

OEP Crypto Options Prediction Bot — Whitepaper

Version 1.0 — November 2025

1. Overview

The **OEP Crypto Options Prediction Bot (OEP)** is an internal analytical system designed to monitor, score, and archive cryptocurrency options data from Deribit.

Built in **Python**, the system leverages **machine learning models** to evaluate and rank BTC and ETH option contracts based on their probability of expiring out-of-the-money (P(OTM)), expected return, volatility, liquidity, and other key market features.

The OEP currently acts as a **research and decision-support tool**, providing high-quality insights for option strategy selection — not automated trading.

2. Current Capabilities

2.1. Data Collection

- Fetches **live Deribit options data** (BTC and ETH) with expiries up to 365 days ahead.
- Filters and groups all contracts expiring on **Fridays**, aligning with standard options cycle behavior.
- Cleans, normalizes, and structures raw data into standardized analytic datasets.

2.2. Machine Learning Models

- Two production-grade models power OEP predictions:
 1. **prob_otm_calibrated.joblib** — a calibrated probabilistic model estimating the likelihood of options expiring out-of-the-money.
 2. **esr_xgb.joblib** — an XGBoost regression model predicting expected short-term return percentages for each contract.

These models are **trained offline** and version-controlled under the **Model Registry**, ensuring traceability and reproducibility.

2.3. Scoring Engine

Each option contract is scored using a proprietary composite metric combining:

- **Probability of Expiry OTM (P(OTM))**
- **Expected Return (%)**
- **Liquidity**
- **Volatility**
- **Regime Weighting Factor (IV Rank-based)**

The system ranks and highlights the most statistically favorable contracts for option sellers or buyers.

2.4. Archiving

- Weekly or on-demand snapshots are stored as timestamped CSV files under [/archive/](#), maintaining a structured historical dataset.
- Each archive entry records model version, filters, and prediction context, ensuring full auditability.

2.5. Internal Use Only

- Runs **on internal machines only**, not connected to external APIs or trading accounts.
- Data access and model usage are limited to authorized internal researchers.
- No external API or remote access endpoints are active.

3. Current Use Case

The OEP system is presently deployed as an **in-house crypto options scanner**.

It serves to:

- Identify high-probability setups for short-term option strategies (especially covered calls and short puts).
- Track implied volatility shifts and structural changes across expiries.
- Generate consistent, explainable weekly reports for internal review.

Important:

The system **does not execute trades**. It produces **data-driven ideas** and analytical insights used by human traders for further evaluation.

4. Architecture

Component	Description
Streamlit App	Front-end for manual scanning, filtering, and visualization.
Weekly Bot Script (<code>oep_weekly_job.py</code>)	Headless background script that automatically fetches and archives Deribit data every Friday 08:00 UTC.
Model Registry	Tracks models, versions, registration timestamps, and accuracy metadata.
Archive Module	Stores prediction results for longitudinal performance analysis.
Feature Pipeline	Converts raw market data into feature matrices compatible with ML models.

All components are modular and designed for easy future integration with on-chain execution systems.

5. Future Roadmap

Phase	Objective	Timeline	Description
Phase 1 — Learning & Validation	Continuous data accumulation	Nov 2025 – Feb 2026	Weekly automatic Deribit scans build an expanding dataset for model retraining and backtesting.
Phase 2 — Experimental Auto-Trading (Internal)	Controlled on-chain execution	Mar 2026 – Jul 2026	Integrate OEP with limited test capital to execute small option positions autonomously using smart-contract interaction.
Phase 3 — Feedback-Driven Model Improvement	Reinforcement learning layer	Q3 2026	Implement closed-loop learning to refine models based on actual outcomes and performance metrics.
Phase 4 — Pre-Commercial Prototype	External interface and compliance review	Q4 2026 – Q2 2027	Build secure external API endpoints, auditing framework, and compliance-ready deployment model.

6. Technical Summary

Parameter	Value
Language	Python 3.12
Data Source	Deribit Public API
Machine Learning	Scikit-learn, XGBoost
Storage	CSV archives (local)
Visualization	Streamlit
Runtime Schedule	Weekly (Friday 08:00 UTC)
Environment	Internal network only (air-gapped from production wallets)

7. Strategic Vision

The long-term goal for OEP is to evolve from a **data-driven research tool** into a **semi-autonomous trading intelligence system** that:

- Integrates directly with DeFi protocols and on-chain option platforms.
- Executes delta-neutral or volatility-optimized trades automatically.
- Provides transparent, explainable AI decision layers for fund-level auditing.

Before any external or public release, the system will undergo:

- 12+ months of closed-loop live simulations,
- On-chain stress testing, and
- Third-party security & compliance audits.

8. Conclusion

The OEP Crypto Options Prediction Bot represents an early but powerful step toward an **AI-assisted crypto options hedge engine**.

At its current stage, it serves as an internal intelligence layer — helping human traders identify statistically sound option opportunities.

As the system matures, it will gradually bridge quantitative modeling, automation, and DeFi execution, setting the foundation for a fully autonomous, transparent, and compliant crypto options management system.