

Alpha Vantage API - XAML Forms Guide for Financial Analysis Application

Overview

This document provides a comprehensive guide for creating XAML markup forms in a WPF financial analysis application that integrates with the Alpha Vantage API. The focus is on supporting Python-based ML predictions for stock price analysis.

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1. Core Stock Data Forms

1.1 Global Quote Form

API Endpoint: GLOBAL_QUOTE

Purpose: Display real-time stock quote information

Recommended XAML Components:

Component	Purpose	Binding Property
TextBlock	Symbol display	{Binding Symbol}
TextBlock	Current Price	{Binding Price, StringFormat=\\${0:F2}}
TextBlock	Change	{Binding Change, StringFormat={}{0:F2}}
TextBlock	Change Percent	{Binding ChangePercent, StringFormat={}{0:P2}}
TextBlock	Day High	{Binding DayHigh, StringFormat=\\${0:F2}}
TextBlock	Day Low	{Binding DayLow, StringFormat=\\${0:F2}}
TextBlock	Volume	{Binding Volume, StringFormat={}{0:N0}}
TextBlock	Last Updated	{Binding LastUpdated, StringFormat={}{0:MM/dd/yyyy HH:mm}}

Color Coding:

- Green: Positive change
- Red: Negative change
- White/Gray: Neutral

1.2 Symbol Search Form

API Endpoint: SYMBOL_SEARCH

Purpose: Search and select stock symbols

Recommended XAML Components:

Component	Purpose	Properties
TextBox	Search input	TextChanged event for live search
Popup	Dropdown results	StaysOpen="False"
ListBox	Search results	Custom ItemTemplate with Symbol, Name, Region
Button	Confirm selection	Click handler

2. Technical Indicators Forms

2.1 Momentum Indicators Panel

API Endpoints: RSI, STOCH, CCI, MOM, WILLR, ADX, AROON

Purpose: Display momentum-based technical indicators

Recommended XAML Components:

Indicator	Display Type	Color Logic
RSI	Progress Bar + Value	<30 Green (Oversold), >70 Red (Overbought)
Stochastic %K/%D	Dual Line Chart	Crossover signals
CCI	Value with Color	<-100 Green, >100 Red
Williams %R	Progress Bar	<-80 Green, >-20 Red
ADX	Gauge/Value	>25 Strong Trend (Blue)

2.2 Trend Indicators Panel

API Endpoints: SMA, EMA, WMA, DEMA, TEMA, TRIMA, KAMA, MACD, BBANDS

Purpose: Display trend-following indicators

Recommended XAML Components:

Indicator	Display Type	Properties
Moving Averages	Chart Overlay	Multiple lines with legend
MACD	Histogram + Lines	MACD, Signal, Histogram values
Bollinger Bands	Chart Overlay	Upper, Middle, Lower bands

Bollinger Bands Data:

- Upper Band: Price level
- Middle Band: Price level (SMA)
- Lower Band: Price level

- Band Width: Percentage
- %B Position: 0-1 value

MACD Data:

- MACD Line: Value
- Signal Line: Value
- Histogram: Value with Bullish/Bearish indicator

2.3 Volume Indicators Panel

API Endpoints: OBV, AD, ADOSC, VWAP

Purpose: Display volume-based technical indicators

Recommended XAML Components:

Indicator	Display Type	Purpose
OBV	Line Chart	Cumulative volume flow
AD (Accum/Dist)	Line Chart	Money flow direction
ADOSC	Histogram	A/D momentum
VWAP	Value + Comparison	Fair value benchmark

VWAP Display:

- VWAP Value
- Current Price
- Position (Above/Below VWAP)
- Distance (Percentage)

2.4 Volatility Indicators Panel

API Endpoints: ATR, NATR, TRANGE

Purpose: Display volatility measurements

Recommended XAML Components:

Indicator	Display Type	Purpose
ATR	Value + Historical	Average price movement
NATR	Percentage	Normalized ATR
True Range	Current Value	Today's volatility

3. Fundamental Data Forms

3.1 Company Overview Form

API Endpoint: OVERVIEW

Purpose: Display company fundamental data

Company Information Section:

- Name, Symbol, Exchange
- Sector, Industry
- Description (expandable TextBlock)

Valuation Metrics Section:

Metric	Display Format
Market Cap	Currency (Trillions/Billions)
P/E Ratio	Decimal
PEG Ratio	Decimal
Book Value	Currency
Dividend Yield	Percentage
EPS	Currency
52-Week High	Currency
52-Week Low	Currency

3.2 Income Statement Form

API Endpoint: INCOME_STATEMENT

Purpose: Display quarterly/annual income data

Recommended XAML Components:

Data Point	Display Type	Format
Total Revenue	DataGrid Column	Currency (Billions)
Gross Profit	DataGrid Column	Currency
Operating Income	DataGrid Column	Currency
Net Income	DataGrid Column	Currency
EPS	DataGrid Column	Decimal

3.3 Balance Sheet Form

API Endpoint: BALANCE_SHEET

Purpose: Display company balance sheet data

Key Sections:

- Total Assets
- Total Liabilities
- Shareholders' Equity
- Current Ratio
- Debt-to-Equity Ratio

3.4 Cash Flow Form

API Endpoint: CASH_FLOW

Purpose: Display cash flow statement data

Key Sections:

- Operating Cash Flow
- Investing Cash Flow
- Financing Cash Flow
- Free Cash Flow

3.5 Earnings Form

API Endpoint: EARNINGS

Purpose: Display quarterly/annual earnings data

Recommended XAML Components:

Component	Purpose
DataGrid	Historical earnings data
Chart	EPS trend visualization
TextBlocks	Upcoming earnings date

4. Time Series Data Forms

4.1 Intraday Chart Form

API Endpoint: TIME_SERIES_INTRADAY

Purpose: Display intraday price data (1min, 5min, 15min, 30min, 60min)

Recommended XAML Components:

Component	Purpose	Properties
CartesianChart	Price visualization	LiveCharts.Wpf
ComboBox	Interval selector	1min, 5min, 15min, 30min, 60min
DatePicker	Date range	Start/End dates
ToggleButton	Chart type	Candlestick, Line, Area

4.2 Daily/Weekly/Monthly Chart Form

API Endpoints: TIME_SERIES_DAILY, TIME_SERIES_DAILY_ADJUSTED, TIME_SERIES_WEEKLY, TIME_SERIES_MONTHLY

Purpose: Display historical price data

Recommended XAML Components:

Component	Purpose
Time Range Buttons	1D, 5D, 1M, 6M, 1Y, 5Y, ALL
CartesianChart	Historical price chart
Volume Chart	Secondary chart below price
DataGrid	OHLCV data table

5. Forex and Cryptocurrency Forms

5.1 Forex Exchange Rate Form

API Endpoints: CURRENCY_EXCHANGE_RATE, FX_DAILY, FX_INTRADAY

Purpose: Display forex pair data

Recommended XAML Components:

Component	Purpose
ComboBox (From)	Source currency selector
ComboBox (To)	Target currency selector
TextBlock	Exchange rate display
Chart	Historical exchange rate

Forex Data Display:

- Exchange Rate
- Bid Price
- Ask Price
- Last Refresh Timestamp

5.2 Cryptocurrency Form

API Endpoints: DIGITAL_CURRENCY_DAILY, DIGITAL_CURRENCY_WEEKLY, CRYPTO_INTRADAY

Purpose: Display cryptocurrency data

Recommended XAML Components:

Component	Purpose
ComboBox	Cryptocurrency selector (BTC, ETH, etc.)
ComboBox	Market selector (USD, EUR, etc.)
Chart	Price history
TextBlocks	Market cap, volume

6. Intelligence and News Forms

6.1 News Sentiment Form

API Endpoint: NEWS_SENTIMENT

Purpose: Display market news and sentiment analysis

Recommended XAML Components:

Component	Purpose
ListView	News articles list
ProgressBar	Sentiment score visualization
TextBlock	Article summary
Hyperlink	Link to full article

News Item Template Fields:

- Sentiment Label (Bullish/Bearish/Neutral)
 - Headline
 - Source
 - Time ago
 - Sentiment Score (0-1)
 - Summary
-

6.2 Top Gainers/Losers Form

API Endpoint: TOP_GAINERS_LOSERS

Purpose: Display market movers

Recommended XAML Components:

Component	Purpose
TabControl	Gainers, Losers, Most Active tabs
DataGrid	Symbol, Price, Change%, Volume
Button	Refresh data

6.3 Insider Transactions Form

API Endpoint: INSIDER_TRANSACTIONS

Purpose: Display insider trading activity

Recommended XAML Components:

Component	Purpose
DataGrid	Transaction details
FilterComboBox	Transaction type filter
DateRangePicker	Date range filter

7. Python ML Prediction Integration Forms

7.1 Prediction Analysis Control

Purpose: Display ML-generated price predictions

Recommended XAML Components:

Component	Purpose	Binding
DataGrid	Top predictions list	{Binding TopPredictions}
ProgressBar	Confidence score	{Binding Confidence}
TextBlock	Predicted action	{Binding PredictedAction}
TextBlock	Target price	{Binding TargetPrice}
TextBlock	Potential return	{Binding PotentialReturn}
Chart	Prediction visualization	Price + Predicted line

Prediction Grid Columns:

Column	Binding	Format
Symbol	{Binding Symbol}	Text
Action	{Binding PredictedAction}	BUY/SELL with color
Confidence	{Binding Confidence}	Progress bar + percentage
Current	{Binding CurrentPrice}	Currency
Target	{Binding TargetPrice}	Currency
Potential	{Binding PotentialReturn}	Percentage
Signals	Indicator badges	RSI, MACD, ADX, VOL

7.2 Trading Strategy Selector

Purpose: Select and configure trading strategies for predictions

Recommended XAML Components:

Component	Purpose
ComboBox	Strategy selector
CheckBox list	Indicator toggles
Slider	Confidence threshold
ComboBox	Timeframe selector

Available Strategies:

- SMA Crossover
- RSI Divergence
- Bollinger Bands
- MACD Crossover

7.3 Backtesting Results Form

Purpose: Display historical strategy performance

Recommended XAML Components:

Metric	Display Type
Total Return	Percentage with color
Win Rate	Progress bar
Sharpe Ratio	Value
Max Drawdown	Value with color
Profit Factor	Value

7.4 Sentiment Correlation Panel

Purpose: Correlate sentiment with price predictions

Recommended XAML Sections:

- Overall Sentiment Score
- News Sentiment
- Social Media Sentiment
- Analyst Sentiment
- Sentiment vs. Price Chart

8. Sample XAML Templates

8.1 Stock Quote Card Template

Note: This template uses styles from `EnhancedStyles.xaml`. Ensure the `ResourceDictionary` is properly merged.

```
<Border Background="#262638" BorderBrush="#3E3E56" BorderThickness="1"
        CornerRadius="5" Padding="10">
    <Grid>
        <Grid.RowDefinitions>
            <RowDefinition Height="Auto"/>
            <RowDefinition Height="Auto"/>
            <RowDefinition Height="Auto"/>
        </Grid.RowDefinitions>

        <StackPanel Grid.Row="0" Orientation="Horizontal">
            <TextBlock Text="{Binding Symbol}"
                      Style="{StaticResource EnhancedHeaderTextBlockStyle}"/>
            <TextBlock Text="{Binding CompanyName}"
                      Style="{StaticResource EnhancedSmallTextBlockStyle}"
                      Margin="10,0,0,0"/>
        </StackPanel>

        <StackPanel Grid.Row="1" Orientation="Horizontal" Margin="0,5">
            <TextBlock Text="{Binding Price, StringFormat=C2}"
                      Style="{StaticResource EnhancedTextBlockStyle}"
                      FontSize="24"/>
            <TextBlock Text="{Binding ChangePercent, StringFormat=P2}"
                      Style="{StaticResource EnhancedSmallTextBlockStyle}"
                      Margin="10,0,0,0"/>
        </StackPanel>

        <StackPanel Grid.Row="2" Orientation="Horizontal">
            <TextBlock Text="{Binding Volume, StringFormat='Vol: {0:N0}'}"
                      Style="{StaticResource EnhancedSmallTextBlockStyle}"/>
        </StackPanel>
    </Grid>
</Border>
```

8.2 Indicator Badge Template

Note: Uses standardized styles and the application's color scheme.

```
<Border Width="50" Height="50" CornerRadius="5" Padding="5"
        Background="#2A2A3B" BorderBrush="#3E3E56" BorderThickness="1">
```

```

<StackPanel VerticalAlignment="Center">
    <TextBlock Text="{Binding Name}"
        Style="{StaticResource EnhancedSmallTextBlockStyle}"
        FontWeight="Bold"
        HorizontalAlignment="Center"/>
    <TextBlock Text="{Binding Value, StringFormat={}{0:F1}}"
        Style="{StaticResource EnhancedSmallTextBlockStyle}"
        HorizontalAlignment="Center"/>
</StackPanel>
</Border>

```

8.3 Prediction Row Template

Note: Uses styles compatible with `EnhancedDataGridColumnStyle` for consistent `DataGrid` styling.

```

<DataTemplate>
    <Grid>
        <Grid.ColumnDefinitions>
            <ColumnDefinition Width="80"/>
            <ColumnDefinition Width="80"/>
            <ColumnDefinition Width="100"/>
            <ColumnDefinition Width="90"/>
            <ColumnDefinition Width="90"/>
            <ColumnDefinition Width="90"/>
        </Grid.ColumnDefinitions>

        <TextBlock Grid.Column="0" Text="{Binding Symbol}"
            Style="{StaticResource EnhancedTextBlockStyle}"
            FontWeight="Bold"/>

        <TextBlock Grid.Column="1" Text="{Binding PredictedAction}"
            Style="{StaticResource EnhancedTextBlockStyle}/>

        <Grid Grid.Column="2">
            <ProgressBar Value="{Binding Confidence}" Maximum="1" Height="15"/>
            <TextBlock Text="{Binding Confidence, StringFormat={}{0:P0}}"
                Style="{StaticResource EnhancedSmallTextBlockStyle}"
                HorizontalAlignment="Center"/>
        </Grid>

        <TextBlock Grid.Column="3"
            Text="{Binding CurrentPrice, StringFormat=C2}"
            Style="{StaticResource EnhancedTextBlockStyle}/>

        <TextBlock Grid.Column="4"
            Text="{Binding TargetPrice, StringFormat=C2}"
            Foreground="Cyan"
            Style="{StaticResource EnhancedTextBlockStyle}/>

        <TextBlock Grid.Column="5"
            Text="{Binding PotentialReturn, StringFormat={}{0:P2}}"
            Style="{StaticResource EnhancedTextBlockStyle}/>
    </Grid>

```

</DataTemplate>

Summary: Recommended Forms for Python Prediction Application

Essential Forms (Priority 1)

1. **Symbol Search Form** - SYMBOL_SEARCH
2. **Global Quote Form** - GLOBAL_QUOTE
3. **Daily Time Series Form** - TIME_SERIES_DAILY_ADJUSTED
4. **Technical Indicators Panel** - RSI, MACD, BBANDS, VWAP
5. **Prediction Analysis Control** - ML Integration

Important Forms (Priority 2)

6. **Company Overview Form** - OVERVIEW
7. **Intraday Chart Form** - TIME_SERIES_INTRADAY
8. **News Sentiment Form** - NEWS_SENTIMENT
9. **Top Movers Form** - TOP_GAINERS_LOSERS
10. **Backtesting Results Form** - Historical validation

Additional Forms (Priority 3)

11. **Forex Exchange Form** - FX_DAILY
 12. **Cryptocurrency Form** - DIGITAL_CURRENCY_DAILY
 13. **Earnings Form** - EARNINGS
 14. **Income Statement Form** - INCOME_STATEMENT
 15. **Insider Transactions Form** - INSIDER_TRANSACTIONS
-

Design Guidelines

IMPORTANT: Always reference the existing `EnhancedStyles.xaml` resource dictionary for consistent styling across all components.

Using Existing Styles

The application has standardized styles defined in `Quantra/Styles/EnhancedStyles.xaml`. Always use these styles instead of hardcoding properties:

Style Name	Component Type	Usage
<code>EnhancedButtonStyle</code>	Button	All buttons
<code>EnhancedComboBoxStyle</code>	ComboBox	All dropdown selectors
<code>EnhancedTextBoxStyle</code>	TextBox	All text inputs
<code>EnhancedCheckBoxStyle</code>	CheckBox	All checkboxes
<code>EnhancedTextBlockStyle</code>	TextBlock	Standard text
<code>EnhancedSmallTextBlockStyle</code>	TextBlock	Labels and small text
<code>EnhancedHeaderTextBlockStyle</code>	TextBlock	Section headers
<code>EnhancedDataGridColumnHeaderStyle</code>	DataGridColumnHeader	Grid headers
<code>EnhancedDataGridRowStyle</code>	DataGridRow	Grid rows
<code>EnhancedDataGridCellStyle</code>	DataGridCell	Grid cells

Color Scheme (Quantra Dark Theme)

These colors match the existing application color scheme from `EnhancedStyles.xaml`:

Element	Color	Notes
Background	#2A2A3B	Main application background
Card Background	#262638	Panel/card backgrounds
Border	#3E3E56	Standard borders
Border (Accent)	#007ACC	Accent borders
Border (Hover)	#1E90FF	Hover state borders
Text Primary	GhostWhite	Main text color
Text Secondary	#CCCCCC	Secondary text
Text Disabled	#666677	Disabled text
Bullish/Buy	#20C040	Positive indicators
Bearish/Sell	#C02020	Negative indicators
Neutral	#3E3E56	Neutral indicators
Strong Trend	#3E90FF	Trend strength

Font Guidelines

The application uses **Franklin Gothic Medium** as the standard font family:

Element	Size	Weight	Style Reference
Headers	18-22	Bold	<code>EnhancedHeaderTextBlockStyle</code>
Subheaders	14-16	SemiBold	Custom or inherited
Body	12	Normal	<code>EnhancedTextBlockStyle</code>
Small/Labels	10	Normal	<code>EnhancedSmallTextBlockStyle</code>
Data Values	12-14	Normal/Bold	<code>EnhancedDataGridColumnStyle</code>

Responsive Design

- Use `Grid` with `*` sizing for flexible layouts
- Implement `ScrollViewer` for overflow content
- Use `WrapPanel` for indicator badges
- Enable column resizing in `DataGrid`
- Reference existing styles from `EnhancedStyles.xaml` ResourceDictionary

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