CDW Documentation

Responsible AI Test

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Purpose

Evaluate the Responsible AI dashboard and see what it does.

Test Process

Here's a structured list of **Responsible AI Dashboard Deployment Steps** using the corrected scripts. Each step includes:

- □ **Step Number & Action**
- □ **Purpose**
- □ **Expected Result**

□ Step 1: Install Required Packages

```
pip install --upgrade raiutils raiwidgets responsibleai ipywidgets
```

□ **Purpose**:
Install the Python packages required to run Responsible AI analysis and render the dashboard.

□ **Expected Result**:
Packages are installed without errors; dashboard widgets can render in the notebook (after kernel restart).

□ Step 2: Load and Preprocess the Dataset

```
from sklearn.datasets import fetch_openml
import pandas as pd

data = fetch_openml(name='adult', version=2, as_frame=True)
df = data.frame.dropna()
```

□ **Purpose**:
Load a well-known classification dataset (Adult Census Income) and remove any missing values to avoid downstream errors.

□ **Expected Result**:
A clean DataFrame with no null values is loaded.

🔹 Step 3: Split Dataset into Train and Test Sets

```
from sklearn.model_selection import train_test_split

target_column = 'class'
X = df.drop(columns=[target_column])
y = df[target_column]

X_train, X_test, y_train, y_test = train_test_split(X, y, stratify=y,
random_state=42)
```

🔸 **Purpose**:
Separate features and target, then split into training/testing sets for model training and evaluation.

🔸 **Expected Result**:
`X_train`, `X_test`, `y_train`, `y_test` variables created and stratified properly.

🔹 Step 4: Define Preprocessing and Train a Model

```
from sklearn.pipeline import Pipeline
from sklearn.preprocessing import OneHotEncoder, StandardScaler
from sklearn.compose import ColumnTransformer
from sklearn.ensemble import RandomForestClassifier

categorical_cols = X_train.select_dtypes(include=['object',
'category']).columns.tolist()
numerical_cols = X_train.select_dtypes(include=['int64',
'float64']).columns.tolist()

preprocessor = ColumnTransformer([
    ('cat', OneHotEncoder(handle_unknown='ignore'), categorical_cols),
    ('num', StandardScaler(), numerical_cols)
])

clf = Pipeline(steps=[
    ('preprocessor', preprocessor),
    ('classifier', RandomForestClassifier(n_estimators=10, random_state=42))
])

clf.fit(X_train, y_train)
```

🔸 **Purpose**:
Build a model pipeline that encodes categorical features, scales numeric ones, and trains a classifier.

🔸 **Expected Result**:
Pipeline is trained successfully on the training data without conversion errors.

🔹 Step 5: Prepare Data for RAIInsights

```
# Ensure target column is a supported type
y_train_clean = y_train.astype(str)
y_test_clean = y_test.astype(str)

train_data = X_train.copy()
train_data[target_column] = y_train_clean

test_data = X_test.copy()
test_data[target_column] = y_test_clean
```

 Purpose:
Re-attach the target column (as string) to the feature DataFrames — required for RAIInsights.

 Expected Result:
`train_data` and `test_data` DataFrames contain all required columns including the target.

🔹 Step 6: Initialize the Responsible AI Insights Object

```
from responsibleai import RAIInsights, FeatureMetadata

feature_metadata = FeatureMetadata(categorical_features=categorical_cols)

rai_insights = RAIInsights(
    model=clf,
    train=train_data,
    test=test_data,
    target_column=target_column,
    task_type="classification",
    feature_metadata=feature_metadata
)
```

 Purpose:
Create a RAIInsights object that acts as the core engine for the Responsible AI dashboard.

 Expected Result:
RAIInsights object is initialized successfully and ready for configuration.

🔹 Step 7: Add Responsible AI Analysis Tools

```
rai_insights.explainer.add()
rai_insights.error_analysis.add()
```

```
rai_insights.counterfactual.add(total_CFs=5, desired_class='opposite')
rai_insights.causal.add(treatment_features=categorical_cols)
```

Purpose:
Attach various tools (explanation, error analysis, counterfactuals, causal inference) to the insights engine.

Expected Result:
No errors thrown; tools are queued for computation.

Step 8: Compute Insights

```
rai_insights.compute()
```

Purpose:
Run analysis for all selected tools. This step may take a minute or more.

Expected Result:
Tool outputs are generated for the first 5,000 rows of the test set.

Step 9: Launch the Responsible AI Dashboard

```
from raiwidgets import ResponsibleAIDashboard

ResponsibleAIDashboard(rai_insights)
```

Purpose:
Open an interactive dashboard to explore insights such as feature importance, what-if analysis, and error breakdowns.

Expected Result:
A dashboard is displayed inside the notebook. Interactive plots and controls are available for analysis.

```
NOTE:  Due to the way that these URLs are deployed, this step will fail
because the notebook sends the wrong headers and this is expected.  You have
to either pull the notebook local and use it from the terminal or register
the dashboard/dataset and review it through the portal.
NOTE:  To deploy locally you need to follow the process below.
```

Use Local Jupyter Notebook

1. Download the full notebook (`.ipynb`) to your local machine.
2. Create a conda/venv environment with:

   ```
   pipx install raiwidgets responsibleai scikit-learn ipywidgets jupyter
   ```

```
notebooks
```

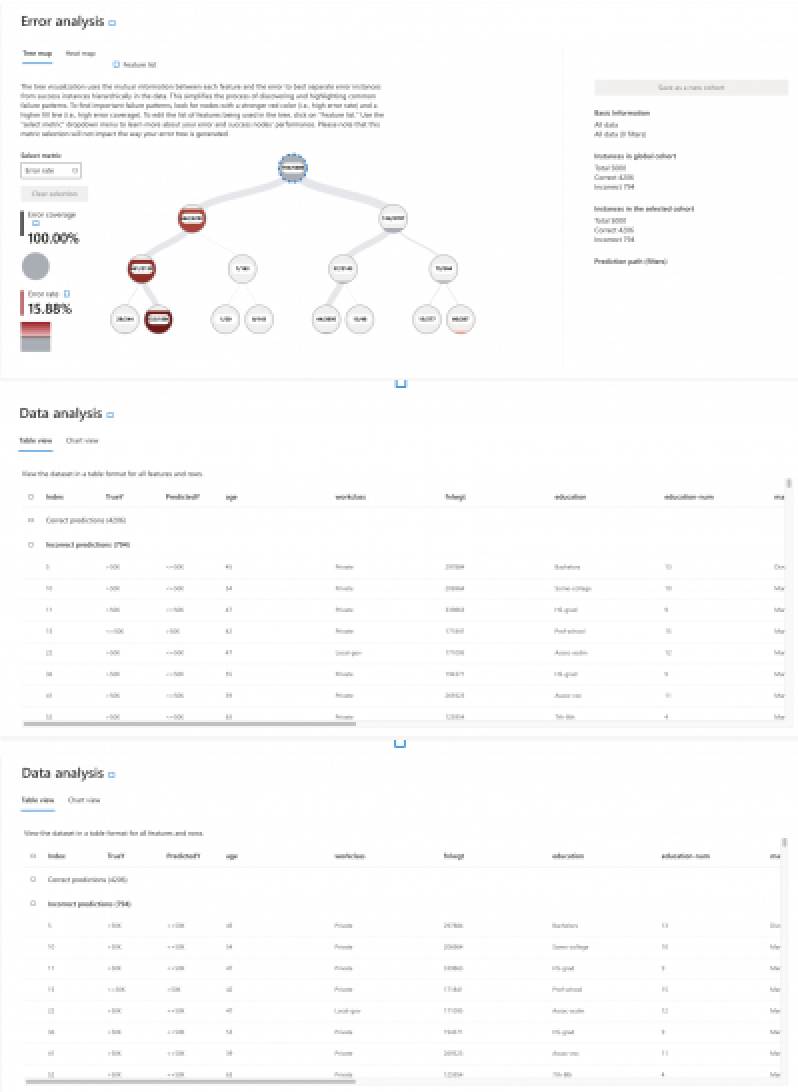
3. Launch local notebook from the directory you downloaded the file to using:

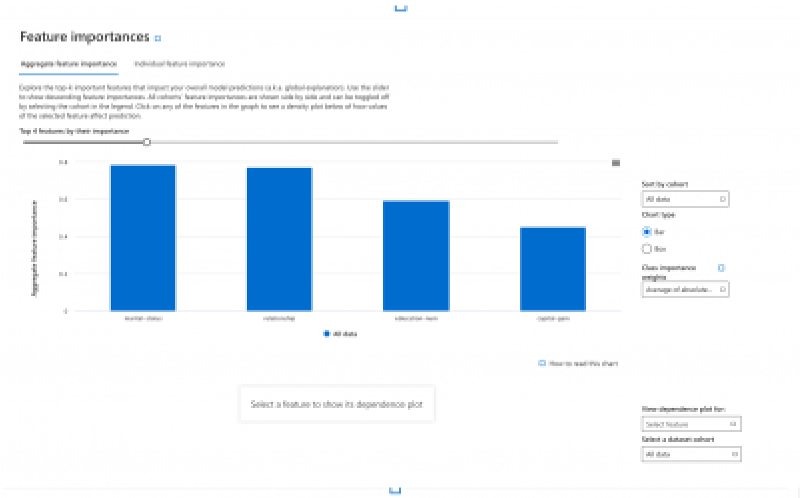
```
jupyter notebook
```

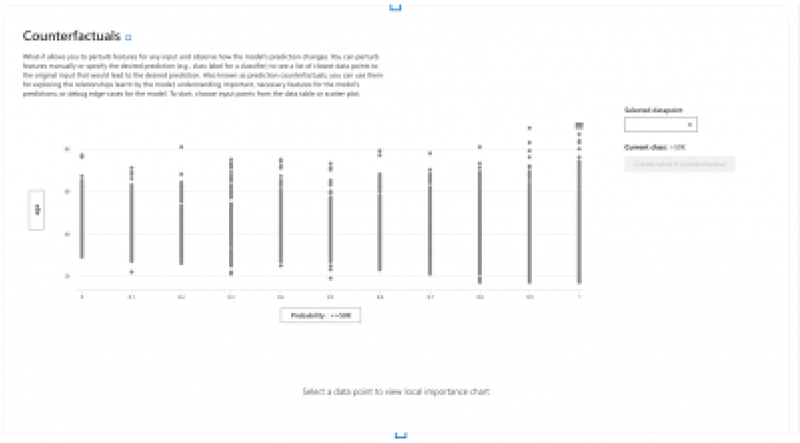
1. This will launch a notebook session in your default browser.
2. Open downloaded ipynb file.
3. Rerun all steps in local notebook.

 It will render **inline** without CORS issues.

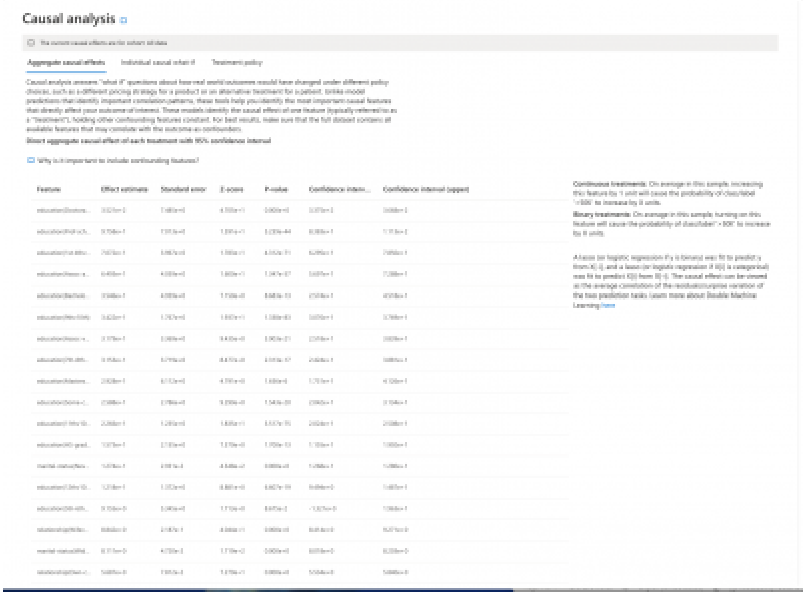
Output

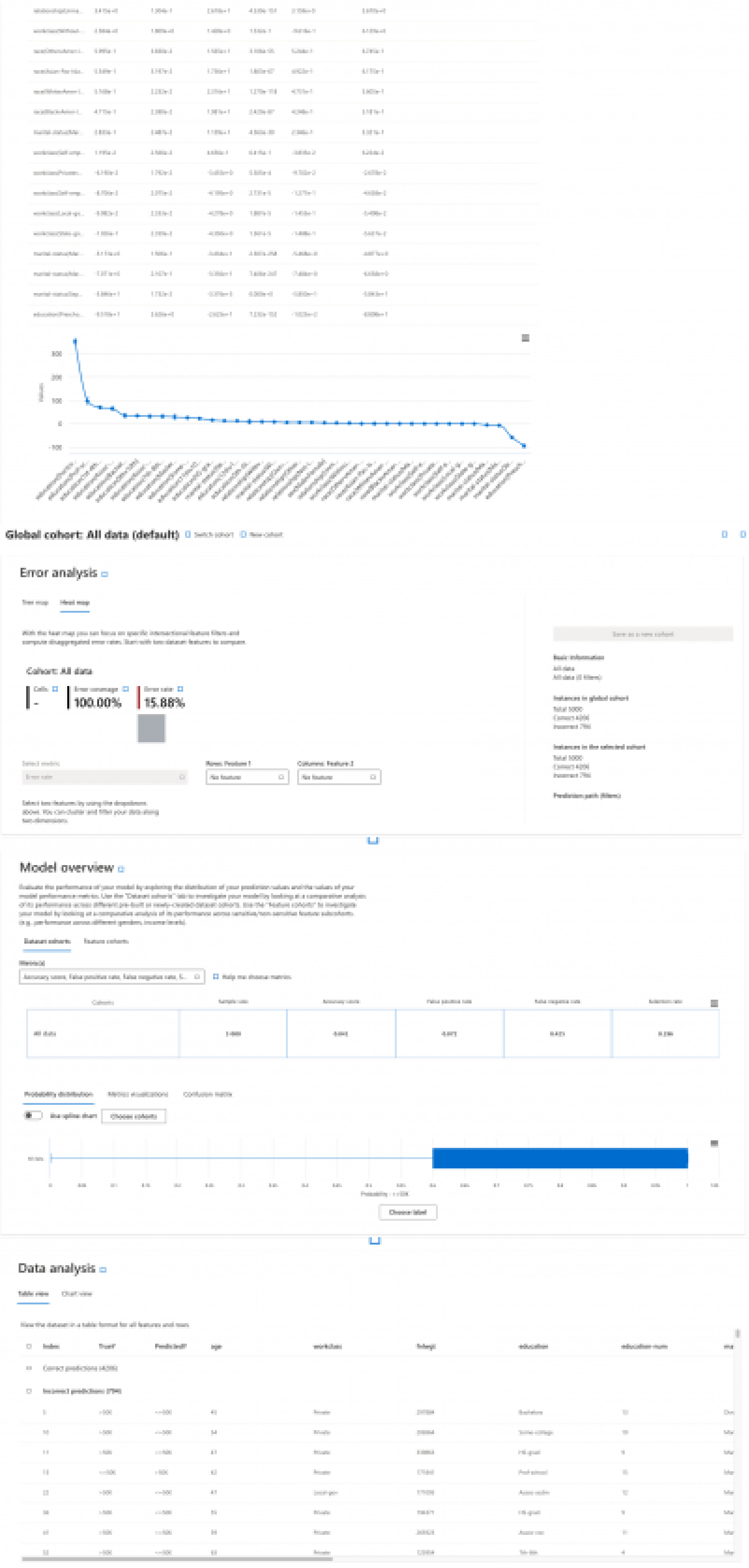



Feature importances
Select a feature to show its dependence plot


Counterfactuals
Select a data point to view local importance chart


Counterfactuals
Select a data point to view local importance chart


Causal analysis



AI Knowledge