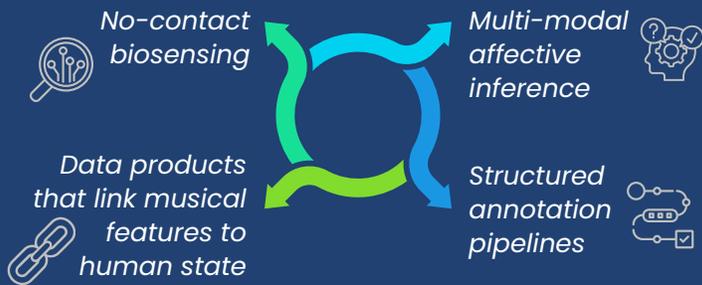


WHAT IS BIOMIR?

BioMIR is LUCID's **affective sensing and intelligence stack**: a coordinated set of edge-based sensing technologies, inference models, and data processing pipelines designed to measure how humans emotionally, attentively and physiologically respond to music. BioMIR is a **modular system** that combines:



WHY IT MATTERS

BioMIR transforms music from passive content into a **measurable, adaptive intervention**. By combining no-contact biosensing, real-time affective inference, and closed-loop optimization, LUCID can quantify *how* sound changes human state and continuously improve outcomes at scale. **This enables a rare combination:**



supports validation, personalization, and defensible differentiation across regulated and consumer markets.



INTELLIGENCE LEVERAGE

Measure

- Sensing the **human response** to music
- We capture:
 - physiology (HR / HRV)
 - affect (valence / arousal)
 - attention & immersion (absorption)
 - behavior (engagement, skips, ratings)
 - self-report where appropriate
- Works **without** required hardware; wearables optional

Learn

- Aligns music features with **measured human state**
- Generates rich, multi-modal annotations
- Enables outcome-oriented optimization:
 - emotional regulation
 - engagement
 - absorption
- Sample-efficient learning from **real-world usage**
- Supports **closed-loop adaptation** over time

Defend

- Data moat is **earned through deployment**, not scraped
- **Intelligence compounds** as products scale
- Difficult to replicate without the full stack

STRATEGIC POSITIONING

BioMIR gives LUCID something most music, wellness, and digital therapeutic platforms lack: a closed-loop, outcome-measured system that links sound to real human state change, at scale, without adding hardware or clinical friction.

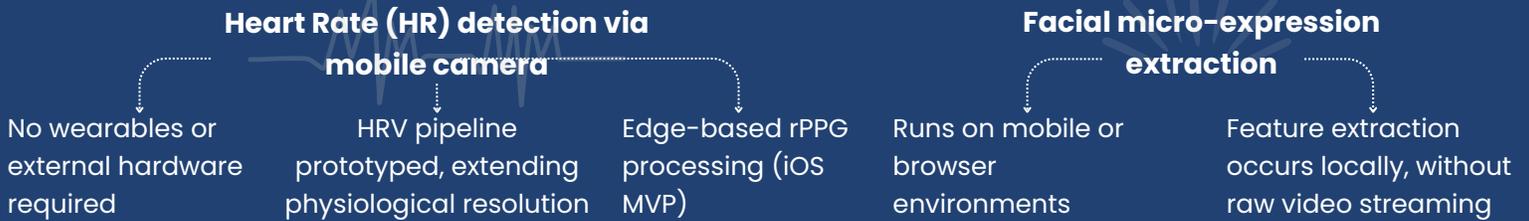
- **Scales across markets** (clinical + consumer) with the same sensing primitives
- **Low hardware dependence**: works without requiring wearables; wearables optional for richer signals
- **Cost + privacy advantages**: edge extraction reduces cloud load and avoids raw video streaming

BioMIR turns music into measurable outcomes—and converts usage into defensible intelligence.



Edge-Based, No-Contact Sensing

BioMIR prioritizes sensing approaches that **minimize friction, cost, and privacy risk**:



This edge-first design enables deployment in healthcare settings and consumer environments while **keeping infrastructure and compliance overhead low**.

Annotation & Dataset Generation Pipelines

A core function of BioMIR is its ability to generate **richly annotated datasets** that correlate music with measurable human state data. As users interact with music experiences, BioMIR enables the structured capture of:

- ✓ Musical features and content metadata
- ✓ Contextual listening information
- ✓ Behavioral signals (engagement, skips, ratings)
- ✓ Physiological signals (e.g., HR, HRV)
- ✓ Self-assessment data
- ✓ Affective state estimates (valence, arousal, absorption)

These signals are aligned temporally and semantically. The result is datasets that link how music is constructed with *how* it affects people across different use cases. Importantly, these datasets are generated in **vivo**, through **real products and real users**, rather than simulated or lab-only environments.

Affective State Inference Layer

BioMIR uses lightweight features derived from edge sensing to perform **higher-order inference** in the cloud:

Arousal inference

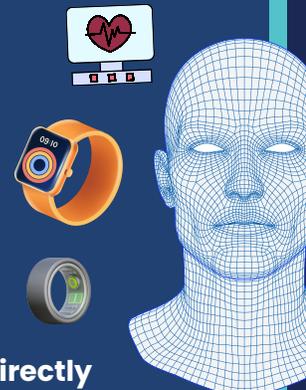
Inputs: facial micro-expression features, HR/HRV
Compatible with LUCID's edge-based sensing or consumer wearable devices (Oura ring, Apple Watch, etc)

Valence inference

Inputs: facial micro-expression features from mobile/web apps

Absorption inference

Inputs: HR/HRV
Models depth of psychological engagement rather than surface emotion
Compatible with LUCID's edge-based sensing or consumer wearable devices



These inference processes focus on continuous affective and attentional states that are **directly actionable for adaptive music sequencing and therapeutic design**, rather than discrete emotion classification.