PROJECT YUREI – WHITEPAPER

1. Abstract

YUREI is an on-chain intelligence system built for the Solana ecosystem, combining real-time data ingestion with an LLM (Protocol NAVI) specifically trained to understand blockchain behavior. Unlike traditional analytics tools that rely on centralized APIs or delayed indexers, YUREI operates directly on raw Solana events through a high-performance Geyser-based pipeline.

The system has two core layers:

• YUREI Agent — real-time intelligence
A microsecond-level event listener that analyzes wallet flows, token patterns, distribution behavior, and liquidity signals as they occur.

• Protocol NAVI — reasoning layer (LLM)
A transformer model trained on blockchain event sequences, enabling it to describe, interpret, and contextualize on-chain activity in natural language.

Together, these components enable users and builders to identify trends, detect anomalies, and understand market movements that are difficult or impossible to observe manually.

YUREI's mission is to make blockchain data readable and actionable. The platform offers a web interface where users can connect their wallets and interact with both the Agent and NAVI. The ecosystem includes a utility NFT collection (Ghost Pass) and a fair-launch $YUREI token that supports platform growth, community incentives, and long-term sustainability.

YUREI aims to become the standard intelligence layer for Solana — enabling traders, developers, and protocols to gain deeper visibility into on-chain behavior with AI-driven insights.

2. Introduction

2.1 The Problem: Blockchain Intelligence Is Fragmented

Solana produces millions of on-chain events every day — transfers, swaps, liquidity changes, token mints, wallet interactions, and contract calls.
However, this data is:

- **unstructured**,
- **difficult to interpret**,
- **spread across multiple sources**,
- and **optimized for machines, not humans**.

Most users and even many builders rely on dashboards, explorers, or expensive third-party APIs to make sense of what is happening. These tools show *what* occurred on-chain, but rarely explain *why* it happened or *what it means*.

Traders do not understand wallet intent.
Developers do not see real-time behavioral patterns.
Projects cannot easily monitor their token ecosystems.
Communities cannot track emerging risks or opportunities.

There is no system that can *read, understand, and explain* blockchain activity with context — especially in real time.

2.2 Why On-Chain AI?

Traditional LLMs are trained on text, not blockchain activity.
They have no native understanding of:

- wallet behavior
- token flow patterns
- liquidity structures
- early accumulation or exit signals
- ecosystem interactions
- on-chain anomalies

Even when connected to on-chain data, standard AI models only "summarize" — they cannot *interpret* the chain the way a domain-native system can.

A specialized LLM trained directly on structured blockchain event sequences can:

- detect patterns humans miss,
- contextualize risk,
- summarize wallet behavior,
- identify emerging narratives,
- and provide meaningful insights instantly.

Solana's high throughput makes it ideal for such a system — if you can process the data fast enough.

2.3 Vision: A Unified Intelligence Layer for Solana

YUREI aims to build exactly that:
an intelligence layer that sits on top of Solana, observing and understanding activity in real time.

This includes:

- a **real-time agent** for instant detection,
- an **LLM (Protocol NAVI)** trained on event-level data,
- an **open-source data pipeline**,
- a **web platform** where users interact with the AI in natural language,
- and **NFT + token utilities** that shape the community and incentive structure.

The goal is simple:
Turn raw blockchain noise into actionable intelligence.

For traders → insights.
For developers → tools.
For protocols → monitoring.
For communities → transparency.

YUREI is designed to scale alongside Solana and evolve into a core part of its data and intelligence infrastructure.

3. System Overview (High-Level Architecture)

YUREI consists of two core intelligence layers — a real-time detection engine (YUREI Agent) and a reasoning engine (Protocol NAVI). Both layers are powered by a high-performance data pipeline that processes raw Solana events with minimal latency. The result is an AI system capable of interpreting blockchain behavior as it happens.

The high-level architecture includes four main components:

3.1 YUREI Agent — Real-Time Intelligence Layer

The YUREI Agent listens directly to Solana through a custom data ingestion system.
It is responsible for:

- subscribing to live Solana events
- analyzing wallet flows as they occur
- monitoring buy/sell patterns
- detecting rapid distribution or accumulation
- identifying liquidity anomalies
- producing real-time alerts and signals

This layer operates continuously, maintaining an internal profile of wallets and tokens to detect unusual patterns instantly.

3.2 Protocol NAVI — LLM Reasoning Layer

Protocol NAVI is YUREI's chain-aware LLM.
It is trained on:

- structured blockchain event sequences
- behavioral patterns
- liquidity and movement signatures
- wallet histories
- aggregated token timelines

NAVI's role is to **explain and contextualize** what the Agent detects.

It provides:

- natural-language interpretations
- narrative summaries
- explanations of anomalies
- wallet behavioral insights
- token flow analysis
- predictions based on learned patterns

Business value:
Insights become understandable and actionable for non-technical users, investors, protocols, and communities.

3.3 Data Pipeline

YUREI’s pipeline transforms raw Solana data into structured intelligence.

Pipeline stages include:

- event ingestion (via Geyser client or RPC equivalent dataset)
- normalization & classification
- sequence construction
- PostgreSQL storage
- feature extraction
- dataset generation for NAVI

The pipeline is optimized for:

- low latency
- high throughput
- scalable storage
- clean dataset formatting
- LLM fine-tuning compatibility

3.4 Web Platform

The YUREI web app provides the primary user interface for interacting with both layers.

Key features include:

- wallet connection
- real-time Agent feed
- NAVI chat interface
- token/wallet analysis
- behavioral summaries
- ecosystem dashboard

Users can ask NAVI questions like:

- “Explain this wallet’s activity today.”
- “Show early accumulation patterns in token X.”
- “Why is liquidity moving like this?”

Business value:
Makes advanced blockchain analytics accessible to everyone — from traders to developers to retail users.

4. Protocol NAVI — LLM Architecture

Protocol NAVI is YUREI's chain-aware language model designed to interpret on-chain activity through a transformer-based reasoning framework. Unlike generic LLMs trained solely on natural text corpora, NAVI is specifically optimized for blockchain event sequences, behavioral signals, and token flow structures native to Solana.

The model is engineered to understand not just *language*, but the underlying *intent, patterns, and causality* that emerge from real-time on-chain behavior.

4.1 Model Objective

NAVI's primary objective is to perform **contextual reasoning** over structured blockchain data.

The model is trained to:

- interpret wallet activity sequences
- identify behavioral signatures (accumulation, distribution, wash patterns)
- summarize token-level timelines
- detect anomalous flows
- translate event sequences into natural language explanations
- forecast possible short-term outcomes using pattern similarity

Its goal is to bridge the gap between raw blockchain data and human-understandable insights.

4.2 Tokenizer Design (Event → Token)

Standard LLM tokenizers cannot represent blockchain events effectively.
NAVI uses a **custom event-tokenizer**, converting raw events into structured tokens, such as:

- TRANSFER:<amount_class>
- SWAP:<pool_id>:<direction>
- CREATION:<mint_id>
- LP_CHANGE:<delta>
- WALLET_BEHAVIOR:<profile_tag>
- PATTERN:<signature_hash>

Events are normalized into short, dense symbolic tokens.
This allows NAVI to process long event sequences (thousands of blocks) efficiently without losing semantic meaning.

4.3 Sequence Modeling for On-Chain Behavior

Blockchain data is inherently sequential and relational.

NAVI uses:

- **temporal encoding** to track event order
- **behavior embeddings** for wallet profiling
- **graph-aware metadata** representing wallet-token relationships
- **flow signatures** that capture buy/sell and liquidity trends
- **latent state tracking** to maintain long-term behavior memory

This gives the model an emergent understanding of *how wallets typically behave* and *how tokens evolve over time*.

4.4 Transformer Architecture (Encoder-Only)

NAVI uses an **encoder-only transformer**, similar to BERT or LLaMA-encoder variants, because:

- event reasoning does not require generative autoregression
- analyzing patterns is more important than generating long text
- encoder-only architectures are more efficient for sequence classification and interpretation
- inference is significantly faster and cheaper

The architecture includes:

- multi-head attention
- event positional embeddings
- signed event-delta vectors
- custom attention biases (wallet → token dependencies)
- lightweight adapter layers for domain fine-tuning

This structure makes NAVI ideal for real-time, low-latency inference.

4.5 Training Pipeline (PyTorch)

NAVI’s training pipeline consists of three phases:

Phase 1 — Pretraining on event sequences

Using YUREI’s dataset (Geyser feed + indexed storage):

- masked event prediction
- next-event reasoning
- sequence similarity modeling

Phase 2 — Behavioral classification tasks

- accumulation vs distribution
- aggressive vs passive swap behavior
- liquidity manipulation patterns
- wallet intent detection

Phase 3 — Natural language alignment

NAVI is aligned to natural text via:

- distilled explanations
- synthetic reasoning data
- supervised summaries
- prompt-alignment tasks

This enables NAVI to deliver human-readable insights without losing technical rigor.

4.6 Evaluation Metrics

NAVI is evaluated using metrics tailored to blockchain intelligence:

- **Sequence Recall Score (SRS)** — how well the model reconstructs event intent
- **Behavior Classification Accuracy**
- **Anomaly Detection Precision**
- **Token-Flow Interpretation Quality (TFIQ)**
- **Latency under load (real-time constraints)**

These metrics ensure NAVI functions effectively in production environments, not just in training.

4.7 Inference Engine

NAVI’s inference layer is designed for low overhead:

- Python + FastAPI for API requests
- optional Rust/C++ FFI via navic-ffi-core for acceleration
- quantized transformer weights for real-time usage
- caching of high-frequency wallet patterns
- configurable rate limits per user

Inference is optimized for:

- sub-second responses
- concurrent NAVI + Agent usage
- minimal RAM footprint
- scalable horizontal deployment

5. YUREI Agent — Real-Time Intelligence Layer

The YUREI Agent is the real-time analytical engine of the YUREI ecosystem.
While Protocol NAVI interprets and reasons about historical or aggregated data, the Agent operates **live**, processing every event streamed from Solana with microsecond-level responsiveness.

Its job is to *observe, track, classify, and detect* meaningful on-chain activity the moment it happens — giving users immediate visibility into market behavior.

5.1 Event Subscription & Ingestion

The Agent subscribes to Solana events through:

- a custom Geyser-based ingestion client
- gRPC streams for low-latency transport
- fallback RPC polling for redundancy

The system receives:

- token transfers
- swaps
- liquidity pool updates
- wallet interactions
- mint/burn events
- staking & reward flows
- contract instructions

Events are processed in near real-time, with ingestion times typically **10–15 microseconds**, depending on node proximity and network conditions.

5.2 Real-Time Anomaly Detection

The Agent analyzes:

- sudden inflow/outflow spikes
- synchronized wallet behavior
- unusual liquidity shifts
- rapid swap cycles (wash patterns)
- bot-like transaction bursts
- early accumulation by known entities

When anomalies are detected, the Agent generates internal “behavior signatures” that NAVI can later interpret in natural language.

5.3 Wallet Profiling

The Agent maintains dynamic profiles for active wallets.

Each profile tracks:

- historical buy/sell patterns
- liquidity behavior
- token holdings
- volatility response
- time-of-day activity
- clustering with other wallets
- probability of being a bot, farmer, or long-term holder

Wallet behavior is encoded into compact states that NAVI uses during reasoning.

5.4 Pattern Recognition & Feature Extraction

The Agent uses internal rules + learned heuristics to extract:

- accumulation signatures
- distribution cascades
- liquidity rug risks
- coordinated activity clusters
- pre-pump buildup patterns
- token lifecycle stages

These features form the “raw intelligence layer” of the YUREI ecosystem.

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5.5 Interaction with Protocol NAVI

The Agent and NAVI work together as a two-layer intelligence system.

Agent → NAVI:

- sends detected anomalies
- provides structured feature vectors
- updates wallet profiles
- forwards decoded event timelines

NAVI → Agent:

- returns narrative explanations
- categorizes behavior
- predicts continuation or reversal
- generates contextual summaries

Their synergy allows YUREI to deliver insights that are both:

- **instant** (from the Agent)
- **interpretable** (from NAVI)

Why the Agent Matters (Business Perspective)

The Agent provides unique value that other analytics platforms cannot easily replicate:

- ultra-low-latency event visibility
- behavioral pattern detection
- real-time fraud/risk flags
- insights before explorers update
- foundational intelligence for NAVI

This gives YUREI a competitive advantage and establishes it as the potential **intelligence layer for Solana**.

6. Web Platform

The YUREI web platform is the primary interface through which users interact with both intelligence layers — the real-time YUREI Agent and the Protocol NAVI LLM.
It is designed to be fast, minimal, and accessible directly in the browser, requiring no specialized tooling or external dashboards.

The platform turns complex blockchain analytics into a clean, intuitive user experience powered by AI.

6.1 Wallet Connect

Users authenticate by connecting a Solana wallet.
Once connected, they gain access to:

- personalized analysis
- real-time signals
- portfolio intelligence
- wallet-specific behavior summaries
- token-level monitoring

The system uses non-custodial authentication — wallet signatures prove identity without storing private data.

6.2 Two-Layer Intelligence UI

The interface includes two parallel intelligence modes:

1) Agent View (Real-Time Layer)

Shows:

- live market movements
- rapid wallet actions
- token spikes or drops
- liquidity shifts
- anomalies detected by the Agent

It acts like an early-warning system for users.

2) NAVI Chat (Reasoning Layer)

A conversational interface for:

- explaining Agent signals
- summarizing wallet behavior
- analyzing tokens on request
- predicting patterns
- asking natural language questions

Examples questions users can ask NAVI:

- “Explain this wallet’s behavior today.”
- “What’s happening with this token right now?”
- “Is there early accumulation happening here?”
- “Why did liquidity move like that?”

6.3 Token & Wallet Analysis

The platform supports:

- deep token breakdowns
- early accumulation detection
- whale movement tracking
- liquidity monitoring
- holder behavior classification
- volatility pattern mapping

All of this is powered by real-time data + NAVI reasoning.

6.4 API Endpoints (FastAPI)

Developers can access YUREI's intelligence via API, including:

- wallet behavior summaries
- sequence embeddings
- token flow analysis
- NAVI natural language reasoning
- live event feeds (rate-limited)

This makes YUREI not only a platform but also an **infrastructure layer** for Solana analytics.

6.5 UI/UX Philosophy

The web platform emphasizes:

- minimal visuals
- dark mode by default
- glitch cyberpunk aesthetics
- clean typography
- zero clutter
- fast response times

The goal is to match the YUREI identity while ensuring the experience feels premium and trustworthy.

7. NFT Utility — Ghost Pass

Ghost Pass is the foundational NFT of the YUREI ecosystem, designed as a lightweight access credential that connects early supporters with long-term platform utility.
Rather than acting as a simple collectible, Ghost Pass functions as a **permission tier**, unlocking deeper functionality across the YUREI intelligence stack.

The collection follows a deliberately low supply model to preserve exclusivity and reward early adopters.

7.1 Supply Model (222 Total)

Ghost Pass has a total supply of **222 NFTs**, structured as follows:

- **50 OG Free Mints** — reserved for the earliest community members
- **172 Public Mints** — available during the main mint
- **0 team-minted supply** beyond giveaways (transparent, fair distribution)

A low supply ensures the NFT retains value while keeping the holder base focused and highly engaged.

Business value:
Lower supply = higher conversion, stronger community identity, easier to maintain long-term value.

7.2 Core Utility

Ghost Pass holders receive multi-layered utility across the YUREI stack:

• Priority access to Protocol NAVI

When NAVI becomes publicly available, Ghost Pass holders retain:

- early access
- faster rate limits
- extended usage quotas
- access to experimental endpoints

• Enhanced YUREI Agent capabilities

Holders unlock expanded features such as:

- deeper wallet analysis
- extended historical lookback
- more frequent refresh cycles
- early alerts on high-priority anomalies

• Access to closed beta features

Before platform updates go live, Pass holders can test new:

- LLM reasoning modes
- analytics dashboards
- token-behavior classifiers
- API endpoints

• Community benefit: holder-only channels

Discord includes:

- a private holder channel
- early announcements
- direct feedback loops with the team
- proposal voting for certain features

Business value:
Creates a strong retention loop and makes holders part of the development cycle.

7.3 Role-Based Utility

Ghost Pass unlocks additional roles across the ecosystem:

- **OG Holder** — for free-mint participants
- **Ghost Access** — for full utility access
- **Beta Tester** — for early feature testing
- **Contributor** — for developers working on open-source components

These roles unify the NFT with both technical and community growth.

7.4 Future Integrations

The NFT is designed as a long-term credential that integrates natively with future YUREI components:

- **pro access to advanced AI models**
- **cross-chain analytics features**
- **NAVI fine-tuning tools**
- **AI-powered alerts directly in Discord/Telegram**
- **token reward multipliers after TGE**
- **limited governance participation (non-binding)**

As YUREI expands, Ghost Pass acts as the **identity layer** for dedicated users.

7.5 Identity & Branding

Ghost Pass is intentionally minimal, designed as:

- a glitch-styled digital credential
- inspired by cyberpunk networks
- with pale-cyan/white accents
- a black background for consistency with the YUREI brand

It is visually positioned as a **network access card**, not a PFP, to reinforce its functional and technical role in the ecosystem.

8. Token Model — $YUREI

$YUREI is the native utility token of the YUREI intelligence ecosystem.
It is designed to support platform sustainability, incentivize participation, and create long-term alignment between users, builders, and the protocol.
While the platform's core intelligence features do **not** require holding the token, $YUREI unlocks enhanced utility and advanced functionality.

The token follows a fair-distribution approach with **no private seed round**, ensuring a transparent and community-driven launch.

8.1 Total Supply

1,000,000,000 (1B) $YUREI

A round, scalable supply that works well across:

- platform utility
- reward distribution
- ecosystem growth
- liquidity planning

8.2 Distribution Model (High-Level)

The $YUREI token is distributed across four primary categories:

- **Ecosystem & Rewards — 40%**
  Used to incentivize usage, contribute to datasets, participate in beta features, security testing, and community actions.
- **Liquidity & Market Making — 25%**
  Ensures deep liquidity on launch and supports stable long-term trading conditions.
- **Team & Development — 20%**
  Allocated to long-term technical development of NAVI, Agent upgrades, and ongoing operational needs.
  Vested linearly to ensure commitment.
- **Community Airdrops & NFT Holder Benefits — 15%**
  Ghost Pass holders, early contributors, and ecosystem supporters receive targeted rewards.

8.3 Unlock Schedule & Emissions

To ensure long-term stability:

- **Team tokens vest over 24–36 months**
- **Ecosystem tokens unlock based on usage milestones**
- **Liquidity tokens unlocked at TGE**
- **Airdrops distributed in waves tied to platform growth metrics**

This prevents short-term dumping and encourages sustained platform contribution.

8.4 Utility Functions

While the platform remains accessible to all, holding or using $YUREI enables additional benefits:

• Enhanced AI Limits

Higher request caps for:

- NAVI inference
- Agent queries
- dataset lookbacks

• Staking for Signal Priority

Stakers receive:

- faster data refresh
- priority prompt processing
- higher concurrency

• Fee Reductions

Certain platform features (advanced scans, automated reports, API access) offer reduced fees when paid in $YUREI.

• Governance (Non-Binding)

Community members can vote on:

- dataset expansion priorities
- new Agent features
- early beta rollouts
- integration requests

• Reward Loop with NFT Holders

Ghost Pass holders receive:

- $YUREI reward boosts
- higher-tier platform perks
- early access to staking modules

8.5 Economic Philosophy

The $YUREI token is designed around three core principles:

- **Real Utility → Real Demand**
  Value comes from actual usage of NAVI and the Agent, not artificial hype.
- **Low Barrier to Entry**
  All core features remain accessible without holding the token.
- **Long-Term Alignment**
  Token encourages growth, usage, and contribution — not short-term flipping.

Roadmap

Phase I — Alpha Release (Coming in ~2 Weeks)

- Deployment of the real-time data pipeline (Geyser-based ingestion)
- Initial integration of YUREI Agent + Protocol NAVI
- Alpha version of the web platform
    - Wallet connect
    - Basic real-time feed
    - Early NAVI reasoning
- Start of early community feedback loop

Phase II — Ghost Pass NFT Launch (~1 Week After Alpha)

- Launch of the 222-supply **Ghost Pass** collection
- Activation of holder utilities inside the platform
- Beta access tier for Pass holders
- Expanded Agent capabilities
- NAVI v0.2 dataset improvements

Phase III — $YUREI Token Release (Post-NFT)

- Token Generation Event (TGE) for **$YUREI**
- Initial liquidity deployment
- Token utility activation inside the platform
- Staking module for compute priority
- Ghost Pass holder boosts + reward multipliers
- Implementation of governance-lite mechanisms

Phase IV — Public Beta Platform

- Public beta release of the YUREI platform
- NAVI v0.3 transformer upgrade
- Advanced wallet & token behavior timelines
- Live flow analysis dashboard
- Public API (rate-limited)
- Developer integration tools

Phase V — Scaling the Intelligence Layer

- NAVI v1.0: fully chain-native reasoning engine
- Cross-chain data research & ingestion
- Automated alert systems (Discord/Telegram integration)
- ZK-assisted state verification (research module)
- Institutional-grade analytics features
- Wider open-source expansion