.10/dist-packages (from scikit-image<0.21.0,>=0.19.1->autogluon.multimodal==1.1.1->autogluon) (2024.9.20)
Requirement already satisfied: PyWavelets>=1.1.1 in /usr/local/lib/python3.10/dist-packages (from scikit-image<0.21.0,>=0.19.1->autogluon.multimodal==1.1.1->autogluon) (1.7.0)
Requirement already satisfied: lazy_loader>=0.1 in /usr/local/lib/python3.10/dist-packages (from scikit-image<0.21.0,>=0.19.1->autogluon.multimodal==1.1.1->autogluon) (0.4)
Requirement already satisfied: threadpoolctl>=2.0.0 in /usr/local/lib/python3.10/dist-packages (from scikit-learn<1.4.1,>=1.3.0->autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon) (3.5.0)
Requirement already satisfied: statsmodels>=0.13.2 in /usr/local/lib/python3.10/dist-packages (from statsforecast<1.5,>=1.4.0->autogluon.timeseries==1.1.1->autogluon.timeseries[all]==1.1.1->autogluon) (0.14.4)
Requirement already satisfied: absl-py>=0.4 in /usr/local/lib/python3.10/dist-packages (from tensorboard<3,>=2.9->autogluon.multimodal==1.1.1->autogluon) (1.4.0)
Requirement already satisfied: markdown>=2.6.8 in /usr/local/lib/python3.10/dist-packages (from tensorboard<3,>=2.9->autogluon.multimodal==1.1.1->autogluon) (3.7)
Requirement already satisfied: tensorboard-data-server<0.8.0,>=0.7.0 in /usr/local/lib/python3.10/dist-packages (from tensorboard<3,>=2.9->autogluon.multimodal==1.1.1->autogluon) (0.7.2)
Requirement already satisfied: werkzeug>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from tensorboard<3,>=2.9->autogluon.multimodal==1.1.1->autogluon) (2.3.8)

Requirement already satisfied: safetensors in /usr/local/lib/python3.10/dist-packages (from timm<0.10.0,>=0.9.5->autogluon.multimodal==1.1.1->autogluon) (0.4.5)

Collecting nvidia-cuda-nvrtc-cu12==12.1.105 (from torch<2.4,>=2.2->autogluon.multimodal==1.1.1->autogluon)
 Downloading nvidia_cuda_nvrtc_cu12-12.1.105-py3-none-manylinux1_x86_64.whl.metadata (1.5 kB)

Collecting nvidia-cuda-runtime-cu12==12.1.105 (from torch<2.4,>=2.2->autogluon.multimodal==1.1.1->autogluon)
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Collecting nvidia-cuda-cupti-cu12==12.1.105 (from torch<2.4,>=2.2->autogluon.multimodal==1.1.1->autogluon)
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Collecting nvidia-cudnn-cu12==8.9.2.26 (from torch<2.4,>=2.2->autogluon.multimodal==1.1.1->autogluon)
 Downloading nvidia_cudnn_cu12-8.9.2.26-py3-none-manylinux1_x86_64.whl.metadata (1.6 kB)

Collecting nvidia-cublas-cu12==12.1.3.1 (from torch<2.4,>=2.2->autogluon.multimodal==1.1.1->autogluon)
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Collecting nvidia-cufft-cu12==11.0.2.54 (from torch<2.4,>=2.2->autogluon.multimodal==1.1.1->autogluon)
 Downloading nvidia_cufft_cu12-11.0.2.54-py3-none-manylinux1_x86_64.whl.metadata (1.5 kB)

Collecting nvidia-curand-cu12==10.3.2.106 (from torch<2.4,>=2.2->autogluon.multimodal==1.1.1->autogluon)
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Collecting nvidia-cuspars-cu12==12.1.0.106 (from torch<2.4,>=2.2->autogluon.multimodal==1.1.1->autogluon)
 Downloading nvidia_cuspars-cu12-12.1.0.106-py3-none-manylinux1_x86_64.whl.metadata (1.6 kB)

Collecting nvidia-nccl-cu12==2.20.5 (from torch<2.4,>=2.2->autogluon.multimodal==1.1.1->autogluon)
 Downloading nvidia_nccl_cu12-2.20.5-py3-none-manylinux2014_x86_64.whl.metadata (1.8 kB)

Collecting nvidia-nvtx-cu12==12.1.105 (from torch<2.4,>=2.2->autogluon.multimodal==1.1.1->autogluon)
 Downloading nvidia_nvtx_cu12-12.1.105-py3-none-manylinux1_x86_64.whl.metadata (1.7 kB)

Collecting triton==2.3.1 (from

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torch<2.4,>=2.2->autogluon.multimodal==1.1.1->autogluon)
  Downloading
triton-2.3.1-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86_64.whl.metadata
(1.4 kB)
Requirement already satisfied: nvidia-nvjitlink-cu12 in
/usr/local/lib/python3.10/dist-packages (from nvidia-cusolver-
cu12==11.4.5.107->torch<2.4,>=2.2->autogluon.multimodal==1.1.1->autogluon)
(12.6.77)
Collecting tokenizers<0.19,>=0.14 (from transformers<4.41.0,>=4.38.0->transforme
rs[sentencepiece]<4.41.0,>=4.38.0->autogluon.multimodal==1.1.1->autogluon)
  Downloading tokenizers-0.15.2-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_
x86_64.whl.metadata (6.7 kB)
Requirement already satisfied: sentencepiece!=0.1.92,>=0.1.91 in
/usr/local/lib/python3.10/dist-packages (from transformers[sentencepiece]<4.41.0
,>=4.38.0->autogluon.multimodal==1.1.1->autogluon) (0.2.0)
Requirement already satisfied: contourpy>=1.0.1 in
/usr/local/lib/python3.10/dist-packages (from
matplotlib->autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon)
(1.3.1)
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.10/dist-
packages (from
matplotlib->autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon)
(0.12.1)
Requirement already satisfied: fonttools>=4.22.0 in
/usr/local/lib/python3.10/dist-packages (from
matplotlib->autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon)
(4.54.1)
Requirement already satisfied: kiwisolver>=1.0.1 in
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matplotlib->autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon)
(1.4.7)
Requirement already satisfied: pyparsing>=2.3.1 in
/usr/local/lib/python3.10/dist-packages (from
matplotlib->autogluon.core==1.1.1->autogluon.core[all]==1.1.1->autogluon)
(3.2.0)
Requirement already satisfied: aiohappyeyeballs>=2.3.0 in
/usr/local/lib/python3.10/dist-packages (from
aiohttp>=3.7->ray[default,tune]<2.11,>=2.10.0; extra ==
"all"->autogluon.core[all]==1.1.1->autogluon) (2.4.3)
Requirement already satisfied: multidict<7.0,>=4.5 in
/usr/local/lib/python3.10/dist-packages (from
aiohttp>=3.7->ray[default,tune]<2.11,>=2.10.0; extra ==
"all"->autogluon.core[all]==1.1.1->autogluon) (6.1.0)
Requirement already satisfied: yarl<2.0,>=1.12.0 in
/usr/local/lib/python3.10/dist-packages (from
aiohttp>=3.7->ray[default,tune]<2.11,>=2.10.0; extra ==
"all"->autogluon.core[all]==1.1.1->autogluon) (1.17.1)
Requirement already satisfied: async-timeout<5.0,>=4.0 in

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/usr/local/lib/python3.10/dist-packages (from
aiohttp>=3.7->ray[default,tune]<2.11,>=2.10.0; extra ==
"all"->autogluon.core[all]==1.1.1->autogluon) (4.0.3)
Collecting dill (from
evaluate<0.5.0,>=0.4.0->autogluon.multimodal==1.1.1->autogluon)
  Downloading dill-0.3.8-py3-none-any.whl.metadata (10 kB)
Collecting multiprocessing (from
evaluate<0.5.0,>=0.4.0->autogluon.multimodal==1.1.1->autogluon)
  Downloading multiprocessing-0.70.16-py310-none-any.whl.metadata (7.2 kB)
Collecting fsspec>=2021.05.0 (from fsspec[http]>=2021.05.0->evaluate<0.5.0,>=0.4
.0->autogluon.multimodal==1.1.1->autogluon)
  Downloading fsspec-2024.9.0-py3-none-any.whl.metadata (11 kB)
Requirement already satisfied: beautifulsoup4 in /usr/local/lib/python3.10/dist-
packages (from
gdown>=4.0.0->nlpaug<1.2.0,>=1.1.10->autogluon.multimodal==1.1.1->autogluon)
(4.12.3)
Requirement already satisfied: llvmlite<0.44,>=0.43.0dev0 in
/usr/local/lib/python3.10/dist-packages (from numba->mlforecast<0.10.1,>=0.10.0-
>autogluon.timeseries==1.1.1->autogluon.timeseries[all]==1.1.1->autogluon)
(0.43.0)
Requirement already satisfied: flatbuffers in /usr/local/lib/python3.10/dist-
packages (from onnxruntime>=1.11.0->optimum[onnxruntime]<1.19,>=1.17; extra ==
"all"->autogluon.timeseries[all]==1.1.1->autogluon) (24.3.25)
Requirement already satisfied: annotated-types>=0.6.0 in
/usr/local/lib/python3.10/dist-packages (from pydantic<3,>=1.7->gluonts==0.15.1-
>autogluon.timeseries==1.1.1->autogluon.timeseries[all]==1.1.1->autogluon)
(0.7.0)
Requirement already satisfied: pydantic-core==2.23.4 in
/usr/local/lib/python3.10/dist-packages (from pydantic<3,>=1.7->gluonts==0.15.1-
>autogluon.timeseries==1.1.1->autogluon.timeseries[all]==1.1.1->autogluon)
(2.23.4)
Requirement already satisfied: spacy-legacy<3.1.0,>=3.0.11 in
/usr/local/lib/python3.10/dist-packages (from
spacy<4->fastai<2.8,>=2.3.1->autogluon.tabular[all]==1.1.1->autogluon) (3.0.12)
Requirement already satisfied: spacy-loggers<2.0.0,>=1.0.0 in
/usr/local/lib/python3.10/dist-packages (from
spacy<4->fastai<2.8,>=2.3.1->autogluon.tabular[all]==1.1.1->autogluon) (1.0.5)
Requirement already satisfied: murmurhash<1.1.0,>=0.28.0 in
/usr/local/lib/python3.10/dist-packages (from
spacy<4->fastai<2.8,>=2.3.1->autogluon.tabular[all]==1.1.1->autogluon) (1.0.10)
Requirement already satisfied: cymem<2.1.0,>=2.0.2 in
/usr/local/lib/python3.10/dist-packages (from
spacy<4->fastai<2.8,>=2.3.1->autogluon.tabular[all]==1.1.1->autogluon) (2.0.8)
Requirement already satisfied: preshed<3.1.0,>=3.0.2 in
/usr/local/lib/python3.10/dist-packages (from
spacy<4->fastai<2.8,>=2.3.1->autogluon.tabular[all]==1.1.1->autogluon) (3.0.9)
Requirement already satisfied: thinc<8.3.0,>=8.2.2 in
/usr/local/lib/python3.10/dist-packages (from

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spacy<4->fastai<2.8,>=2.3.1->autogluon.tabular[all]==1.1.1->autogluon) (8.2.5)
Requirement already satisfied: wasabi<1.2.0,>=0.9.1 in
/usr/local/lib/python3.10/dist-packages (from
spacy<4->fastai<2.8,>=2.3.1->autogluon.tabular[all]==1.1.1->autogluon) (1.1.3)
Requirement already satisfied: srsly<3.0.0,>=2.4.3 in
/usr/local/lib/python3.10/dist-packages (from
spacy<4->fastai<2.8,>=2.3.1->autogluon.tabular[all]==1.1.1->autogluon) (2.4.8)
Requirement already satisfied: catalogue<2.1.0,>=2.0.6 in
/usr/local/lib/python3.10/dist-packages (from
spacy<4->fastai<2.8,>=2.3.1->autogluon.tabular[all]==1.1.1->autogluon) (2.0.10)
Requirement already satisfied: weasel<0.5.0,>=0.1.0 in
/usr/local/lib/python3.10/dist-packages (from
spacy<4->fastai<2.8,>=2.3.1->autogluon.tabular[all]==1.1.1->autogluon) (0.4.1)
Requirement already satisfied: typer<1.0.0,>=0.3.0 in
/usr/local/lib/python3.10/dist-packages (from
spacy<4->fastai<2.8,>=2.3.1->autogluon.tabular[all]==1.1.1->autogluon) (0.13.0)
Requirement already satisfied: langcodes<4.0.0,>=3.2.0 in
/usr/local/lib/python3.10/dist-packages (from
spacy<4->fastai<2.8,>=2.3.1->autogluon.tabular[all]==1.1.1->autogluon) (3.4.1)
Requirement already satisfied: patsy>=0.5.6 in /usr/local/lib/python3.10/dist-
packages (from statsmodels>=0.13.2->statsforecast<1.5,>=1.4.0->autogluon.timeser
ies==1.1.1->autogluon.timeseries[all]==1.1.1->autogluon) (1.0.1)
Collecting distlib<1,>=0.3.7 (from
virtualenv!=20.21.1,>=20.0.24->ray[default,tune]<2.11,>=2.10.0; extra ==
"all"->autogluon.core[all]==1.1.1->autogluon)
  Downloading distlib-0.3.9-py2.py3-none-any.whl.metadata (5.2 kB)
Requirement already satisfied: platformdirs<5,>=3.9.1 in
/usr/local/lib/python3.10/dist-packages (from
virtualenv!=20.21.1,>=20.0.24->ray[default,tune]<2.11,>=2.10.0; extra ==
"all"->autogluon.core[all]==1.1.1->autogluon) (4.3.6)
Collecting humanfriendly>=9.1 (from
coloredlogs->optimum<1.19,>=1.17->optimum[onnxruntime]<1.19,>=1.17; extra ==
"all"->autogluon.timeseries[all]==1.1.1->autogluon)
  Downloading humanfriendly-10.0-py2.py3-none-any.whl.metadata (9.2 kB)
Collecting ordered-set (from model-
index->openmim<0.4.0,>=0.3.7->autogluon.multimodal==1.1.1->autogluon)
  Downloading ordered_set-4.1.0-py3-none-any.whl.metadata (5.3 kB)
Collecting opencensus-context>=0.1.3 (from
opencensus->ray[default,tune]<2.11,>=2.10.0; extra ==
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ltimodal==1.1.1->autogluon) (2.6)
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extra == "all"->autogluon.core[all]==1.1.1->autogluon)
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  Preparing metadata (setup.py) ... done
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  Downloading openxlab-0.0.29-py3-none-any.whl.metadata (3.8 kB)
INFO: This is taking longer than usual. You might need to provide the dependency
resolver with stricter constraints to reduce runtime. See
https://pip.pypa.io/warnings/backtracking for guidance. If you want to abort
this run, press Ctrl + C.
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      86.8/86.8 kB
7.6 MB/s eta 0:00:00
Downloading opencensus_context-0.1.3-py2.py3-none-any.whl (5.1 kB)
Downloading openxlab-0.0.11-py3-none-any.whl (55 kB)
      55.3/55.3 kB
4.4 MB/s eta 0:00:00
Downloading ordered_set-4.1.0-py3-none-any.whl (7.6 kB)
Downloading
pycryptodome-3.21.0-cp36-abi3-manylinux_2_17_x86_64.manylinux2014_x86_64.whl
(2.3 MB)
      2.3/2.3 MB
71.4 MB/s eta 0:00:00
Building wheels for collected packages: nvidia-ml-py3,
antlr4-python3-runtime, sequeval
  Building wheel for nvidia-ml-py3 (setup.py) ... done
  Created wheel for nvidia-ml-py3: filename=nvidia_ml_py3-7.352.0-py3-none-
any.whl size=19173
sha256=024223f6ed2534f5e28e67677c883dc2470519942e46138851e2bcdd796eb9b1
  Stored in directory: /root/.cache/pip/wheels/5c/d8/c0/46899f8be7a75a2ffd197a23
c8797700ea858b9b34819fbf9e
  Building wheel for antlr4-python3-runtime (setup.py) ... done
  Created wheel for antlr4-python3-runtime:
filename=antlr4_python3_runtime-4.9.3-py3-none-any.whl size=144555
sha256=c87a31a95a83e2e042e71ae9c0c078d2bc31e3ba9e3dd7c50d41946c8a082b5b
  Stored in directory: /root/.cache/pip/wheels/12/93/dd/1f6a127edc45659556564c57
30f6d4e300888f4bca2d4c5a88
  Building wheel for sequeval (setup.py) ... done
  Created wheel for sequeval: filename=sequeval-1.2.2-py3-none-any.whl size=16161
sha256=39e9d86774d5e7a63e6f1b5a040f3703ce5cebf3e6ed3507f5c2d86a745acd60
  Stored in directory: /root/.cache/pip/wheels/1a/67/4a/ad4082dd7dfc30f2abfe4d80
a2ed5926a506eb8a972b4767fa
Successfully built nvidia-ml-py3 antlr4-python3-runtime sequeval
Installing collected packages: py-spy, opencensus-context, nvidia-ml-py3,
distlib, colorful, antlr4-python3-runtime, virtualenv, triton, pycryptodome,
Pillow, ordered-set, openxlab, onnx, omegaconf, nvidia-nvtx-cu12, nvidia-nccl-
cu12, nvidia-cuspars-cu12, nvidia-curand-cu12, nvidia-cufft-cu12, nvidia-cuda-
runtime-cu12, nvidia-cuda-nvrtc-cu12, nvidia-cuda-cupti-cu12, nvidia-cublas-
cu12, nptyping, lightning-utilities, humanfriendly, fsspec, dill, colorama,
xgboost, window-ops, scikit-learn, pytesseract, pdf2image, nvidia-cusolver-cu12,
nvidia-cudnn-cu12, multiprocessing, model-index, lightgbm, coloredlogs,
utilsforecast, torch, tokenizers, sequeval, scikit-image, opendatalab,
onnxruntime, jsonschema, gluonts, transformers, torchvision, torchmetrics,
statsforecast, ray, pytorch-metric-learning, openmim, opencensus, nlpaug,
mlforecast, aiohttp-cors, accelerate, timm, pytorch-lightning, datasets,
autogluon.common, optimum, lightning, evaluate, autogluon.features,
autogluon.core, autogluon.tabular, autogluon.multimodal, autogluon.timeseries,
autogluon

```

Attempting uninstall: antlr4-python3-runtime
Found existing installation: antlr4-python3-runtime 4.11.1
Uninstalling antlr4-python3-runtime-4.11.1:
Successfully uninstalled antlr4-python3-runtime-4.11.1

Attempting uninstall: Pillow
Found existing installation: pillow 11.0.0
Uninstalling pillow-11.0.0:
Successfully uninstalled pillow-11.0.0

Attempting uninstall: nvidia-nccl-cu12
Found existing installation: nvidia-nccl-cu12 2.23.4
Uninstalling nvidia-nccl-cu12-2.23.4:
Successfully uninstalled nvidia-nccl-cu12-2.23.4

Attempting uninstall: nvidia-cusparse-cu12
Found existing installation: nvidia-cusparse-cu12 12.5.4.2
Uninstalling nvidia-cusparse-cu12-12.5.4.2:
Successfully uninstalled nvidia-cusparse-cu12-12.5.4.2

Attempting uninstall: nvidia-curand-cu12
Found existing installation: nvidia-curand-cu12 10.3.7.77
Uninstalling nvidia-curand-cu12-10.3.7.77:
Successfully uninstalled nvidia-curand-cu12-10.3.7.77

Attempting uninstall: nvidia-cufft-cu12
Found existing installation: nvidia-cufft-cu12 11.3.0.4
Uninstalling nvidia-cufft-cu12-11.3.0.4:
Successfully uninstalled nvidia-cufft-cu12-11.3.0.4

Attempting uninstall: nvidia-cuda-runtime-cu12
Found existing installation: nvidia-cuda-runtime-cu12 12.6.77
Uninstalling nvidia-cuda-runtime-cu12-12.6.77:
Successfully uninstalled nvidia-cuda-runtime-cu12-12.6.77

Attempting uninstall: nvidia-cuda-cupti-cu12
Found existing installation: nvidia-cuda-cupti-cu12 12.6.80
Uninstalling nvidia-cuda-cupti-cu12-12.6.80:
Successfully uninstalled nvidia-cuda-cupti-cu12-12.6.80

Attempting uninstall: nvidia-cublas-cu12
Found existing installation: nvidia-cublas-cu12 12.6.3.3
Uninstalling nvidia-cublas-cu12-12.6.3.3:
Successfully uninstalled nvidia-cublas-cu12-12.6.3.3

Attempting uninstall: fsspec
Found existing installation: fsspec 2024.10.0
Uninstalling fsspec-2024.10.0:
Successfully uninstalled fsspec-2024.10.0

Attempting uninstall: dill
Found existing installation: dill 0.3.9
Uninstalling dill-0.3.9:
Successfully uninstalled dill-0.3.9

Attempting uninstall: xgboost
Found existing installation: xgboost 2.1.2
Uninstalling xgboost-2.1.2:
Successfully uninstalled xgboost-2.1.2

Attempting uninstall: scikit-learn
Found existing installation: scikit-learn 1.4.2
Uninstalling scikit-learn-1.4.2:
Successfully uninstalled scikit-learn-1.4.2
Attempting uninstall: nvidia-cusolver-cu12
Found existing installation: nvidia-cusolver-cu12 11.7.1.2
Uninstalling nvidia-cusolver-cu12-11.7.1.2:
Successfully uninstalled nvidia-cusolver-cu12-11.7.1.2
Attempting uninstall: nvidia-cudnn-cu12
Found existing installation: nvidia-cudnn-cu12 9.5.1.17
Uninstalling nvidia-cudnn-cu12-9.5.1.17:
Successfully uninstalled nvidia-cudnn-cu12-9.5.1.17
Attempting uninstall: multiprocessing
Found existing installation: multiprocessing 0.70.17
Uninstalling multiprocessing-0.70.17:
Successfully uninstalled multiprocessing-0.70.17
Attempting uninstall: lightgbm
Found existing installation: lightgbm 4.5.0
Uninstalling lightgbm-4.5.0:
Successfully uninstalled lightgbm-4.5.0
Attempting uninstall: torch
Found existing installation: torch 2.5.1+cu121
Uninstalling torch-2.5.1+cu121:
Successfully uninstalled torch-2.5.1+cu121
Attempting uninstall: tokenizers
Found existing installation: tokenizers 0.20.3
Uninstalling tokenizers-0.20.3:
Successfully uninstalled tokenizers-0.20.3
Attempting uninstall: scikit-image
Found existing installation: scikit-image 0.24.0
Uninstalling scikit-image-0.24.0:
Successfully uninstalled scikit-image-0.24.0
Attempting uninstall: jsonschema
Found existing installation: jsonschema 4.23.0
Uninstalling jsonschema-4.23.0:
Successfully uninstalled jsonschema-4.23.0
Attempting uninstall: transformers
Found existing installation: transformers 4.46.2
Uninstalling transformers-4.46.2:
Successfully uninstalled transformers-4.46.2
Attempting uninstall: torchvision
Found existing installation: torchvision 0.20.1+cu121
Uninstalling torchvision-0.20.1+cu121:
Successfully uninstalled torchvision-0.20.1+cu121
Attempting uninstall: statsforecast
Found existing installation: statsforecast 1.5.0
Uninstalling statsforecast-1.5.0:
Successfully uninstalled statsforecast-1.5.0

```

Attempting uninstall: ray
  Found existing installation: ray 2.39.0
  Uninstalling ray-2.39.0:
    Successfully uninstalled ray-2.39.0
Attempting uninstall: accelerate
  Found existing installation: accelerate 1.1.1
  Uninstalling accelerate-1.1.1:
    Successfully uninstalled accelerate-1.1.1
Attempting uninstall: timm
  Found existing installation: timm 1.0.11
  Uninstalling timm-1.0.11:
    Successfully uninstalled timm-1.0.11
ERROR: pip's dependency resolver does not currently take into account all
the packages that are installed. This behaviour is the source of the following
dependency conflicts.

gcsfs 2024.10.0 requires fsspec==2024.10.0, but you have fsspec 2024.9.0 which
is incompatible.

plotnine 0.14.1 requires matplotlib>=3.8.0, but you have matplotlib 3.7.5 which
is incompatible.

plotnine 0.14.1 requires pandas>=2.2.0, but you have pandas 2.1.4 which is
incompatible.

pycaret 3.3.2 requires scikit-learn>1.4.0, but you have scikit-learn 1.4.0 which
is incompatible.

qpd 0.4.4 requires antlr4-python3-runtime<4.12,>=4.11.1, but you have
antlr4-python3-runtime 4.9.3 which is incompatible.

sentence-transformers 3.2.1 requires transformers<5.0.0,>=4.41.0, but you have
transformers 4.39.3 which is incompatible.

torchaudio 2.5.1+cu121 requires torch==2.5.1, but you have torch 2.3.1 which is
incompatible.

Successfully installed Pillow-10.4.0 accelerate-0.21.0 aiohttp-cors-0.7.0
antlr4-python3-runtime-4.9.3 autogluon-1.1.1 autogluon.common-1.1.1
autogluon.core-1.1.1 autogluon.features-1.1.1 autogluon.multimodal-1.1.1
autogluon.tabular-1.1.1 autogluon.timeseries-1.1.1 colorama-0.4.6
coloredlogs-15.0.1 colorful-0.5.6 datasets-3.1.0 dill-0.3.8 distlib-0.3.9
evaluate-0.4.3 fsspec-2024.9.0 gluonts-0.15.1 humanfriendly-10.0
jsonschema-4.21.1 lightgbm-4.3.0 lightning-2.3.3 lightning-utilities-0.11.8
mlforecast-0.10.0 model-index-0.1.11 multiprocessing-0.70.16 nlpaug-1.1.11
nptyping-2.4.1 nvidia-cublas-cu12-12.1.3.1 nvidia-cuda-cupti-cu12-12.1.105
nvidia-cuda-nvrtc-cu12-12.1.105 nvidia-cuda-runtime-cu12-12.1.105 nvidia-cudnn-

```



```
cu12-8.9.2.26 nvidia-cufft-cu12-11.0.2.54 nvidia-curand-cu12-10.3.2.106 nvidia-
cusolver-cu12-11.4.5.107 nvidia-cusparse-cu12-12.1.0.106 nvidia-ml-py3-7.352.0
nvidia-nccl-cu12-2.20.5 nvidia-nvtx-cu12-12.1.105 omegaconf-2.2.3 onnx-1.17.0
onnxruntime-1.20.0 opencensus-0.11.4 opencensus-context-0.1.3 opendatalab-0.0.10
openmim-0.3.9 openxlab-0.0.11 optimum-1.18.1 ordered-set-4.1.0 pdf2image-1.17.0
py-spy-0.4.0 pycryptodome-3.21.0 pytesseract-0.3.10 pytorch-lightning-2.3.3
pytorch-metric-learning-2.3.0 ray-2.10.0 scikit-image-0.20.0 scikit-learn-1.4.0
sequeval-1.2.2 statsforecast-1.4.0 timm-0.9.16 tokenizers-0.15.2 torch-2.3.1
torchmetrics-1.2.1 torchvision-0.18.1 transformers-4.39.3 triton-2.3.1
utilsforecast-0.0.10 virtualenv-20.27.1 window-ops-0.0.15 xgboost-2.0.3
```

```
[ ]: import pandas as pd
import numpy as np
```

```
[ ]: df = pd.read_csv("rentfaster.csv")
```

```
[ ]: df.head()
```

```
[ ]:      rentfaster_id      city province      address  latitude  longitude \
0          468622  Airdrie  Alberta  69 Gateway Dr NE  51.305962 -114.012515
1          468622  Airdrie  Alberta  69 Gateway Dr NE  51.305962 -114.012515
2          468622  Airdrie  Alberta  69 Gateway Dr NE  51.305962 -114.012515
3          468622  Airdrie  Alberta  69 Gateway Dr NE  51.305962 -114.012515
4          468622  Airdrie  Alberta  69 Gateway Dr NE  51.305962 -114.012515
```

```
      lease_term      type  price  beds baths sq_feet \
0  Long Term  Townhouse  2495.0  2 Beds  2.5  1403
1  Long Term  Townhouse  2695.0  3 Beds  2.5  1496
2  Long Term  Townhouse  2295.0  2 Beds  2.5  1180
3  Long Term  Townhouse  2095.0  2 Beds  2.5  1403
4  Long Term  Townhouse  2495.0  2 Beds  2.5  1403
```

```
      link  furnishing \
0  /ab/airdrie/rentals/townhouse/2-bedrooms/pet-f...  Unfurnished
1  /ab/airdrie/rentals/townhouse/2-bedrooms/pet-f...  Unfurnished
2  /ab/airdrie/rentals/townhouse/2-bedrooms/pet-f...  Unfurnished
3  /ab/airdrie/rentals/townhouse/2-bedrooms/pet-f...  Unfurnished
4  /ab/airdrie/rentals/townhouse/2-bedrooms/pet-f...  Unfurnished
```

```
      availability_date      smoking  cats  dogs
0      Immediate  Non-Smoking  True  True
1      Immediate  Non-Smoking  True  True
2      Immediate  Non-Smoking  True  True
3      November 18  Non-Smoking  True  True
4      Immediate  Non-Smoking  True  True
```

```
[ ]: df.columns
```

```
[ ]: Index(['city', 'province', 'latitude', 'longitude', 'lease_term', 'type',
         'price', 'beds', 'baths', 'sq_feet', 'furnishing', 'availability_date',
         'smoking', 'cats', 'dogs'],
        dtype='object')
```

```
[ ]: # Remove unnecessary columns
df = df.drop(axis=1, columns = ["address", "link", "rentfaster_id"])
```

```
[ ]: df.head()
```

```
[ ]:
      city province  latitude  longitude lease_term      type  price \
0  Airdrie  Alberta  51.305962 -114.012515  Long Term  Townhouse  2495.0
1  Airdrie  Alberta  51.305962 -114.012515  Long Term  Townhouse  2695.0
2  Airdrie  Alberta  51.305962 -114.012515  Long Term  Townhouse  2295.0
3  Airdrie  Alberta  51.305962 -114.012515  Long Term  Townhouse  2095.0
4  Airdrie  Alberta  51.305962 -114.012515  Long Term  Townhouse  2495.0

      beds baths sq_feet  furnishing availability_date      smoking  cats \
0  2 Beds    2.5    1403  Unfurnished      Immediate  Non-Smoking  True
1  3 Beds    2.5    1496  Unfurnished      Immediate  Non-Smoking  True
2  2 Beds    2.5    1180  Unfurnished      Immediate  Non-Smoking  True
3  2 Beds    2.5    1403  Unfurnished  November 18  Non-Smoking  True
4  2 Beds    2.5    1403  Unfurnished      Immediate  Non-Smoking  True

      dogs
0  True
1  True
2  True
3  True
4  True
```

```
[ ]: from autogluon.tabular import TabularDataset, TabularPredictor
```

```
[ ]: # Regressing for the price
target = "price"
```

```
[ ]: train_data = TabularDataset(df)
```

```
[ ]: # Sample 70% randomly for the train data
subsample_size = int(0.7*len(df))
```

```
[ ]: train_data = train_data.sample(n=subsample_size, random_state=0)
train_data.head()
```

```
[ ]:
      city province  latitude  longitude lease_term      type \
12512  Calgary  Alberta  51.032613 -114.062190  Long Term  Condo Unit
24216  Montréal  Quebec  45.505681 -73.563915  Long Term  Apartment
```

13161	Calgary	Alberta	50.859881	-114.078010	Long Term	Basement
2415	Calgary	Alberta	51.134793	-113.949708	Long Term	Condo Unit
7519	Edmonton	Alberta	53.544671	-113.577309	12 months	House

	price	beds	baths	sq_feet	furnishing	availability_date	\
12512	2150.0	1 Bed	1	763	Unfurnished	July 01	
24216	3390.0	2 Beds	1	1058	Unfurnished	Immediate	
13161	1300.0	1 Bed	1	700	Unfurnished	July 01	
2415	2150.0	2 Beds	2	980	Unfurnished	Immediate	
7519	1700.0	2 Beds	2	800	Unfurnished	July 01	

	smoking	cats	dogs
12512	Non-Smoking	False	False
24216	Non-Smoking	True	True
13161	Non-Smoking	True	True
2415	Non-Smoking	False	False
7519	Non-Smoking	True	True

```
[ ]: # Training a fast model
predictor_price = TabularPredictor(label=target, path="agModels-predictprice").
    ↪ fit(train_data)
```

Verbosity: 2 (Standard Logging)

===== System Info =====

```
AutoGluon Version: 1.1.1
Python Version: 3.10.12
Operating System: Linux
Platform Machine: x86_64
Platform Version: #1 SMP PREEMPT_DYNAMIC Thu Jun 27 21:05:47 UTC 2024
CPU Count: 2
Memory Avail: 11.12 GB / 12.67 GB (87.7%)
Disk Space Avail: 64.18 GB / 107.72 GB (59.6%)
=====
```

No presets specified! To achieve strong results with AutoGluon, it is recommended to use the available presets.

Recommended Presets (For more details refer to <https://auto.gluon.ai/stable/tutorials/tabular/tabular-essentials.html#presets>):

```
presets='best_quality' : Maximize accuracy. Default time_limit=3600.
presets='high_quality' : Strong accuracy with fast inference speed.
Default time_limit=3600.
presets='good_quality' : Good accuracy with very fast inference speed.
Default time_limit=3600.
presets='medium_quality' : Fast training time, ideal for initial
prototyping.
```

Beginning AutoGluon training ...

AutoGluon will save models to "agModels-predictprice"

Train Data Rows: 18039

```

Train Data Columns: 14
Label Column:      price
AutoGluon infers your prediction problem is: 'regression' (because dtype of
label-column == float and many unique label-values observed).
    Label info (max, min, mean, stddev): (29990.0, 0.0, 2144.43951,
972.07588)
    If 'regression' is not the correct problem_type, please manually specify
the problem_type parameter during Predictor init (You may specify problem_type
as one of: ['binary', 'multiclass', 'regression', 'quantile'])
Problem Type:      regression
Preprocessing data ...
Using Feature Generators to preprocess the data ...
Fitting AutoMLPipelineFeatureGenerator...
    Available Memory:      11394.67 MB
    Train Data (Original) Memory Usage: 12.43 MB (0.1% of available memory)
    Inferring data type of each feature based on column values. Set
feature_metadata_in to manually specify special dtypes of the features.
    Stage 1 Generators:
        Fitting AsTypeFeatureGenerator...
    Stage 2 Generators:
        Fitting FillNaFeatureGenerator...
    Stage 3 Generators:
        Fitting IdentityFeatureGenerator...
        Fitting CategoryFeatureGenerator...
        Fitting CategoryMemoryMinimizeFeatureGenerator...
    Stage 4 Generators:
        Fitting DropUniqueFeatureGenerator...
    Stage 5 Generators:
        Fitting DropDuplicatesFeatureGenerator...
    Types of features in original data (raw dtype, special dtypes):
        ('float', []) : 2 | ['latitude', 'longitude']
        ('object', []) : 12 | ['city', 'province', 'lease_term', 'type',
'beds', ...]
    Types of features in processed data (raw dtype, special dtypes):
        ('category', []) : 12 | ['city', 'province', 'lease_term',
'type', 'beds', ...]
        ('float', []) : 2 | ['latitude', 'longitude']
    0.3s = Fit runtime
    14 features in original data used to generate 14 features in processed
data.
    Train Data (Processed) Memory Usage: 0.52 MB (0.0% of available memory)
Data preprocessing and feature engineering runtime = 0.38s ...
AutoGluon will gauge predictive performance using evaluation metric:
'root_mean_squared_error'
    This metric's sign has been flipped to adhere to being higher_is_better.
The metric score can be multiplied by -1 to get the metric value.
    To change this, specify the eval_metric parameter of Predictor()
Automatically generating train/validation split with holdout_frac=0.1, Train

```

Rows: 16235, Val Rows: 1804

User-specified model hyperparameters to be fit:

```
{
  'NN_TORCH': {},
  'GBM': [{'extra_trees': True, 'ag_args': {'name_suffix': 'XT'}}, {}],
  'GBMLarge': {},
  'CAT': {},
  'XGB': {},
  'FASTAI': {},
  'RF': [{'criterion': 'gini', 'ag_args': {'name_suffix': 'Gini',
'problem_types': ['binary', 'multiclass']}}, {'criterion': 'entropy', 'ag_args':
{'name_suffix': 'Entr', 'problem_types': ['binary', 'multiclass']}},
{'criterion': 'squared_error', 'ag_args': {'name_suffix': 'MSE',
'problem_types': ['regression', 'quantile']}}],
  'XT': [{'criterion': 'gini', 'ag_args': {'name_suffix': 'Gini',
'problem_types': ['binary', 'multiclass']}}, {'criterion': 'entropy', 'ag_args':
{'name_suffix': 'Entr', 'problem_types': ['binary', 'multiclass']}},
{'criterion': 'squared_error', 'ag_args': {'name_suffix': 'MSE',
'problem_types': ['regression', 'quantile']}}],
  'KNN': [{'weights': 'uniform', 'ag_args': {'name_suffix': 'Unif'}},
{'weights': 'distance', 'ag_args': {'name_suffix': 'Dist'}}],
}
```

Fitting 11 L1 models ...

Fitting model: KNeighborsUnif ...

```
-675.2201          = Validation score    (-root_mean_squared_error)
3.91s             = Training   runtime
0.03s             = Validation runtime
```

Fitting model: KNeighborsDist ...

```
-605.6837          = Validation score    (-root_mean_squared_error)
0.02s             = Training   runtime
0.01s             = Validation runtime
```

Fitting model: LightGBMXT ...

```
[1000] valid_set's rmse: 423.81
[2000] valid_set's rmse: 415.834
[3000] valid_set's rmse: 410.2
[4000] valid_set's rmse: 407.48
[5000] valid_set's rmse: 404.523
[6000] valid_set's rmse: 402.728
[7000] valid_set's rmse: 400.988
[8000] valid_set's rmse: 399.787
[9000] valid_set's rmse: 399.434
[10000] valid_set's rmse: 398.293
```

```
-398.293          = Validation score    (-root_mean_squared_error)
28.69s           = Training   runtime
6.34s            = Validation runtime
```

Fitting model: LightGBM ...

```

[1000] valid_set's rmse: 378.305
[2000] valid_set's rmse: 365.213
[3000] valid_set's rmse: 360.246
[4000] valid_set's rmse: 357.389
[5000] valid_set's rmse: 355.923
[6000] valid_set's rmse: 354.684
[7000] valid_set's rmse: 353.801
[8000] valid_set's rmse: 353.769
[9000] valid_set's rmse: 353.433
[10000] valid_set's rmse: 352.957

      -352.8283          = Validation score    (-root_mean_squared_error)
      26.76s    = Training    runtime
      3.41s     = Validation runtime
Fitting model: RandomForestMSE ...
      -375.0482          = Validation score    (-root_mean_squared_error)
      25.15s    = Training    runtime
      0.25s     = Validation runtime
Fitting model: CatBoost ...
      -359.9289          = Validation score    (-root_mean_squared_error)
      691.99s   = Training    runtime
      0.21s     = Validation runtime
Fitting model: ExtraTreesMSE ...
      -367.7976          = Validation score    (-root_mean_squared_error)
      11.08s    = Training    runtime
      0.23s     = Validation runtime
Fitting model: NeuralNetFastAI ...
      -421.5468          = Validation score    (-root_mean_squared_error)
      34.19s    = Training    runtime
      0.06s     = Validation runtime
Fitting model: XGBoost ...
      -365.5962          = Validation score    (-root_mean_squared_error)
      72.47s    = Training    runtime
      0.96s     = Validation runtime
Fitting model: NeuralNetTorch ...
      -523.5231          = Validation score    (-root_mean_squared_error)
      31.13s    = Training    runtime
      0.03s     = Validation runtime
Fitting model: LightGBMLarge ...

[1000] valid_set's rmse: 341.631
[2000] valid_set's rmse: 336.496
[3000] valid_set's rmse: 336.635

      -336.3645          = Validation score    (-root_mean_squared_error)
      18.61s    = Training    runtime
      1.76s     = Validation runtime
Fitting model: WeightedEnsemble_L2 ...
      Ensemble Weights: {'LightGBMLarge': 0.429, 'RandomForestMSE': 0.143,

```

```
'CatBoost': 0.143, 'KNeighborsDist': 0.095, 'NeuralNetFastAI': 0.095, 'XGBoost': 0.095}
```

```
-312.9316          = Validation score    (-root_mean_squared_error)
```

```
0.04s             = Training    runtime
```

```
0.0s              = Validation runtime
```

AutoGluon training complete, total runtime = 966.98s ... Best model:

WeightedEnsemble_L2 | Estimated inference throughput: 555.2 rows/s (1804 batch size)

TabularPredictor saved. To load, use: predictor =

TabularPredictor.load("agModels-predictprice")

```
[ ]: # Creating test data for the rows that have not been sampled by the train data
test_data = TabularDataset(df.drop(train_data.index))
y_test = test_data[target]
```

```
[ ]: # predictor = TabularPredictor.load("agModels-predictprice")

# Predicting rent prices for the test data
y_pred = predictor_price.predict(test_data)
print("Predictions: \n", y_pred)
perf = predictor_price.evaluate_predictions(y_true=y_test, y_pred=y_pred,
↪ auxiliary_metrics=True)
```

Predictions:

```
10      2514.037109
11      2052.797852
13      2523.323730
19      2492.110840
24      1985.207031
```

...

```
25748   1298.104858
25755   1064.368164
25762    930.289490
25763   1141.226807
25764    930.289490
```

Name: price, Length: 7732, dtype: float32

```
[ ]: # Looking at the performance
perf
```

```
[ ]: {'root_mean_squared_error': -379.06860452004804,
      'mean_squared_error': -143693.0069327766,
      'mean_absolute_error': -169.37559000941798,
      'r2': 0.8486421928585806,
      'pearsonr': 0.9228787141770844,
      'median_absolute_error': -92.62921142578125}
```

```
[ ]: # retraining the model using best_quality and time limit of an hour, focusing
      ↪ on MAE
predictor_price = TabularPredictor(label=target, path="agModels-predictprice",
                                   eval_metric="mean_absolute_error").
      ↪ fit(train_data,
            presets="best_quality", time_limit=3600)
```

Warning: path already exists! This predictor may overwrite an existing predictor! path="agModels-predictprice"

Verbosity: 2 (Standard Logging)

===== System Info =====

```
AutoGluon Version:  1.1.1
Python Version:     3.10.12
Operating System:   Linux
Platform Machine:   x86_64
Platform Version:   #1 SMP PREEMPT_DYNAMIC Thu Jun 27 21:05:47 UTC 2024
CPU Count:          2
Memory Avail:       10.03 GB / 12.67 GB (79.1%)
Disk Space Avail:   63.39 GB / 107.72 GB (58.9%)
=====
```

Presets specified: ['best_quality']

Setting dynamic_stacking from 'auto' to True. Reason: Enable dynamic_stacking when use_bag_holdout is disabled. (use_bag_holdout=False)

Stack configuration (auto_stack=True): num_stack_levels=1, num_bag_folds=8, num_bag_sets=1

DyStack is enabled (dynamic_stacking=True). AutoGluon will try to determine whether the input data is affected by stacked overfitting and enable or disable stacking as a consequence.

This is used to identify the optimal `num_stack_levels` value. Copies of AutoGluon will be fit on subsets of the data. Then holdout validation data is used to detect stacked overfitting.

Running DyStack for up to 900s of the 3600s of remaining time (25%).

Running DyStack sub-fit in a ray process to avoid memory leakage.

Enabling ray logging (enable_ray_logging=True). Specify

`ds_args={'enable_ray_logging': False}` if you experience logging issues.

2024-11-17 02:16:59,357 INFO worker.py:1743 -- Started a local Ray instance.

View the dashboard at 127.0.0.1:8265

Context path: "agModels-predictprice/ds_sub_fit/sub_fit_ho"

(_dystack pid=13261) Running DyStack sub-fit ...

(_dystack pid=13261) Beginning AutoGluon training ... Time limit = 889s

(_dystack pid=13261) AutoGluon will save models to "agModels-predictprice/ds_sub_fit/sub_fit_ho"

(_dystack pid=13261) Train Data Rows: 16034

(_dystack pid=13261) Train Data Columns: 14

(_dystack pid=13261) Label Column: price

(_dystack pid=13261) Problem Type: regression

(_dystack pid=13261) Preprocessing data ...


```

(_dystack pid=13261) Using Feature Generators to preprocess the data
...
(_dystack pid=13261) Fitting AutoMLPipelineFeatureGenerator...
(_dystack pid=13261)   Available Memory:                      9845.21 MB
(_dystack pid=13261)   Train Data (Original) Memory Usage: 11.04 MB
(0.1% of available memory)
(_dystack pid=13261)   Inferring data type of each feature based on
column values. Set feature_metadata_in to manually specify special dtypes of the
features.
(_dystack pid=13261)   Stage 1 Generators:
(_dystack pid=13261)       Fitting AsTypeFeatureGenerator...
(_dystack pid=13261)   Stage 2 Generators:
(_dystack pid=13261)       Fitting FillNaFeatureGenerator...
(_dystack pid=13261)   Stage 3 Generators:
(_dystack pid=13261)       Fitting IdentityFeatureGenerator...
(_dystack pid=13261)       Fitting CategoryFeatureGenerator...
(_dystack pid=13261)       Fitting
CategoryMemoryMinimizeFeatureGenerator...
(_dystack pid=13261)   Stage 4 Generators:
(_dystack pid=13261)       Fitting DropUniqueFeatureGenerator...
(_dystack pid=13261)   Stage 5 Generators:
(_dystack pid=13261)       Fitting
DropDuplicatesFeatureGenerator...
(_dystack pid=13261)   Types of features in original data (raw dtype,
special dtypes):
(_dystack pid=13261)       ('float', []) : 2 | ['latitude',
'longitude']
(_dystack pid=13261)       ('object', []) : 12 | ['city',
'province', 'lease_term', 'type', 'beds', ...]
(_dystack pid=13261)   Types of features in processed data (raw dtype,
special dtypes):
(_dystack pid=13261)       ('category', []) : 12 | ['city',
'province', 'lease_term', 'type', 'beds', ...]
(_dystack pid=13261)       ('float', []) : 2 | ['latitude',
'longitude']
(_dystack pid=13261)   0.3s = Fit runtime
(_dystack pid=13261)   14 features in original data used to generate 14
features in processed data.
(_dystack pid=13261)   Train Data (Processed) Memory Usage: 0.46 MB
(0.0% of available memory)
(_dystack pid=13261) Data preprocessing and feature engineering runtime
= 0.28s ...
(_dystack pid=13261) AutoGluon will gauge predictive performance using
evaluation metric: 'mean_absolute_error'
(_dystack pid=13261) This metric's sign has been flipped to adhere to
being higher_is_better. The metric score can be multiplied by -1 to get the
metric value.
(_dystack pid=13261) To change this, specify the eval_metric

```

```

parameter of Predictor()
(_dystack pid=13261) Large model count detected (112 configs) ... Only
displaying the first 3 models of each family. To see all, set `verbosity=3`.
(_dystack pid=13261) User-specified model hyperparameters to be fit:
(_dystack pid=13261) {
(_dystack pid=13261)   'NN_TORCH': [{}, {'activation': 'elu',
'dropout_prob': 0.10077639529843717, 'hidden_size': 108, 'learning_rate':
0.002735937344002146, 'num_layers': 4, 'use_batchnorm': True, 'weight_decay':
1.356433327634438e-12, 'ag_args': {'name_suffix': '_r79', 'priority': -2}},
{'activation': 'elu', 'dropout_prob': 0.11897478034205347, 'hidden_size': 213,
'learning_rate': 0.0010474382260641949, 'num_layers': 4, 'use_batchnorm': False,
'weight_decay': 5.594471067786272e-10, 'ag_args': {'name_suffix': '_r22',
'priority': -7}}],
(_dystack pid=13261)   'GBM': [{ 'extra_trees': True, 'ag_args':
{'name_suffix': 'XT'}}, {}, 'GBMLarge'],
(_dystack pid=13261)   'CAT': [{}, {'depth': 6, 'grow_policy':
'SymmetricTree', 'l2_leaf_reg': 2.1542798306067823, 'learning_rate':
0.06864209415792857, 'max_ctr_complexity': 4, 'one_hot_max_size': 10, 'ag_args':
{'name_suffix': '_r177', 'priority': -1}}, {'depth': 8, 'grow_policy':
'Depthwise', 'l2_leaf_reg': 2.7997999596449104, 'learning_rate':
0.031375015734637225, 'max_ctr_complexity': 2, 'one_hot_max_size': 3, 'ag_args':
{'name_suffix': '_r9', 'priority': -5}}],
(_dystack pid=13261)   'XGB': [{}, {'colsample_bytree':
0.6917311125174739, 'enable_categorical': False, 'learning_rate':
0.018063876087523967, 'max_depth': 10, 'min_child_weight': 0.6028633586934382,
'ag_args': {'name_suffix': '_r33', 'priority': -8}}, {'colsample_bytree':
0.6628423832084077, 'enable_categorical': False, 'learning_rate':
0.08775715546881824, 'max_depth': 5, 'min_child_weight': 0.6294123374222513,
'ag_args': {'name_suffix': '_r89', 'priority': -16}}],
(_dystack pid=13261)   'FASTAI': [{}, {'bs': 256, 'emb_drop':
0.5411770367537934, 'epochs': 43, 'layers': [800, 400], 'lr':
0.01519848858318159, 'ps': 0.23782946566604385, 'ag_args': {'name_suffix':
'_r191', 'priority': -4}}, {'bs': 2048, 'emb_drop': 0.05070411322605811,
'epochs': 29, 'layers': [200, 100], 'lr': 0.08974235041576624, 'ps':
0.10393466140748028, 'ag_args': {'name_suffix': '_r102', 'priority': -11}}],
(_dystack pid=13261)   'RF': [{ 'criterion': 'gini', 'ag_args':
{'name_suffix': 'Gini', 'problem_types': ['binary', 'multiclass']}},
{'criterion': 'entropy', 'ag_args': {'name_suffix': 'Entr', 'problem_types':
['binary', 'multiclass']}}, {'criterion': 'squared_error', 'ag_args':
{'name_suffix': 'MSE', 'problem_types': ['regression', 'quantile']}}],
(_dystack pid=13261)   'XT': [{ 'criterion': 'gini', 'ag_args':
{'name_suffix': 'Gini', 'problem_types': ['binary', 'multiclass']}},
{'criterion': 'entropy', 'ag_args': {'name_suffix': 'Entr', 'problem_types':
['binary', 'multiclass']}}, {'criterion': 'squared_error', 'ag_args':
{'name_suffix': 'MSE', 'problem_types': ['regression', 'quantile']}}],
(_dystack pid=13261)   'KNN': [{ 'weights': 'uniform', 'ag_args':
{'name_suffix': 'Unif'}}, {'weights': 'distance', 'ag_args': {'name_suffix':
'Dist'}}],

```

```

(_dystack pid=13261) }
(_dystack pid=13261) AutoGluon will fit 2 stack levels (L1 to L2) ...
(_dystack pid=13261) Fitting 108 L1 models ...
(_dystack pid=13261) Fitting model: KNeighborsUnif_BAG_L1 ... Training
model for up to 592.38s of the 888.78s of remaining time.
(_dystack pid=13261) -479.4095 = Validation score
(-mean_absolute_error)
(_dystack pid=13261) 0.52s = Training runtime
(_dystack pid=13261) 0.08s = Validation runtime
(_dystack pid=13261) Fitting model: KNeighborsDist_BAG_L1 ... Training
model for up to 589.15s of the 885.55s of remaining time.
(_dystack pid=13261) -382.823 = Validation score
(-mean_absolute_error)
(_dystack pid=13261) 0.02s = Training runtime
(_dystack pid=13261) 0.08s = Validation runtime
(_dystack pid=13261) Fitting model: LightGBMXT_BAG_L1 ... Training
model for up to 589.03s of the 885.43s of remaining time.
(_dystack pid=13261) Fitting 8 child models (S1F1 - S1F8) | Fitting
with ParallelLocalFoldFittingStrategy (2 workers, per: cpus=1, gpus=0,
memory=0.07%)

(_ray_fit pid=13425) [1000] valid_set's l1: 250.924
(_ray_fit pid=13425) [3000] valid_set's l1: 235.046 [repeated
4x across cluster] (Ray deduplicates logs by default. Set RAY_DEDUP_LOGS=0 to
disable log deduplication, or see https://docs.ray.io/en/master/ray-observability/ray-logging.html#log-deduplication for more options.)
(_ray_fit pid=13425) [4000] valid_set's l1: 230.145 [repeated
2x across cluster]
(_ray_fit pid=13425) [6000] valid_set's l1: 222.024 [repeated
4x across cluster]
(_ray_fit pid=13425) [8000] valid_set's l1: 216.982 [repeated
4x across cluster]
(_ray_fit pid=13425) [10000] valid_set's l1: 212.979 [repeated
4x across cluster]
(_ray_fit pid=13746) [1000] valid_set's l1: 263.006 [repeated
2x across cluster]
(_ray_fit pid=13746) [3000] valid_set's l1: 245.195 [repeated
4x across cluster]
(_ray_fit pid=13746) [5000] valid_set's l1: 238.01 [repeated 4x
across cluster]
(_ray_fit pid=13746) [7000] valid_set's l1: 233.254 [repeated
4x across cluster]

```

```

(_ray_fit pid=13746) [9000]    valid_set's l1: 229.564 [repeated
4x across cluster]
(_ray_fit pid=14078) [1000]   valid_set's l1: 250.773 [repeated
4x across cluster]
(_ray_fit pid=14078) [2000]   valid_set's l1: 238.709 [repeated
2x across cluster]
(_ray_fit pid=14078) [4000]   valid_set's l1: 227.128 [repeated
4x across cluster]
(_ray_fit pid=14078) [6000]   valid_set's l1: 221.38 [repeated 4x
across cluster]
(_ray_fit pid=14078) [8000]   valid_set's l1: 217.095 [repeated
4x across cluster]
(_ray_fit pid=14078) [10000]  valid_set's l1: 213.151 [repeated
4x across cluster]
(_ray_fit pid=14403) [1000]   valid_set's l1: 276.429 [repeated
2x across cluster]
(_ray_fit pid=14403) [3000]   valid_set's l1: 261.476 [repeated
4x across cluster]
(_ray_fit pid=14403) [4000]   valid_set's l1: 257.136 [repeated
2x across cluster]
(_ray_fit pid=14403) [6000]   valid_set's l1: 250.314 [repeated
4x across cluster]
(_ray_fit pid=14402) [7000]   valid_set's l1: 246.145 [repeated
2x across cluster]
(_ray_fit pid=14402) [8000]   valid_set's l1: 244.284 [repeated
2x across cluster]
(_ray_fit pid=14402) [10000]  valid_set's l1: 240.799 [repeated
4x across cluster]

(_dystack pid=13261)  -226.9382      = Validation score
(-mean_absolute_error)
(_dystack pid=13261)  257.2s    = Training  runtime
(_dystack pid=13261)  107.51s   = Validation runtime
(_dystack pid=13261)  Fitting model: LightGBM_BAG_L1 ... Training model
for up to 309.8s of the 606.2s of remaining time.
(_dystack pid=13261)  Fitting 8 child models (S1F1 - S1F8) | Fitting
with ParallelLocalFoldFittingStrategy (2 workers, per: cpus=1, gpus=0,
memory=0.07%)

```

(<code>_ray_fit</code> pid=14758) [1000]	valid_set's l1: 215.471 [repeated
2x across cluster]	
(<code>_ray_fit</code> pid=14758) [2000]	valid_set's l1: 199.903 [repeated
2x across cluster]	
(<code>_ray_fit</code> pid=14758) [4000]	valid_set's l1: 189.511 [repeated
4x across cluster]	
(<code>_ray_fit</code> pid=14759) [6000]	valid_set's l1: 197.689 [repeated
4x across cluster]	
(<code>_ray_fit</code> pid=14759) [8000]	valid_set's l1: 195.636 [repeated
4x across cluster]	
(<code>_ray_fit</code> pid=14759) [10000]	valid_set's l1: 193.95 [repeated 4x
across cluster]	
(<code>_ray_fit</code> pid=15086) [1000]	valid_set's l1: 228.107 [repeated
2x across cluster]	
(<code>_ray_fit</code> pid=15086) [3000]	valid_set's l1: 209.37 [repeated 4x
across cluster]	
(<code>_ray_fit</code> pid=15087) [4000]	valid_set's l1: 207.314 [repeated
3x across cluster]	
(<code>_ray_fit</code> pid=15086) [6000]	valid_set's l1: 201.205 [repeated
3x across cluster]	
(<code>_ray_fit</code> pid=15086) [8000]	valid_set's l1: 198.092 [repeated
4x across cluster]	
(<code>_ray_fit</code> pid=15086) [10000]	valid_set's l1: 196.683 [repeated
4x across cluster]	
(<code>_ray_fit</code> pid=15427) [1000]	valid_set's l1: 219.708 [repeated
2x across cluster]	
(<code>_ray_fit</code> pid=15427) [3000]	valid_set's l1: 196.638 [repeated
4x across cluster]	
(<code>_ray_fit</code> pid=15427) [5000]	valid_set's l1: 189.012 [repeated
4x across cluster]	
(<code>_ray_fit</code> pid=15427) [7000]	valid_set's l1: 185.061 [repeated
4x across cluster]	
(<code>_ray_fit</code> pid=15427) [9000]	valid_set's l1: 183.074 [repeated
4x across cluster]	
(<code>_ray_fit</code> pid=15762) [1000]	valid_set's l1: 236.045 [repeated
4x across cluster]	

```

(_ray_fit pid=15795) [2000]    valid_set's l1: 224.161 [repeated
3x across cluster]
(_ray_fit pid=15762) [4000]    valid_set's l1: 211.678 [repeated
3x across cluster]
(_ray_fit pid=15762) [5000]    valid_set's l1: 208.891 [repeated
2x across cluster]
(_ray_fit pid=15795) [6000]    valid_set's l1: 207.847 [repeated
3x across cluster]
(_ray_fit pid=15795) [8000]    valid_set's l1: 205.491 [repeated
4x across cluster]
(_ray_fit pid=15795) [9000]    valid_set's l1: 205.004 [repeated
2x across cluster]

(_dystack pid=13261)  -193.1719          = Validation score
(-mean_absolute_error)
(_dystack pid=13261)  264.15s = Training  runtime
(_dystack pid=13261)  100.44s = Validation runtime
(_dystack pid=13261) Fitting model: RandomForestMSE_BAG_L1 ... Training
model for up to 26.32s of the 322.72s of remaining time.
(_dystack pid=13261)  -186.8216          = Validation score
(-mean_absolute_error)
(_dystack pid=13261)  27.71s  = Training  runtime
(_dystack pid=13261)  0.91s   = Validation runtime
(_dystack pid=13261) Fitting model: WeightedEnsemble_L2 ... Training
model for up to 360.0s of the 292.16s of remaining time.
(_dystack pid=13261)  Ensemble Weights: {'RandomForestMSE_BAG_L1':
0.529, 'LightGBM_BAG_L1': 0.412, 'KNeighborsDist_BAG_L1': 0.059}
(_dystack pid=13261)  -173.3011          = Validation score
(-mean_absolute_error)
(_dystack pid=13261)  0.08s   = Training  runtime
(_dystack pid=13261)  0.0s    = Validation runtime
(_dystack pid=13261) Fitting 106 L2 models ...
(_dystack pid=13261) Fitting model: LightGBMXT_BAG_L2 ... Training
model for up to 292.07s of the 292.05s of remaining time.
(_dystack pid=13261)  Fitting 8 child models (S1F1 - S1F8) | Fitting
with ParallelLocalFoldFittingStrategy (2 workers, per: cpus=1, gpus=0,
memory=0.09%)

(_ray_fit pid=16241) [1000]    valid_set's l1: 185.608 [repeated
3x across cluster]
(_ray_fit pid=16241) [3000]    valid_set's l1: 183.47 [repeated 4x
across cluster]
(_ray_fit pid=16241) [4000]    valid_set's l1: 182.164 [repeated
2x across cluster]

```

```

(_ray_fit pid=16241) [6000]    valid_set's l1: 181.542 [repeated
4x across cluster]
(_ray_fit pid=16241) [7000]    valid_set's l1: 181.557 [repeated
2x across cluster]
(_ray_fit pid=16241) [9000]    valid_set's l1: 180.699 [repeated
4x across cluster]
(_ray_fit pid=16584) [1000]    valid_set's l1: 185.308 [repeated
4x across cluster]
(_ray_fit pid=16584) [2000]    valid_set's l1: 183.635 [repeated
2x across cluster]
(_ray_fit pid=16584) [4000]    valid_set's l1: 181.667 [repeated
2x across cluster]
(_ray_fit pid=16584) [5000]    valid_set's l1: 180.901
(_ray_fit pid=16584) [6000]    valid_set's l1: 180.506
(_ray_fit pid=16584) [7000]    valid_set's l1: 180.137
(_ray_fit pid=16584) [8000]    valid_set's l1: 179.849
(_ray_fit pid=16584) [9000]    valid_set's l1: 179.544
(_ray_fit pid=16884) [3000]    valid_set's l1: 186.896 [repeated
4x across cluster]
(_ray_fit pid=16884) [4000]    valid_set's l1: 185.54
(_ray_fit pid=16884) [5000]    valid_set's l1: 184.628
(_ray_fit pid=16884) [6000]    valid_set's l1: 183.832
(_ray_fit pid=16884) [7000]    valid_set's l1: 183.605
(_ray_fit pid=16884) [8000]    valid_set's l1: 183.476
(_ray_fit pid=16884) [9000]    valid_set's l1: 183.247
(_ray_fit pid=16884) [10000]   valid_set's l1: 182.976

(_dystack pid=13261)  -179.6073      = Validation score
(-mean_absolute_error)
(_dystack pid=13261)  156.92s = Training  runtime
(_dystack pid=13261)  41.49s  = Validation runtime
(_dystack pid=13261) Fitting model: LightGBM_BAG_L2 ... Training model
for up to 123.09s of the 123.06s of remaining time.
(_dystack pid=13261) Fitting 8 child models (S1F1 - S1F8) | Fitting
with ParallelLocalFoldFittingStrategy (2 workers, per: cpus=1, gpus=0,
memory=0.10%)
(_dystack pid=13261)  -175.881      = Validation score
(-mean_absolute_error)
(_dystack pid=13261)  36.0s   = Training  runtime
(_dystack pid=13261)  0.69s   = Validation runtime
(_dystack pid=13261) Fitting model: RandomForestMSE_BAG_L2 ... Training
model for up to 83.55s of the 83.52s of remaining time.
(_dystack pid=13261)  -161.1856     = Validation score
(-mean_absolute_error)

```



```

(_dystack pid=13261) 70.86s = Training runtime
(_dystack pid=13261) 1.02s = Validation runtime
(_dystack pid=13261) Fitting model: CatBoost_BAG_L2 ... Training model
for up to 9.84s of the 9.81s of remaining time.
(_dystack pid=13261) Fitting 8 child models (S1F1 - S1F8) | Fitting
with ParallelLocalFoldFittingStrategy (2 workers, per: cpus=1, gpus=0,
memory=0.13%)
(_dystack pid=13261) Time limit exceeded... Skipping CatBoost_BAG_L2.
(_dystack pid=13261) Unhandled error (suppress with
'RAY_IGNORE_UNHANDLED_ERRORS=1'): The worker died unexpectedly while executing
this task. Check python-core-worker-*.log files for more information.
(_dystack pid=13261) Fitting model: WeightedEnsemble_L3 ... Training
model for up to 360.0s of the -3.66s of remaining time.
(_dystack pid=13261) Ensemble Weights: {'RandomForestMSE_BAG_L2':
0.792, 'LightGBMXT_BAG_L2': 0.167, 'RandomForestMSE_BAG_L1': 0.042}
(_dystack pid=13261) -160.0844 = Validation score
(-mean_absolute_error)
(_dystack pid=13261) 0.17s = Training runtime
(_dystack pid=13261) 0.0s = Validation runtime
(_dystack pid=13261) AutoGluon training complete, total runtime =
892.92s ... Best model: WeightedEnsemble_L3 | Estimated inference throughput:
8.0 rows/s (2005 batch size)
(_dystack pid=13261) TabularPredictor saved. To load, use: predictor =
TabularPredictor.load("agModels-predictprice/ds_sub_fit/sub_fit_ho")
(_dystack pid=13261) Deleting DyStack predictor artifacts
(clean_up_fits=True) ...
Leaderboard on holdout data (DyStack):

```

	model	score_holdout	score_val	eval_metric
0	WeightedEnsemble_L3	-152.755268	-160.084368	mean_absolute_error
		155.605188	251.538851	777.546118
				0.004352
		0.001026	0.166086	3
				True
				10
1	WeightedEnsemble_L2	-154.515361	-173.301087	mean_absolute_error
		52.663997	101.436138	291.966737
				0.004397
		0.000960	0.082121	2
				True
				6
2	RandomForestMSE_BAG_L2	-155.151780	-161.185620	mean_absolute_error
		127.161649	210.043661	620.462580
				1.526617
		1.022077	70.860944	2
				True
				9
3	LightGBM_BAG_L2	-161.270910	-175.881049	mean_absolute_error
		126.207753	209.713374	585.603833
				0.572721
		0.691790	36.002197	2
				True
				8
4	LightGBMXT_BAG_L2	-165.449410	-179.607294	mean_absolute_error
		154.074219	250.515748	706.519088
				28.439187
		41.494164	156.917451	2
				True
				7
5	RandomForestMSE_BAG_L1	-170.523665	-186.821607	mean_absolute_error
		1.541138	0.914071	27.710770
				1.541138
		0.914071	27.710770	1
				True
				5


```

6      LightGBM_BAG_L1      -172.977279 -193.171862 mean_absolute_error
51.100331      100.442312 264.153419      51.100331
100.442312      264.153419      1      True      4
7      LightGBMXT_BAG_L1      -205.894370 -226.938172 mean_absolute_error
72.952085      107.510965 257.196824      72.952085
107.510965      257.196824      1      True      3
8      KNeighborsDist_BAG_L1      -361.440087 -382.823030 mean_absolute_error
0.018130      0.078794 0.020427      0.018130
0.078794      0.020427      1      True      2
9      KNeighborsUnif_BAG_L1      -464.501994 -479.409497 mean_absolute_error
0.023347      0.075441 0.520197      0.023347
0.075441      0.520197      1      True      1
1      = Optimal      num_stack_levels (Stacked Overfitting Occurred:
False)
1064s      = DyStack      runtime | 2536s      = Remaining runtime
Starting main fit with num_stack_levels=1.
For future fit calls on this dataset, you can skip DyStack to save time:
`predictor.fit(..., dynamic_stacking=False, num_stack_levels=1)`
Beginning AutoGluon training ... Time limit = 2536s
AutoGluon will save models to "agModels-predictprice"
Train Data Rows:      18039
Train Data Columns: 14
Label Column:      price
Problem Type:      regression
Preprocessing data ...
Using Feature Generators to preprocess the data ...
Fitting AutoMLPipelineFeatureGenerator...
Available Memory:      9693.57 MB
Train Data (Original) Memory Usage: 12.43 MB (0.1% of available memory)
Inferring data type of each feature based on column values. Set
feature_metadata_in to manually specify special dtypes of the features.
Stage 1 Generators:
Fitting AsTypeFeatureGenerator...
Stage 2 Generators:
Fitting FillNaFeatureGenerator...
Stage 3 Generators:
Fitting IdentityFeatureGenerator...
Fitting CategoryFeatureGenerator...
Fitting CategoryMemoryMinimizeFeatureGenerator...
Stage 4 Generators:
Fitting DropUniqueFeatureGenerator...
Stage 5 Generators:
Fitting DropDuplicatesFeatureGenerator...
Types of features in original data (raw dtype, special dtypes):
('float', []) : 2 | ['latitude', 'longitude']
('object', []) : 12 | ['city', 'province', 'lease_term', 'type',
'beds', ...]
Types of features in processed data (raw dtype, special dtypes):

```

```

('category', []) : 12 | ['city', 'province', 'lease_term',
'type', 'beds', ...]
('float', [])    : 2 | ['latitude', 'longitude']
0.7s = Fit runtime
14 features in original data used to generate 14 features in processed
data.

Train Data (Processed) Memory Usage: 0.52 MB (0.0% of available memory)
Data preprocessing and feature engineering runtime = 0.78s ...
AutoGluon will gauge predictive performance using evaluation metric:
'mean_absolute_error'

This metric's sign has been flipped to adhere to being higher_is_better.
The metric score can be multiplied by -1 to get the metric value.

To change this, specify the eval_metric parameter of Predictor()
Large model count detected (112 configs) ... Only displaying the first 3 models
of each family. To see all, set `verbosity=3`.
User-specified model hyperparameters to be fit:
{
    'NN_TORCH': [{}, {'activation': 'elu', 'dropout_prob':
0.10077639529843717, 'hidden_size': 108, 'learning_rate': 0.002735937344002146,
'num_layers': 4, 'use_batchnorm': True, 'weight_decay': 1.356433327634438e-12,
'ag_args': {'name_suffix': '_r79', 'priority': -2}}, {'activation': 'elu',
'dropout_prob': 0.11897478034205347, 'hidden_size': 213, 'learning_rate':
0.0010474382260641949, 'num_layers': 4, 'use_batchnorm': False, 'weight_decay':
5.594471067786272e-10, 'ag_args': {'name_suffix': '_r22', 'priority': -7}}],
    'GBM': [{'extra_trees': True, 'ag_args': {'name_suffix': 'XT'}}], {},
'GBMLarge'],
    'CAT': [{}, {'depth': 6, 'grow_policy': 'SymmetricTree', 'l2_leaf_reg':
2.1542798306067823, 'learning_rate': 0.06864209415792857, 'max_ctr_complexity':
4, 'one_hot_max_size': 10, 'ag_args': {'name_suffix': '_r177', 'priority': -1}},
{'depth': 8, 'grow_policy': 'Depthwise', 'l2_leaf_reg': 2.7997999596449104,
'learning_rate': 0.031375015734637225, 'max_ctr_complexity': 2,
'one_hot_max_size': 3, 'ag_args': {'name_suffix': '_r9', 'priority': -5}}],
    'XGB': [{}, {'colsample_bytree': 0.6917311125174739,
'enable_categorical': False, 'learning_rate': 0.018063876087523967, 'max_depth':
10, 'min_child_weight': 0.6028633586934382, 'ag_args': {'name_suffix': '_r33',
'priority': -8}}, {'colsample_bytree': 0.6628423832084077, 'enable_categorical':
False, 'learning_rate': 0.08775715546881824, 'max_depth': 5, 'min_child_weight':
0.6294123374222513, 'ag_args': {'name_suffix': '_r89', 'priority': -16}}],
    'FASTAI': [{}, {'bs': 256, 'emb_drop': 0.5411770367537934, 'epochs': 43,
'layers': [800, 400], 'lr': 0.01519848858318159, 'ps': 0.23782946566604385,
'ag_args': {'name_suffix': '_r191', 'priority': -4}}, {'bs': 2048, 'emb_drop':
0.05070411322605811, 'epochs': 29, 'layers': [200, 100], 'lr':
0.08974235041576624, 'ps': 0.10393466140748028, 'ag_args': {'name_suffix':
'_r102', 'priority': -11}}],
    'RF': [{'criterion': 'gini', 'ag_args': {'name_suffix': 'Gini',
'problem_types': ['binary', 'multiclass']}}, {'criterion': 'entropy', 'ag_args':
{'name_suffix': 'Entr', 'problem_types': ['binary', 'multiclass']}},
{'criterion': 'squared_error', 'ag_args': {'name_suffix': 'MSE',

```

```

'problem_types': ['regression', 'quantile']}]},
  'XT': [{ 'criterion': 'gini', 'ag_args': { 'name_suffix': 'Gini',
'problem_types': ['binary', 'multiclass']}}, { 'criterion': 'entropy', 'ag_args':
{ 'name_suffix': 'Entr', 'problem_types': ['binary', 'multiclass']}},
{ 'criterion': 'squared_error', 'ag_args': { 'name_suffix': 'MSE',
'problem_types': ['regression', 'quantile']}]},
  'KNN': [{ 'weights': 'uniform', 'ag_args': { 'name_suffix': 'Unif'}},
{ 'weights': 'distance', 'ag_args': { 'name_suffix': 'Dist'}}],
}

```

AutoGluon will fit 2 stack levels (L1 to L2) ...

Fitting 108 L1 models ...

Fitting model: KNeighborsUnif_BAG_L1 ... Training model for up to 1689.49s of the 2534.23s of remaining time.

```

-466.2394      = Validation score   (-mean_absolute_error)
0.05s         = Training   runtime
0.2s          = Validation runtime

```

Fitting model: KNeighborsDist_BAG_L1 ... Training model for up to 1689.19s of the 2533.93s of remaining time.

```

-361.4029      = Validation score   (-mean_absolute_error)
0.03s          = Training   runtime
0.16s          = Validation runtime

```

Fitting model: LightGBMXT_BAG_L1 ... Training model for up to 1688.94s of the 2533.68s of remaining time.

Fitting 8 child models (S1F1 - S1F8) | Fitting with
ParallelLocalFoldFittingStrategy (2 workers, per: cpus=1, gpus=0, memory=0.07%)

```

-217.6134      = Validation score   (-mean_absolute_error)
288.29s        = Training   runtime
144.4s         = Validation runtime

```

Fitting model: LightGBM_BAG_L1 ... Training model for up to 1376.99s of the 2221.73s of remaining time.

Fitting 8 child models (S1F1 - S1F8) | Fitting with
ParallelLocalFoldFittingStrategy (2 workers, per: cpus=1, gpus=0, memory=0.07%)

```

-182.2599      = Validation score   (-mean_absolute_error)
283.0s         = Training   runtime
118.62s        = Validation runtime

```

Fitting model: RandomForestMSE_BAG_L1 ... Training model for up to 1073.81s of the 1918.55s of remaining time.

```

-177.668       = Validation score   (-mean_absolute_error)
31.65s         = Training   runtime
1.31s          = Validation runtime

```

Fitting model: CatBoost_BAG_L1 ... Training model for up to 1038.17s of the 1882.91s of remaining time.

Fitting 8 child models (S1F1 - S1F8) | Fitting with
ParallelLocalFoldFittingStrategy (2 workers, per: cpus=1, gpus=0, memory=0.09%)

```

-242.3283      = Validation score   (-mean_absolute_error)
848.0s         = Training   runtime
1.74s          = Validation runtime

```

Fitting model: ExtraTreesMSE_BAG_L1 ... Training model for up to 185.92s of the

```

1030.66s of remaining time.
    -180.8212          = Validation score    (-mean_absolute_error)
    14.66s    = Training    runtime
    1.13s     = Validation runtime
Fitting model: NeuralNetFastAI_BAG_L1 ... Training model for up to 168.34s of
the 1013.08s of remaining time.
    Fitting 8 child models (S1F1 - S1F8) | Fitting with
ParallelLocalFoldFittingStrategy (2 workers, per: cpus=1, gpus=0, memory=0.08%)
    -267.5496          = Validation score    (-mean_absolute_error)
    164.41s    = Training    runtime
    1.07s     = Validation runtime
Fitting model: WeightedEnsemble_L2 ... Training model for up to 360.0s of the
844.14s of remaining time.
    Ensemble Weights: {'LightGBM_BAG_L1': 0.389, 'RandomForestMSE_BAG_L1':
0.333, 'ExtraTreesMSE_BAG_L1': 0.222, 'KNeighborsDist_BAG_L1': 0.056}
    -162.8819          = Validation score    (-mean_absolute_error)
    0.24s      = Training    runtime
    0.0s       = Validation runtime
Fitting 106 L2 models ...
Fitting model: LightGBMX_T_BAG_L2 ... Training model for up to 843.84s of the
843.77s of remaining time.
    Fitting 8 child models (S1F1 - S1F8) | Fitting with
ParallelLocalFoldFittingStrategy (2 workers, per: cpus=1, gpus=0, memory=0.13%)
    -172.1326          = Validation score    (-mean_absolute_error)
    59.05s     = Training    runtime
    6.51s      = Validation runtime
Fitting model: LightGBM_BAG_L2 ... Training model for up to 779.88s of the
779.81s of remaining time.
    Fitting 8 child models (S1F1 - S1F8) | Fitting with
ParallelLocalFoldFittingStrategy (2 workers, per: cpus=1, gpus=0, memory=0.12%)
    -165.4835          = Validation score    (-mean_absolute_error)
    41.73s     = Training    runtime
    1.02s      = Validation runtime
Fitting model: RandomForestMSE_BAG_L2 ... Training model for up to 734.63s of
the 734.55s of remaining time.
    -149.0707          = Validation score    (-mean_absolute_error)
    109.18s    = Training    runtime
    1.29s     = Validation runtime
Fitting model: CatBoost_BAG_L2 ... Training model for up to 618.23s of the
618.16s of remaining time.
    Fitting 8 child models (S1F1 - S1F8) | Fitting with
ParallelLocalFoldFittingStrategy (2 workers, per: cpus=1, gpus=0, memory=0.16%)
    -164.7187          = Validation score    (-mean_absolute_error)
    510.24s    = Training    runtime
    0.75s      = Validation runtime
Fitting model: ExtraTreesMSE_BAG_L2 ... Training model for up to 104.74s of the
104.67s of remaining time.
    -147.1074          = Validation score    (-mean_absolute_error)

```

```

    23.05s    = Training    runtime
    1.19s    = Validation runtime
Fitting model: NeuralNetFastAI_BAG_L2 ... Training model for up to 76.52s of the
76.45s of remaining time.
    Fitting 8 child models (S1F1 - S1F8) | Fitting with
ParallelLocalFoldFittingStrategy (2 workers, per: cpus=1, gpus=0, memory=0.14%)
    -184.8617      = Validation score    (-mean_absolute_error)
    95.78s    = Training    runtime
    1.32s    = Validation runtime
Fitting model: WeightedEnsemble_L3 ... Training model for up to 360.0s of the
-24.15s of remaining time.
    Ensemble Weights: {'ExtraTreesMSE_BAG_L2': 0.667,
'RandomForestMSE_BAG_L2': 0.333}
    -146.4283      = Validation score    (-mean_absolute_error)
    0.33s    = Training    runtime
    0.0s    = Validation runtime
AutoGluon training complete, total runtime = 2560.19s ... Best model:
WeightedEnsemble_L3 | Estimated inference throughput: 8.5 rows/s (2255 batch
size)
TabularPredictor saved. To load, use: predictor =
TabularPredictor.load("agModels-predictprice")

```

```

[ ]: test_data = TabularDataset(df.drop(train_data.index))
y_test = test_data[target]
# predictor = TabularPredictor.load("agModels-predictprice")

y_pred = predictor_price.predict(test_data)
print("Predictions: \n", y_pred)
perf = predictor_price.evaluate_predictions(y_true=y_test, y_pred=y_pred,
↪auxiliary_metrics=True)

```

```

Predictions:
   10      2625.232422
   11      1909.255127
   13      2749.968750
   19      2288.382324
   24      2052.271484
...
25748    1304.355591
25755    1043.405640
25762     905.823364
25763    1110.603394
25764     905.823364
Name: price, Length: 7732, dtype: float32

```

```

[ ]: # Take a look at the performance of the model
perf

```

```
[ ]: {'mean_absolute_error': -153.4067275796594,
      'root_mean_squared_error': -380.5164302788771,
      'mean_squared_error': -144792.75371217958,
      'r2': 0.8474837839387982,
      'pearsonr': 0.9212355570349564,
      'median_absolute_error': -72.9281005859375}
```

```
[ ]: pd.DataFrame({'y_test': y_test, 'y_pred': y_pred})
```

```
[ ]:
      y_test      y_pred
10    1930.0  2625.232422
11    1700.0  1909.255127
13    3150.0  2749.968750
19    2300.0  2288.382324
24    1910.0  2052.271484
...
25748  1305.0  1304.355591
25755  1085.0  1043.405640
25762   945.0   905.823364
25763  1025.0  1110.603394
25764   995.0   905.823364
```

[7732 rows x 2 columns]

```
[ ]: from google.colab import files
      files.download('/content/agModels-predictprice/models/WeightedEnsemble_L3')
```

<IPython.core.display.Javascript object>

<IPython.core.display.Javascript object>

```
[ ]:
```