

```

import streamlit as st
import pandas as pd
import sys
import os

# Add utils to path
sys.path.append(os.path.dirname(__file__))

# Page configuration
st.set_page_config(
    page_title="Market-Based Price Recommendation System",
    page_icon="💰",
    layout="wide",
    initial_sidebar_state="expanded"
)

# Custom CSS with modern design
st.markdown("""
<style>
    /* Import Google Fonts */
    @import
url('https://fonts.googleapis.com/css2?family=Inter:wght@300;400;600;700&display=swap');

    /* Global Styles */
    * {
        font-family: 'Inter', sans-serif;
    }

    /* Main container */
    .main {
        background: linear-gradient(135deg, #667eea 0%, #764ba2 100%);
        padding: 2rem;
    }

    /* Hero section */
    .hero-section {
        background: linear-gradient(135deg, #667eea 0%, #764ba2 100%);
        padding: 3rem 2rem;
        border-radius: 20px;
        color: white;
        text-align: center;
        margin-bottom: 2rem;
        box-shadow: 0 10px 40px rgba(0,0,0,0.2);

```

```
}
```

```
.hero-title {  
  font-size: 3rem;  
  font-weight: 700;  
  margin-bottom: 1rem;  
  text-shadow: 2px 2px 4px rgba(0,0,0,0.3);  
}
```

```
.hero-subtitle {  
  font-size: 1.3rem;  
  font-weight: 300;  
  opacity: 0.95;  
}
```

```
/* Feature cards */
```

```
.feature-card {  
  background: white;  
  padding: 2rem;  
  border-radius: 15px;  
  box-shadow: 0 5px 20px rgba(0,0,0,0.1);  
  margin-bottom: 1.5rem;  
  transition: transform 0.3s ease, box-shadow 0.3s ease;  
}
```

```
.feature-card:hover {  
  transform: translateY(-5px);  
  box-shadow: 0 10px 30px rgba(0,0,0,0.15);  
}
```

```
.feature-icon {  
  font-size: 2.5rem;  
  margin-bottom: 1rem;  
}
```

```
.feature-title {  
  font-size: 1.5rem;  
  font-weight: 600;  
  color: #667eea;  
  margin-bottom: 0.5rem;  
}
```

```
.feature-description {
```

```

    color: #666;
    line-height: 1.6;
}

/* Info boxes */
.info-box {
    background: linear-gradient(135deg, #f093fb 0%, #f5576c 100%);
    color: white;
    padding: 1.5rem;
    border-radius: 10px;
    margin: 1rem 0;
}

.success-box {
    background: linear-gradient(135deg, #4facfe 0%, #00f2fe 100%);
    color: white;
    padding: 1.5rem;
    border-radius: 10px;
    margin: 1rem 0;
}

.warning-box {
    background: linear-gradient(135deg, #fa709a 0%, #fee140 100%);
    color: white;
    padding: 1.5rem;
    border-radius: 10px;
    margin: 1rem 0;
}

/* Buttons */
.stButton>button {
    background: linear-gradient(135deg, #667eea 0%, #764ba2 100%);
    color: white;
    border: none;
    padding: 0.75rem 2rem;
    border-radius: 10px;
    font-weight: 600;
    transition: all 0.3s ease;
}

.stButton>button:hover {
    transform: scale(1.05);
    box-shadow: 0 5px 20px rgba(102, 126, 234, 0.4);
}

```

```
}
```

```
/* Sidebar */
```

```
.css-1d391kg {  
  background: linear-gradient(180deg, #667eea 0%, #764ba2 100%);  
}
```

```
/* Metrics */
```

```
.metric-card {  
  background: white;  
  padding: 1.5rem;  
  border-radius: 10px;  
  text-align: center;  
  box-shadow: 0 3px 10px rgba(0,0,0,0.1);  
}
```

```
.metric-value {  
  font-size: 2rem;  
  font-weight: 700;  
  color: #667eea;  
}
```

```
.metric-label {  
  color: #666;  
  font-size: 0.9rem;  
  margin-top: 0.5rem;  
}
```

```
/* Tables */
```

```
.dataframe {  
  border-radius: 10px;  
  overflow: hidden;  
}
```

```
/* Section headers */
```

```
.section-header {  
  background: linear-gradient(135deg, #667eea 0%, #764ba2 100%);  
  color: white;  
  padding: 1rem 1.5rem;  
  border-radius: 10px;  
  margin: 2rem 0 1rem 0;  
  font-size: 1.5rem;  
  font-weight: 600;
```

```
}  
</style>  
""", unsafe_allow_html=True)
```

```
# Hero Section
```

```
st.markdown("""  
<div class="hero-section">  
  <div class="hero-title"> 💰 Market-Based Price Recommendation System</div>  
  <div class="hero-subtitle">  
    AI-Powered Optimal Pricing for New Product Launches  
  </div>  
</div>  
""", unsafe_allow_html=True)
```

```
# Introduction
```

```
st.markdown("""  
<div class="feature-card">  
  <div class="feature-icon"> 🎯 </div>  
  <div class="feature-title">Welcome to the Price Recommendation System</div>  
  <div class="feature-description">  
    This end-to-end Data Science application helps you determine the optimal launch price  
    for new products by analyzing live market data, training machine learning models,  
    and providing strategic pricing recommendations.  
  </div>  
</div>  
""", unsafe_allow_html=True)
```

```
# Features Section
```

```
col1, col2, col3 = st.columns(3)
```

```
with col1:
```

```
  st.markdown("""  
    <div class="feature-card">  
      <div class="feature-icon"> 📊 </div>  
      <div class="feature-title">Live Market Data</div>  
      <div class="feature-description">  
        Fetch real-time product pricing from multiple platforms including Amazon, eBay,  
        and more. Analyze competitor pricing across categories.  
      </div>  
    </div>  
    """, unsafe_allow_html=True)
```

```
with col2:
```

```

st.markdown("""
<div class="feature-card">
  <div class="feature-icon"><img alt="ML icon" data-bbox="365 128 388 145"/></div>
  <div class="feature-title">ML-Powered Predictions</div>
  <div class="feature-description">
    Advanced machine learning models (Linear Regression, Random Forest, XGBoost)
    trained on market data to predict optimal prices.
  </div>
</div>
""", unsafe_allow_html=True)

```

with col3:

```

st.markdown("""
<div class="feature-card">
  <div class="feature-icon"><img alt="Lightbulb icon" data-bbox="365 355 388 372"/></div>
  <div class="feature-title">Strategic Insights</div>
  <div class="feature-description">
    Get market positioning analysis, pricing strategy recommendations,
    and competitive intelligence for your product launch.
  </div>
</div>
""", unsafe_allow_html=True)

```

How It Works

```

st.markdown('<div class="section-header"><img alt="Refresh icon" data-bbox="460 545 483 562"/> How It Works</div>', unsafe_allow_html=True)

```

```

st.markdown("""
<div class="feature-card">
  <h3 style="color: #667eea;">End-to-End Data Science Pipeline</h3>

  <ol style="line-height: 2; color: #333;">
    <li><strong>Data Collection:</strong> Fetch live product pricing data from multiple APIs</li>
    <li><strong>Data Cleaning:</strong> Handle missing values, remove duplicates, detect outliers</li>
    <li><strong>Feature Engineering:</strong> Create advanced features like demand score, competitor density</li>
    <li><strong>Model Training:</strong> Train and compare multiple ML models (Linear Regression, Random Forest, XGBoost)</li>
    <li><strong>Price Prediction:</strong> Generate optimal price with confidence intervals</li>
    <li><strong>Strategic Analysis:</strong> Provide market positioning and pricing strategy recommendations</li>
  </ol>
</div>
""")

```

```

    </ol>
</div>
""" , unsafe_allow_html=True)

# Key Features
st.markdown('<div class="section-header">★ Key Features</div>', unsafe_allow_html=True)

col1, col2 = st.columns(2)

with col1:
    st.markdown("""
    <div class="info-box">
        <h4>📊 Advanced Analytics</h4>
        <ul>
            <li>Price distribution analysis</li>
            <li>Competitive price bands</li>
            <li>Rating vs Price correlation</li>
            <li>Market trend visualization</li>
        </ul>
    </div>
    """, unsafe_allow_html=True)

    st.markdown("""
    <div class="success-box">
        <h4>🎯 Smart Recommendations</h4>
        <ul>
            <li>Optimal launch price</li>
            <li>Price range (min-max)</li>
            <li>Market positioning label</li>
            <li>Pricing strategy insights</li>
        </ul>
    </div>
    """, unsafe_allow_html=True)

with col2:
    st.markdown("""
    <div class="warning-box">
        <h4>🔬 Data Science Best Practices</h4>
        <ul>
            <li>Comprehensive data cleaning</li>
            <li>Feature engineering with business logic</li>
            <li>Model comparison & selection</li>
            <li>Hyperparameter tuning</li>
        </ul>
    """)

```

```
    </ul>
  </div>
  """ , unsafe_allow_html=True)
```

```
st.markdown("""
<div class="info-box">
  <h4>📦 Business Value</h4>
  <ul>
    <li>Reduce pricing guesswork</li>
    <li>Maximize profit margins</li>
    <li>Competitive market positioning</li>
    <li>Data-driven decision making</li>
  </ul>
</div>
""" , unsafe_allow_html=True)
```

Navigation Guide

```
st.markdown('<div class="section-header">🗺️ Navigation Guide</div>',
unsafe_allow_html=True)
```

```
st.markdown("""
<div class="feature-card">
  <h3 style="color: #667eea;">Explore the Application</h3>

  <p style="color: #666; line-height: 1.8;">
    Use the sidebar to navigate through different sections:
  </p>

  <div style="margin: 1.5rem 0;">
    <p><strong style="color: #667eea;">📊 Live Market Data:</strong> Fetch and explore
    real-time product pricing from multiple platforms</p>
    <p><strong style="color: #667eea;">💰 Price Recommendation:</strong> Get AI-powered
    price predictions for your new product</p>
    <p><strong style="color: #667eea;">📈 Analytics Dashboard:</strong> View
    comprehensive market analysis and visualizations</p>
  </div>
</div>
""" , unsafe_allow_html=True)
```

Footer

```
st.markdown("""
<div style="text-align: center; margin-top: 3rem; padding: 2rem; background: white;
border-radius: 10px;">
```


<p style="color: #666; font-size: 0.9rem;">

Built with ❤️ using Streamlit, Scikit-learn, XGBoost, and Python

</p>

<p style="color: #999; font-size: 0.8rem;">

© 2024 Market-Based Price Recommendation System | Data Science Application

</p>

</div>

""", unsafe_allow_html=True)