**Market Seasonality Explorer Documentation**

**Introduction**

Market Seasonality Explorer is a React-based interactive dashboard designed to visualize cryptocurrency seasonality and order book data. It provides rich insights into crypto market patterns such as volatility, liquidity, and performance through an interactive calendar and detailed analytics.

**Features**

* **Dynamic Symbol Selection:** Choose from multiple trading pairs with live Binance data.
* **Metric Filtering:** Filter calendar visualizations by volatility, liquidity, performance, or all metrics.
* **Interactive Calendar:** Explore daily, weekly, and monthly metrics with color-coded cells and icons.
* **Order Book Snapshot:** View automatically refreshing top bids and asks for selected symbols.
* **Detailed Drawer View:** Click any date for detailed OHLC stats and price chart.
* **Volatility Coloring:** Calendar cells use colors (green, yellow, red) to represent volatility levels.
* **Liquidity Visuals:** Circle sizes and overlays indicate liquidity.
* **Performance Icons:** Up/down/neutral arrows provide quick performance assessment.
* **Weekly/Monthly Aggregation:** Summarize weekly or monthly data in side panels.
* **Volume Chart:** Responsive chart displays volume trends.
* **PDF Export:** Export the entire dashboard view as a styled PDF.

**Architecture and Components**

| **Component** | **Description** |
| --- | --- |
| Dashboard | Main container handling symbol/metric selection, data fetching, PDF export, and calendar. |
| CalendarComponent | Wraps FullCalendar.js for daily/week/month views, custom render, and drawer triggers. |
| SideDashboard | Drawer panel with detailed OHLC data and intraday price chart when clicking calendar days. |
| OrderBook | Displays live top bids/asks data fetched from Binance API. |
| VolumeChart | Plots volume trends aggregated for week/month intervals. |
| WeeklyComponent | Highlights week-level stats summary. |
| MonthlyComponent | Summarizes and aggregates calendar data monthly. |
| CalendarLegend | Provides color/shape legend for calendar metrics. |

**Technology Stack**

* **Frontend:** React, Material UI, FullCalendar.js, recharts, axios
* **Data Source:** Binance public REST API
* **Utilities:** html2canvas, jsPDF (for PDF export), mathjs (statistics and aggregation)
* **Styling:** CSS modules

**Installation and Setup**

1. Clone the repository.
2. Install dependencies via npm install.
3. Structure your project to include:
   * Dashboard/ (contains Dashboard.js, component.css)
   * Calender/ (contains CalenderComponent.js, calender.css, and child components)
   * Charts/ (contains VolumeChart.js)
   * services/api.js (API endpoints for Binance data fetch)
4. Run the development server with npm start.

**Usage Instructions**

* Select a cryptocurrency trading pair symbol.
* Choose the metric (Volatility, Liquidity, Performance, or All).
* Observe data visualization in the calendar and side panels.
* Hover on calendar cells for detailed tooltips.
* Click a day to open the detailed drawer view with OHLC data and price chart.
* Switch between monthly and weekly calendar views.
* Export the dashboard as a PDF using the export button.

**Data Flow and APIs**

* Fetches live trading pairs and candlestick data from Binance REST API.
* Order book bids and asks are updated every 5 seconds.
* Uses mathjs for calculations such as volatility (standard deviation) and moving averages.
* HTML2Canvas and jsPDF enable PDF creation and download of the entire dashboard snapshot.

**Customization and Extensibility**

* Extend API endpoints in services/api.js to include historical or additional metrics.
* Add new metrics or visual elements in the calendar or detail drawer.
* Customize styling or localization via Material UI theme and CSS modules.

**Screenshots**

(Include relevant screenshots of the dashboard for better understanding)

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