ChatGPT

Industry Overview

Crypto perpetual futures (a.k.a. perpetual swaps) have become a cornerstone of digital asset trading. These contracts have no expiry, allowing 24/7 leveraged speculation on cryptocurrency prices [1]. The market is enormous – for example, July 2025 saw nearly $8.94 trillion in volume, and annualized turnover exceeds $28 trillion, far outpacing spot markets [1]. Perpetuals now represent roughly 75–78% of all crypto trading volume [2]. Volume growth has been explosive: from under $100 billion per month in early 2019 to over $4 trillion at the 2021 peak. Even after a mid-2020s crypto bear market, derivative activity rebounded: by late 2023 monthly perps volume was ~$1.3 trillion (about 4× the spot market) [2]. Open interest has likewise reached record highs (about $131 billion on major exchanges in Dec 2024) [3]. All of this underscores that perpetual futures are now a major venue for liquidity, hedging and speculation, and play a key role in price discovery for digital assets [4].

A few large exchanges dominate this space. Unregulated offshore centralized platforms capture roughly 85% of global futures volume [5]. By far the largest is **Binance** (≈$15.5 billion/day in perp volume), followed by **Bybit** (~$6 billion/day) and **OKX** (~$4.5 billion/day) [5]. Other notable crypto-native futures venues include Bitget, Huobi, and BitMEX (the pioneer of perpetual swaps). In contrast, traditional regulated exchanges account for only a tiny share; for example, CME's regulated Bitcoin and Ether futures only see ~$300 million per day (well under 5% of crypto derivatives volume) [6]. This dominance of offshore CEXs means the market's center of gravity is in Asia-Pacific [7]. Roughly 50% of global crypto derivatives volume originates in APAC, thanks to an enthusiastic trading culture and permissive rules [8]. In fact, over 95% of crypto derivatives volume occurs outside the U.S. [8]. Key jurisdictions include Singapore, Hong Kong, South Korea, Dubai and the Seychelles [8]. The U.S. and Europe see far lower volumes due to stricter regulation, though this is beginning to change. For instance, in 2025 Coinbase and Kraken launched CFTC-regulated perpetual products for institutional clients, and Europe's upcoming MiCA regime will further onshore activity [9].

Lifecycle Stage

The perpetual futures industry is currently in a strong growth (expansion) phase, but it is not yet fully mature. Volumes and open interest continue to rise dramatically, and perpetuals consistently make up roughly three-quarters of total crypto trading [10]. The sustained high volumes and record open interest indicate that interest in perps remains strong and growing [10]. A clear sign of this growth stage is the ongoing entry of new players and innovations. In recent years, major U.S. spot exchanges (Coinbase, Kraken) have added perpetual products, and on-chain DeFi platforms like dYdX and GMX have grown into leading decentralized perp exchanges [11]. There is also continuous product innovation: exchanges are launching exotic-asset perps, new margin models, and AI-driven trading tools, showing that the sector has not settled into a static, mature state [11].

The market has shown notable resilience through shocks. For example, the 2022 FTX collapse did not permanently shrink the perp market – trading volumes simply migrated to other platforms, and total activity quickly recovered [12]. Similarly, despite increasing regulatory scrutiny, trading interest has bounced

back quickly after each downturn. Market concentration has in fact increased (Binance, OKX and Bybit now control 75%+ of volume) and oversight is ramping up, which are early signs of maturing. However, the industry as a whole remains profitable and dynamic [13].

There are regional differences in maturation. Asia-Pacific is the most advanced, given its established perp ecosystem. North America is in an early expansion stage, as U.S. regulators have only recently begun approving compliant perp products [14]. Europe – with MiCA – lies between APAC and the U.S. in development. Globally, however, the market is still expanding: innovation and new entrants continue to emerge rather than plateau [14].

Data Landscape

A rich data ecosystem supports the perp-futures market. Key sources and platforms include:

- **Exchange APIs:** Major exchanges (Binance, Bybit, BitMEX, OKX, dYdX, etc.) offer high-frequency market data such as trades, order books, open interest and funding rates [15].
- **On-chain DeFi Feeds:** For decentralized perpetuals, platforms like GMX provide on-chain statistics, and data infrastructure tools (The Graph, Dune Analytics) allow querying perp activity and positions on-chain [15].
- **Aggregators and Trackers:** Services such as CoinGlass, CryptoQuant and CoinGecko aggregate key perp metrics across exchanges (including funding rates, total open interest, liquidation volumes and aggregate leverage) [15]. These are often used by traders and analysts for market-wide signals.
- **Unified Data APIs:** Commercial providers like CoinAPI, Kaiko and Amberdata offer standardized multi-exchange perp data (trades, funding, open interest, etc.) via single APIs, which facilitates machine-learning and research applications [16].

These data sources feed advanced analytics and AI applications. For example, quantitative researchers use CoinAPI or Kaiko to compare funding rates across exchanges and implement funding-arbitrage strategies. CryptoQuant's data is used as a proxy for market sentiment, and custom Dune Analytics dashboards help visualize on-chain perp activity during stress events [17]. Together, these tools give market participants and AI systems the raw information needed for monitoring risk, backtesting strategies and detecting unusual patterns.

AI and Market Regime Detection

A major use of AI in the perp market is **risk monitoring and regime detection**. To illustrate this, we analyze a recent 90-day period using data from CoinGlass (liquidations) and CryptoQuant (realized volatility and funding rates). The resulting chart (Figure below) plots: (1) total daily liquidations (USD), (2) 7-day realized volatility (annualized), and (3) average funding rate (8-hr). This composite view reveals that large price moves are often tied to endogenous liquidation cascades.

For example, a sharp mid-October crash (triggered by a China–U.S. shock) wiped out nearly **$19 billion** of futures positions within hours. Bitcoin fell from ~$126k to ~$104k, and annualized volatility spiked above 100%. Notably, funding rates stayed positive throughout, indicating traders remained net long-biased despite the sell-off [18]. A second cluster of stress occurred in mid-November when BTC broke support near

$98k; over $1.1 billion in positions were liquidated in 24 hours and volatility again surged above 50%, yet funding remained mildly positive [18].

These observations have important implications. Economically, the data suggest that perps risk events are often *self-reinforcing feedback loops*, triggered when excessive leverage overwhelms market liquidity [19]. In practice, AI-driven risk tools can help detect the build-up to these regimes. For instance, AI agents could continuously watch for patterns like unusually high aggregate funding rates and leverage combined with unusually low realized volatility – a configuration we observed before both crashes. By integrating real-time perp data (plus unstructured information like news or social media), AI systems could flag these red-flag conditions and automatically reduce leverage or increase hedges before full blow-ups occur [19] [20]. In short, AI can serve as an early-warning engine for perp-market liquidity risk, identifying regime shifts and liquidation cascades ahead of time [19] [20].

Figure: 90-day BTC Perpetual Futures Metrics – liquidations (red bars), 7-day realized volatility (blue line), and funding rate (green dashed) across major exchanges. Major deleveraging events (mid-Oct, mid-Nov) are visible alongside persistent positive funding rates [21].

Reflection and Surprises

Studying crypto perpetuals through an AI lens yielded several surprising insights. First, the analysis showed that large price swings are **not random sentiment shocks** but usually structurally induced cascades triggered by liquidations. For example, during the Oct crash almost $19 billion was wiped out within hours (mostly on BTC contracts) while funding rates stubbornly remained positive [18]. The fact that traders stayed net-long even amid forced unwinds was striking. It suggests that AI-driven trading agents – many of which follow similar strategies – may ironically contribute to systemic stress by all moving together.

Another surprise was how quickly on-chain perpetual platforms (DEXs) are evolving into AI-native venues. Emerging exchanges like Hyperliquid, Aevo and dYdX v4 now incorporate dynamic margining, real-time risk metrics and automated routing that interface with AI tools [22]. In other words, they are not just decentralized analogs of CEXs but becoming “intelligent” trading environments. This means the future perps market will be not only more decentralized but also dynamically programmable and AI-augmented.

These lessons have sharpened my own career focus. I now see the crypto-perp space as a complex microstructure ecosystem shaped by AI, rather than just a high-leverage trading playground. Going forward, I aim to work on AI-integrated market design – for example, building smarter execution algorithms, liquidity-provision bots, or decentralized risk engines. The project showed that beyond coding and finance basics, one must master AI interpretability, market microstructure and adversarial dynamics to succeed in this field. Overall, I feel much closer to my goal of operating at the frontier of AI-powered finance, with a clearer sense of the skills and mindset required to navigate these risks and opportunities.

Sources

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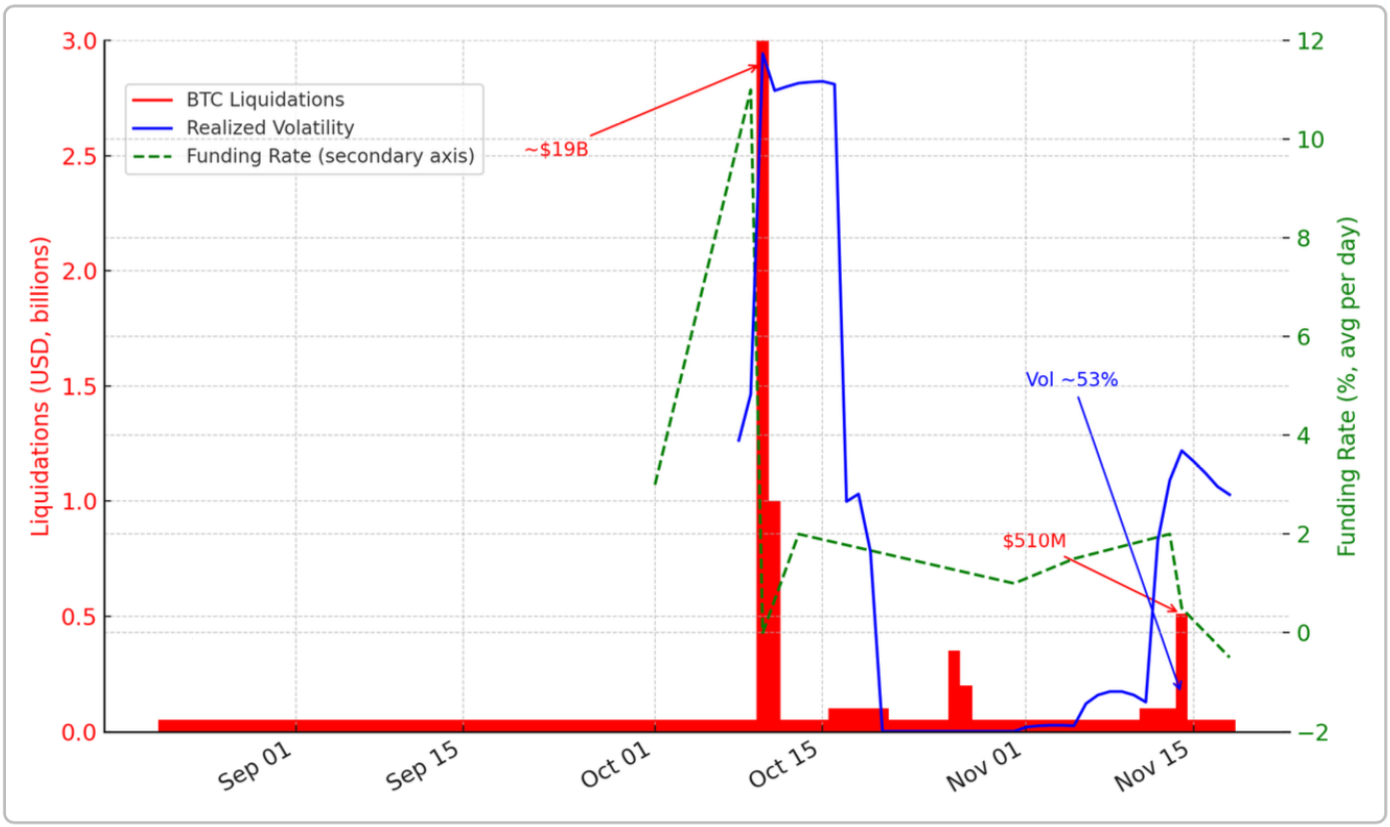
BTC Liquidations
Realized Volatility
Funding Rate (secondary axis)
~$19B
Vol ~53%
$510M
Liquidations (USD, billions)
Funding Rate (%, avg per day)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
12
10
8
6
4
2
0
−2
Sep 01
Sep 15
Oct 01
Oct 15
Nov 01
Nov 15

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