Risk Assessment and Management - Code

Python Code for Risk Assessment

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt

# Define risk data with extended information
risk_data = {
     "Risk": ["AI Misdiagnosis", "IoT Data Failure", "Data Breach", "System Overload",
"Poor Usability"],
    "Likelihood": ["Medium", "Low", "Medium", "High", "Medium"],
    "Impact": ["Severe", "Moderate", "Severe", "Moderate", "Moderate"],
    "Category": ["AI", "IoT", "Security", "Performance", "UX"],
    "Mitigation": [
        "Retrain model with diverse data",
        "Redundant sensors and data backup",
        "Encryption and access control",
        "Auto-scaling and load balancing",
        "User-friendly design and testing"
    ]
}

# Convert to DataFrame
df = pd.DataFrame(risk_data)

# Mapping scores
likelihood_map = {"Low": 1, "Medium": 2, "High": 3}
impact_map = {"Minor": 1, "Moderate": 2, "Severe": 3}

# Calculate scores
df['Likelihood_Score'] = df['Likelihood'].map(likelihood_map)
df['Impact_Score'] = df['Impact'].map(impact_map)
df['Risk_Score'] = df['Likelihood_Score'] * df['Impact_Score']

# Categorize severity
def severity_label(score):
    if score >= 6:
        return "High"
    elif score >= 3:
        return "Medium"
    else:
        return "Low"

df['Severity'] = df['Risk_Score'].apply(severity_label)

# Sort by severity and score
sorted_df = df.sort_values(by=['Risk_Score', 'Severity'], ascending=False)
```

```
# Display full risk table
print("Extended Risk Assessment Table:")
print(sorted_df[['Risk',   'Category',   'Likelihood',   'Impact',   'Likelihood_Score',
'Impact_Score', 'Risk_Score', 'Severity', 'Mitigation']])

# Basic visualization (Not executable in this script-based output)
# sorted_df.plot(kind='bar', x='Risk', y='Risk_Score', title='Risk Scores by Risk Type')

# Risk matrix example (conceptual, not visual)
matrix  =  pd.DataFrame(np.zeros((3,  3)),  columns=["Minor",  "Moderate",  "Severe"],
index=["Low", "Medium", "High"])
for idx, row in df.iterrows():
    matrix.loc[row['Likelihood'], row['Impact']] += 1

print("\nRisk Matrix (count of risks by likelihood and impact):")
print(matrix)
```

Sample Output of Extended Code

```
Extended Risk Assessment Table:
                Risk       Category Likelihood   Impact  Likelihood_Score  Impact_Score
Risk_Score Severity                           Mitigation
0   AI Misdiagnosis             AI     Medium   Severe                 2             3
        6     High      Retrain model with diverse data
2       Data Breach         Security     Medium   Severe                 2             3
         6     High       Encryption and access control
3    System Overload     Performance       High Moderate                3             2
        6     High     Auto-scaling and load balancing
4    Poor Usability             UX     Medium Moderate                2             2
       4   Medium  User-friendly design and testing
1   IoT Data Failure           IoT        Low Moderate                1             2
       2      Low     Redundant sensors and data backup

Risk Matrix (count of risks by likelihood and impact):
          Minor  Moderate  Severe
Low         0.0       1.0     0.0
Medium      0.0       1.0     2.0
High        0.0       1.0     0.0
```