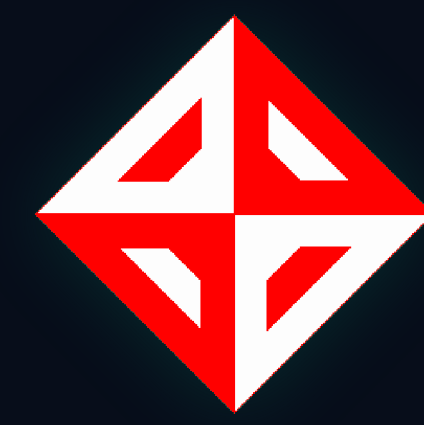




01 • MOTIVATION

The Problem

Retail investors lack access to the **sophisticated analysis tools** available to institutional players. METRADE bridges this gap with **AI-powered, confidence-scored signals** in a sleek mobile interface.

● AMZN	ACTIVE	1h ago
Entry	Target	Stop
\$184.20	\$196.00	\$179.50
Confidence 85%		

02 • KEY FEATURES

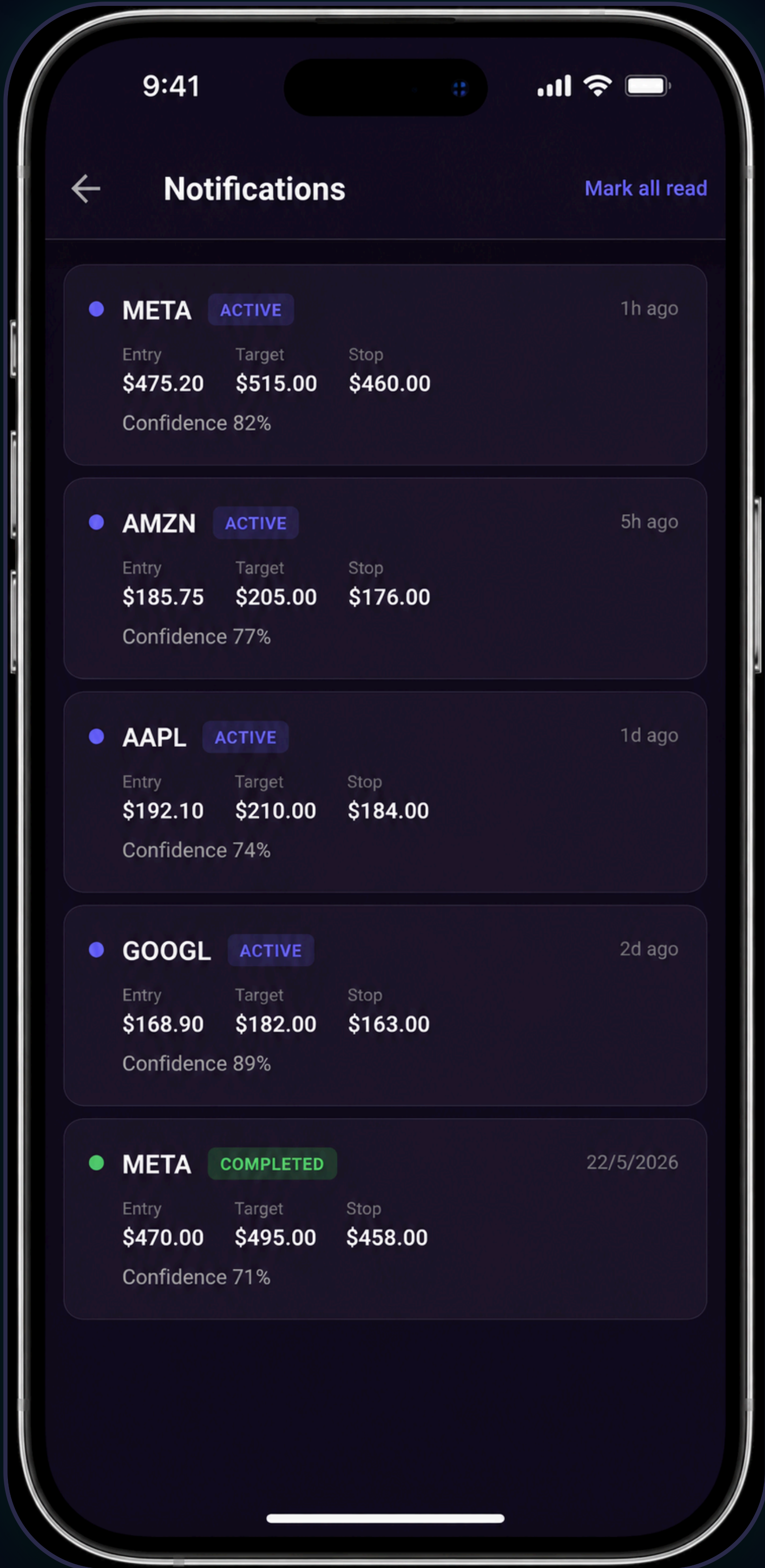
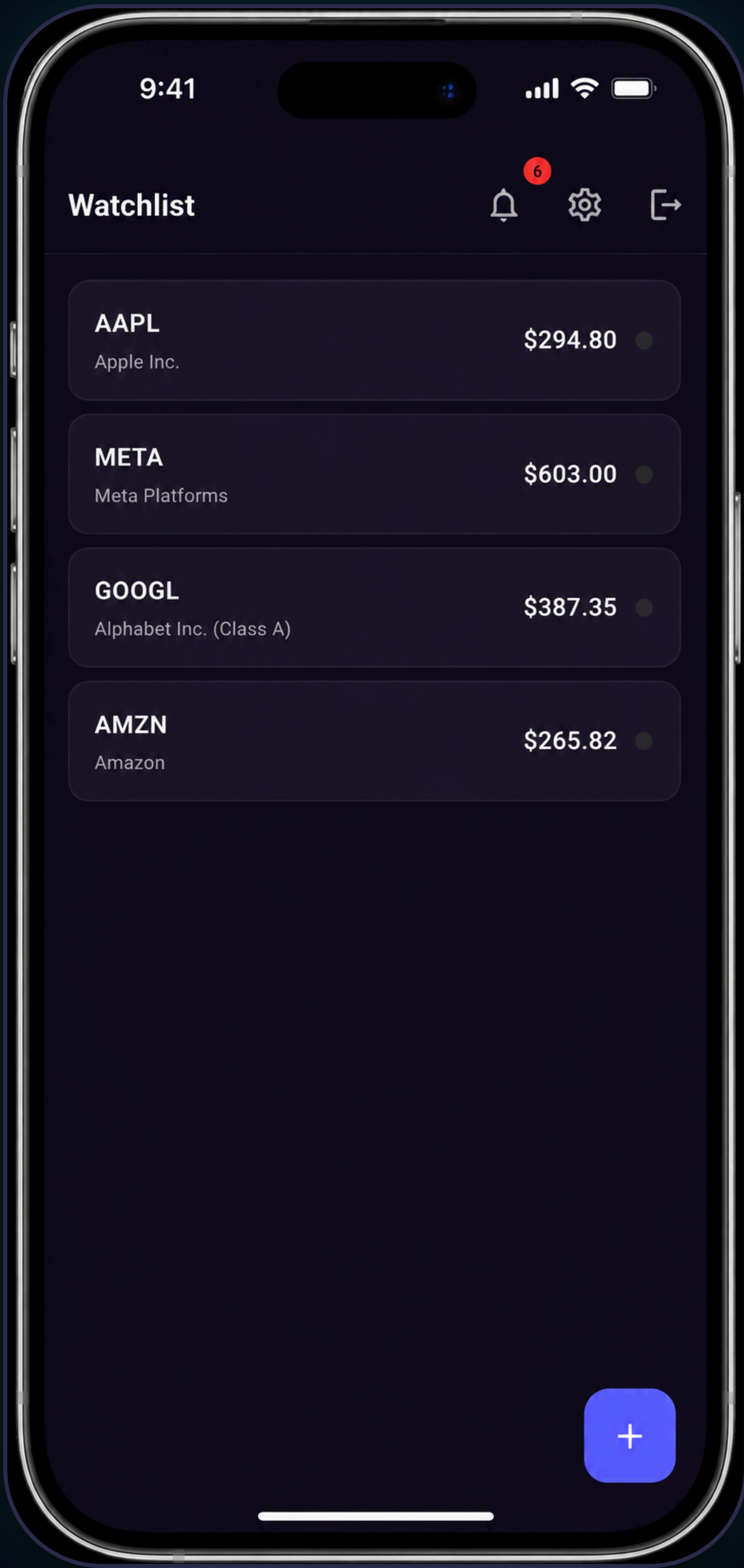
What METRADE Delivers

- Horizon Evaluation
- ML Price Predictions
- Confidence Scores
- Push Notifications
- Stock WatchList
- Price Charts
- Signal Accuracy
- Backtesting
- Firestore Auth
- REST API
- Cloud Deploy
- Offline Sync

03 • PREDICTION PIPELINE

How Signals Are Generated

- Data Engineering**
Price data, technical indicators, earnings, sector, and Google Trends data integrated and normalised.
- News Intelligence**
Market news and earnings reports summarised using an LLM to extract sentiment signals.
- Ensemble Model**
Top 3 models selected per horizon. Signals are sent only when these 3 models agree.
- Horizon Evaluation**
Each stock evaluated in 3 horizons, with separate ensemble strategies per horizon.
- Signal Delivery**
FCM push notifications with confidence scores delivered to the Flutter app.



04 • VALIDATION

Testing Strategy

- Unit Tests**
Technical indicators, earnings, and sector computations verified. Model loading and ensemble selection validated.
- Integration Tests**
End-to-end: Multi-source data pipeline → ensemble models → FastAPI → Flutter.
- Backtesting**
Historical data validates ensemble ROI across 3 horizons. 2-week gap prevents data leakage.

05 • TECH STACK

Built With

- Flutter
- Dart
- FastAPI
- Python
- XGBoost
- sklearn
- Firebase
- Redis
- PostgreSQL
- Docker
- Cloud Run
- Pandas

06 • RISK MITIGATIONS

Key Risks

- Auth / Security**
JWT tokens, HTTPS throughout, Firebase input sanitisation.
- API Reliability**
Multi-source (yfinance + Alpha Vantage) + Redis caching layer.
- Model Overfitting**
Cross-validation, early stopping, precision gate before deployment.

