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LightGBM Regression Algorithm

An overview of LightGBM for regression tasks

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A decorative graphic on the left side of the slide consists of several parallel, 3D rectangular bars of varying heights and colors. The colors transition from dark blue at the bottom to light purple at the top, following a rainbow-like spectrum. The bars are arranged in a perspective view, creating a sense of depth.

Overview of LightGBM

- LightGBM (Light Gradient Boosting Machine) is a fast, distributed, high-performance gradient boosting framework based on decision tree algorithms. It is designed for efficiency and scalability, and is widely used for regression, classification, and ranking tasks.

How LightGBM Works

- LightGBM builds trees using a leaf-wise approach rather than a level-wise approach. It chooses the leaf with the maximum delta loss to grow, which can lead to better accuracy. It uses histogram-based algorithms for faster computation and supports categorical features natively.



Key Parameters

- n_estimators:
Number of boosting
iterations

- learning_rate:
Shrinks the
contribution of
each tree

- max_depth:
Maximum depth of
a tree

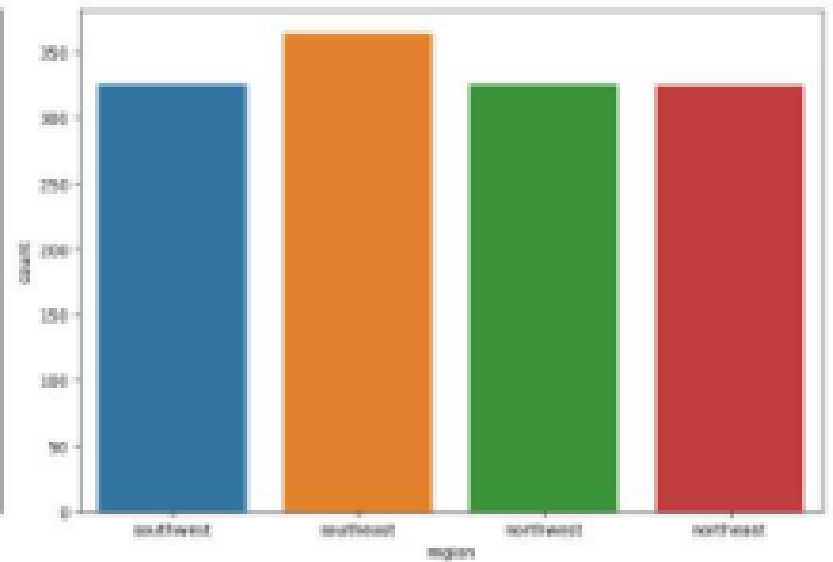
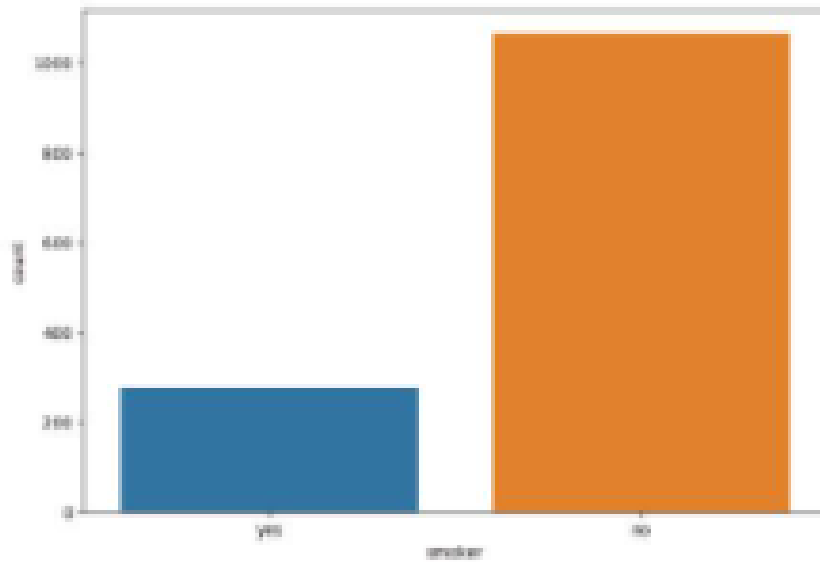
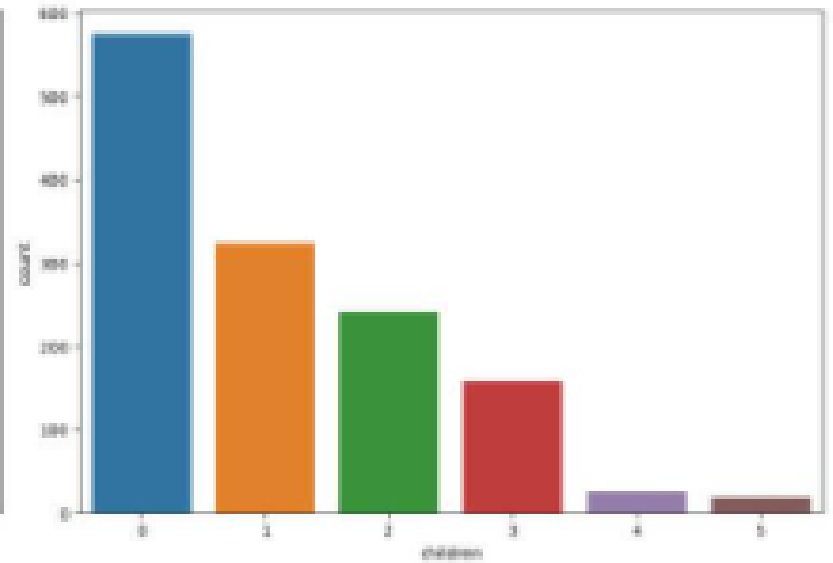
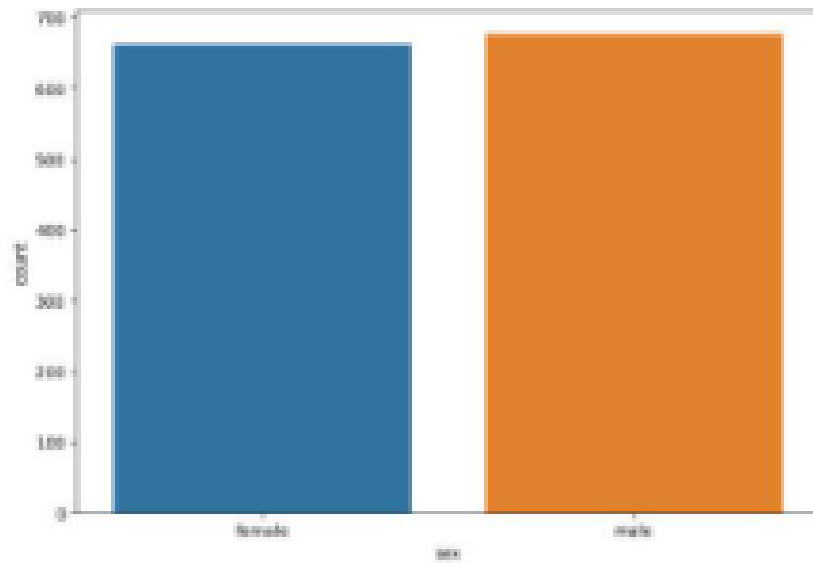
- min_data_in_leaf:
Minimum number
of data points in a
leaf

- objective: Defines
the loss function
(e.g., 'regression')

Python Example

- `!pip install lightgbm`
- `from lightgbm import LGBMRegressor`
- `regressor`
`=LGBMRegressor(n_estimators=100,`
`learning_rate=0.1, max_depth=3,`
`min_data_in_leaf=1,`
`min_data_in_bin=1)`
- `regressor.fit(X_train, y_train)`





Use Cases

- Predicting house prices

- Forecasting sales

- Modeling customer lifetime value

- Any regression task with large datasets and high dimensionality