

Detailed Use Case Steps - AI Sports Commentary System

UC-01: Ingest Live Audio Stream

Actors: Broadcaster

Preconditions: Live event audio stream available

Postconditions: Audio stream received & chunked

Basic Flow:

- 1. Broadcaster connects to ingest API
- 2. Audio stream sent via WebSocket or RTMP
- 3. Server confirms stream receipt

Alternate Flows:

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Exceptions:

Connection failure, malformed audio

UC-02: Real-Time Speech Transcription (STT)

Actors: STT Engine

Preconditions: Audio chunks received

Postconditions: Transcribed text output with timestamps

Basic Flow:

- 1. Audio chunks streamed into STT engine
- 2. Engine returns interim and final transcriptions

Alternate Flows:

STT falls back to backup engine if delay exceeds threshold

Exceptions:

Poor audio quality, unrecognized speech

UC-03: NLP Contextual Analysis & Structuring

Actors: NLP Engine

Preconditions: Transcribed text available

Postconditions: Tagged entities and contextually analyzed text

Basic Flow:

- 1. Text parsed and entities like player names, events are tagged

- 2. Output structured for translation

Alternate Flows:

None

Exceptions:

Token classification fails

UC-04: Real-Time Translation

Actors: Translation Engine

Preconditions: Structured English text available

Postconditions: Translated target language text

Basic Flow:

- 1. NLP output passed to Translation Model
- 2. Translates per user's preferred language

Alternate Flows:

If language unavailable, fallback to default translation

Exceptions:

Model timeout, loss of connection to API

UC-05: Text-to-Speech Synthesis (TTS)

Actors: TTS Engine

Preconditions: Translated text available

Postconditions: AI-voice output stream available

Basic Flow:

- 1. TTS engine receives translated sentence
- 2. Synthesizes speech in selected voice/language
- 3. Streams audio to delivery module

Alternate Flows:

Delayed processing triggers fallback voice model

Exceptions:

Synthetic voice lags behind due to processing bottleneck

UC-06: Deliver Commentary to Viewer

Actors: End User / Broadcast API

Preconditions: TTS audio stream available

Postconditions: Multilingual audio delivered

Basic Flow:

- 1. User selects language on viewer device
- 2. Server streams selected language audio in sync with visuals

Alternate Flows:

User can switch language midstream

Exceptions:

Network issues, playback buffering

UC-07: User Language & Voice Preference Selection

Actors: End User

Preconditions: App or streaming client active

Postconditions: Preferred voice/language stored for session

Basic Flow:

- 1. User accesses audio settings
- 2. Selects preferred language and voice
- 3. Preference saved for session/use

Alternate Flows:

Preference reverted to default on session restart

Exceptions:

UI unresponsive

UC-08: Broadcast Platform Integration

Actors: Broadcaster / DevOps

Preconditions: Commentary APIs live

Postconditions: APIs return metadata and streams

Basic Flow:

- 1. Platform authenticates and connects via API
- 2. Retrieves list of available matches/languages
- 3. Syncs to live audio

Alternate Flows:

Platform uses SDK instead of raw APIs

Exceptions:

Auth token expired

UC-09: Manage Subscriptions

Actors: Viewer / Admin

Preconditions: User account exists

Postconditions: Subscription activated or upgraded

Basic Flow:

- 1. User selects subscription tier
- 2. Payment processed via gateway
- 3. Access granted to commentary features

Alternate Flows:

Failed payment triggers retry flow

Exceptions:

Invalid card, API error

UC-10: Generate Commentary Analytics

Actors: Admin / Data Analyst

Preconditions: Match commentary exists

Postconditions: Commentary performance metrics logged

Basic Flow:

- 1. AI logs time, user engagement, response latency
- 2. Exports to BI dashboard

Alternate Flows:

Real-time graphs display usage by region/language

Exceptions:

DB write failure

UC-11: System Health Monitoring

Actors: DevOps / System

Preconditions: Services are live

Postconditions: All metrics logged and alerts configured

Basic Flow:

- 1. Monitor latency for each component
- 2. Alerts if thresholds exceeded
- 3. Auto-scale if demand spikes

Alternate Flows:

Fallback services spin up

Exceptions:

Metric stream lost, alert missed

UC-12: Admin AI Feedback Loop

Actors: Admin / Data Annotator

Preconditions: User feedback collected

Postconditions: AI models retrained periodically

Basic Flow:

- 1. Annotators review user feedback on commentary quality
- 2. Flag low-quality segments
- 3. Retrain models weekly/monthly

Alternate Flows:

AI auto-tunes from high-confidence data

Exceptions:

Insufficient labeled data