



Knight Foundation
School of Computing
and Information Sciences



TapIn MMA – Senior Design Project

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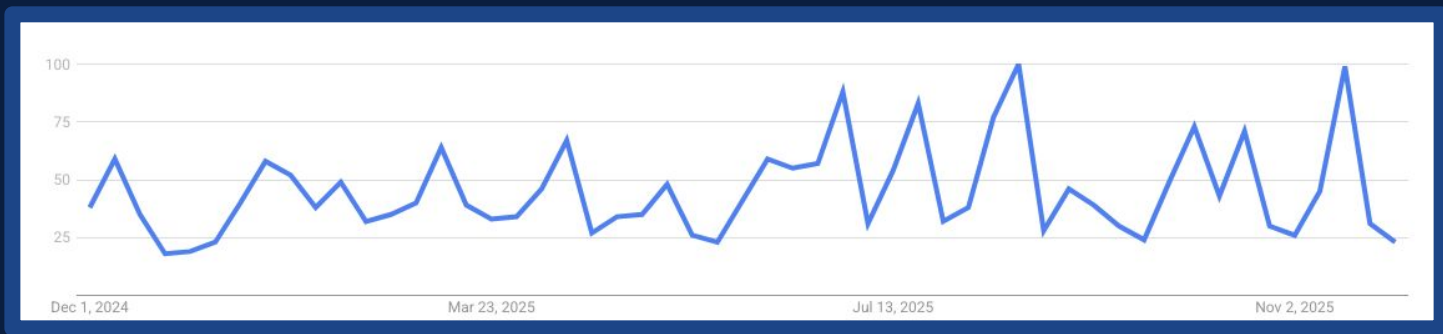
Problem Definition & Motivation

- With the explosion of interest in Mixed Martial Arts (MMA), fans, analysts, and bettors lack a centralized, intelligent platform that combines fighter data, upcoming events, predictive tools, and visual analytics.
- Current solutions are either fragmented, lack interactivity, or don't offer predictive insights.
- Current sites offer partial data only.
- No predictive analytics or real-time visualization.



Why This Problem Matters

- MMA interest is **exploding**.
- Users want fighter stats, events, predictions, all in one place.
- Our system bridges this gap.





Our Solution

- TapIn MMA centralizes fighter stats, events, betting information, predictive tools, and more into one platform.
- It bridges the gap between casual fans and serious analysts, enhancing MMA engagement with real-time insights and intuitive visualizations.

Sprint Overview

Sprint #1

- Conducted background research on MMA data sources.
- Began early-stage development and set up project structure.

Sprint #2

- Continued front-end development (core UI layout, tab structure).
- Established communication between UI components and backend services.
- Began developing our predictive algorithm.

Sprint #3

- Front-end mostly completed.
- Began integrating APIs for:
 - Betting Information
 - Fighter Comparison
 - Upcoming Events
- Completed at least one full API implementation.
- Developed a prototype predictive algorithm.

Sprint #4

- Achieved baseline functionality for all major features.
- Added “could-have” enhancements beyond required core features (such as the newsletter feature and themes).
- Continued refining our predictive algorithm.

Sprint #5

- Performed extensive testing across all tabs and APIs.
- Fixed gaps, refined UI, optimized API calls, and resolved issues.
- Finished refining and testing our predictive algorithm.

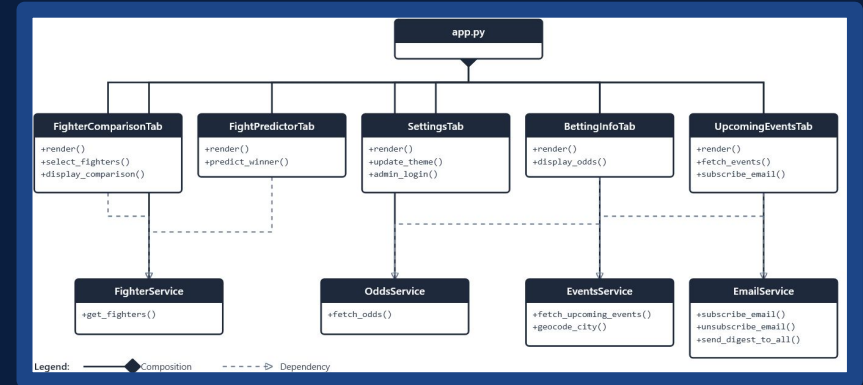
Sprint #6

- Finalized all system features.
- Prepared documentation, poster materials, and presentation.
- Completed final polishing and stability checks.



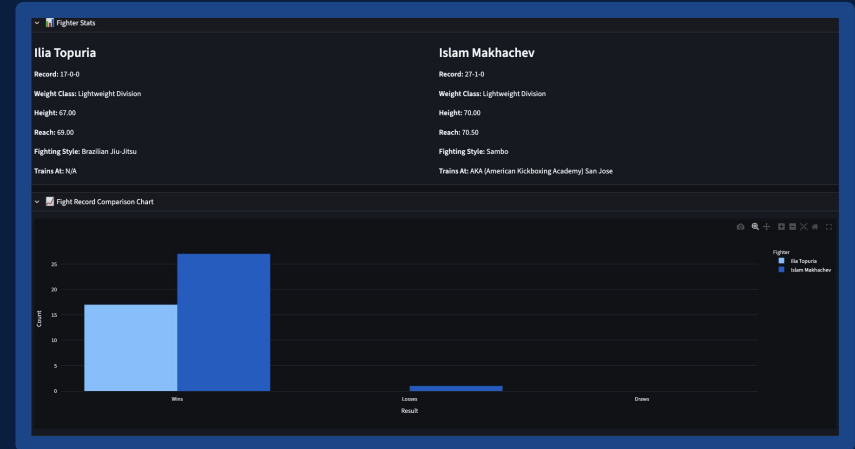
System Architecture Overview

- Frontend: Streamlit UI
- Backend APIs: Octagon, Tapology, Odds, and mailjet.
- Mapping: OpenStreetMap
- Charts: Plotly
- No database needed.



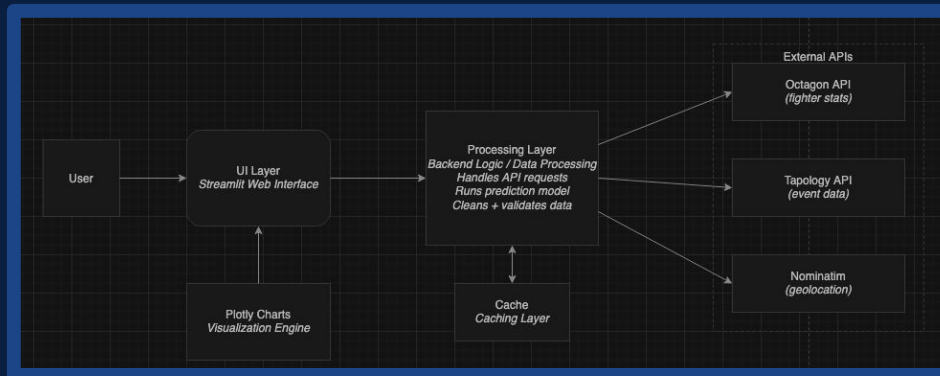
System Design Details

- Responsive UI design
- Secure API connections
- Real-time data fetching
- Interactive visual comparisons



Implementation Highlights

Frontend built with Python + Streamlit	Interactive charts generated using Plotly	Fighter statistics retrieved via Octagon API
Event data sourced from Tapology API	Geolocation powered by Nominatim	Lightweight backend logic



System Demonstration

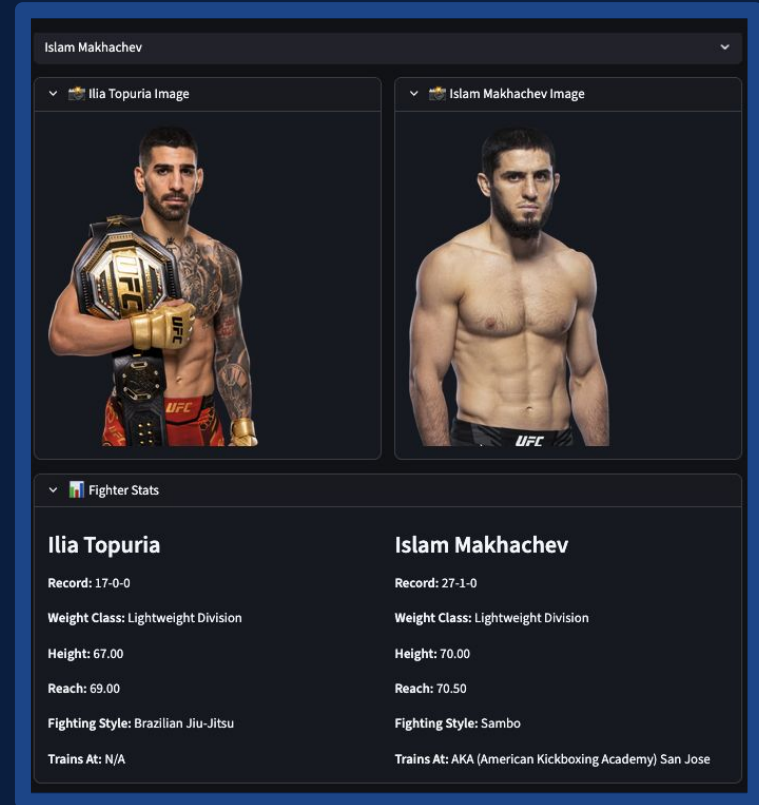
We will look at...

- Live fighter comparison
- Fighter stats/charts
- Upcoming event browser
- Betting odds/info
- Dynamic color/theme selection

Testing & Evaluation

Testing & Evaluation

- **User Testing**
 - Conducted with MMA fans and beginners
 - Evaluated usability, clarity, and navigation
- **API Verification**
 - Cross-checked fighter stats across multiple sources
 - Ensured accuracy and consistency
- **Performance Testing**
 - Caching significantly reduced load times
 - Improved responsiveness during real-time data fetching





Results & Findings

Predictor Performance Results

- During testing, our fight outcome predictor achieved an accuracy of around 80%.
- Performance improved as more fighter data was incorporated.
- The model consistently performed best on matchups with clear statistical disparities.

Key Findings

- Strong correlation between striking differential and prediction accuracy.
- Outliers often involved late notice fights or limited historical data.
- The model shows promise but still requires refinement to handle ambiguous matchups.

Future Improvements

- Expand dataset with additional fight history and biometric features.
- Integrate live betting lines and expert rankings to boost accuracy.
- Evaluate alternative ML models to reduce variance in close match predictions.

Challenges, Lessons Learned & Future Work

Challenges

- API inconsistencies
- Rate limits & throttling
- Variability in available fighter data
- Handling missing or outdated statistics

Lessons Learned

- Importance of caching to reduce API load
- UI simplification improves usability
- Better validation needed for incomplete data
- Visualization clarity impacts user trust

Future Work

- Deeper prediction models (grappling, cardio, momentum)
- User accounts + personalization
- More analytics and historical trends
- Event-level predictions & confidence scoring



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Thank you!

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