

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

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

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        </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)
```