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"import numpy as np\n"
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"# Convert YEAR and MONTH into a datetime object\n",

"data_processed['DATE'] = pd.to_datetime(data_processed['YEAR'].astype(str) +
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"import matplotlib.dates as mdates\n",

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"sns.set_theme(style=\"darkgrid\")\n",

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"# Increase the size of the figure\n",

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"# Create the plot\n",

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plt.plot(data_processed['DATE'], data_processed['SALES'], color='dodgerblue', linewidth=2.5)\n",
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"# Set the title and labels\n",
plt.title('US Retail Sales Over Time', fontsize=20, fontweight='bold')\n",
plt.xlabel('Date', fontsize=15)\n",
plt.ylabel('Sales (in Millions)', fontsize=15)\n",
"\n",
"# Formatting the date on the x-axis\n",
plt.gca().xaxis.set_major_formatter(mdates.DateFormatter('%Y-%m')) \n",
plt.gca().xaxis.set_major_locator(mdates.YearLocator())\n",
"\n",
"# Rotating date labels automatically\n",
plt.gcf().autofmt_xdate()\n",
"\n",
"# Highlight the highest point in the plot\n",
max_sale = data_processed['SALES'].max()\n",
max_date = data_processed['DATE'][data_processed['SALES'].idxmax()]\n",
plt.scatter(max_date, max_sale, color='red')\n",
plt.text(max_date, max_sale, f'Max Sales \\\n({max_date.strftime("%Y-%m")}), ${max_sale}M)', \n",
"    fontsize=12, horizontalalignment='right')\n",
"\n",
"# Create a grid\n",
plt.grid(True)\n",
"\n",
"# Show the plot\n",

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"plt.show()\n"
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data as your test set and the rest as your training set."
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    "# Train-test split\n",
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    "train = data_processed[data_processed['DATE'] < '2020-07-01']\n",
```

```
    "test = data_processed[data_processed['DATE'] >= '2020-07-01']\n"
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    "test['SALES'].fillna(test['SALES'].mean(), inplace=True)"
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    "import warnings\n",
    "warnings.filterwarnings(\"ignore\")\n",
    "from statsmodels.tsa.statespace.sarimax import SARIMAX\n",
    "# Define the model\n",
    "model = SARIMAX(train['SALES'], order=(1, 1, 1), seasonal_order=(1, 1, 1, 12))\n",
    "# Fit the model\n",
    "model_fit = model.fit(dispatch=False)"
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    "predictions = model_fit.predict(start=len(train), end=len(train) + len(test) - 1)\n",  
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    "rmse = sqrt(mean_squared_error(test['SALES'], predictions))\n",  
    "print('Test RMSE: %.3f' % rmse)\n"  
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