

The Body as a Longitudinal Diagnostic Record

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Abstract

A single photograph or laboratory result is a snapshot of physiology; a sequence of observations reveals change. This paper advances a longitudinal phenotype model in which images, symptoms, movement patterns and biometrics are interpreted relative to a person's baseline. It argues that detecting change may sometimes be more useful than comparing an individual with one fixed population threshold—provided that noise, bias and false alarms are explicitly modeled.

The Clinical Question and Its Context

Human appearance varies with lighting, hydration, sleep, camera perspective, skin pigmentation, medications and ordinary aging. A facial color change cannot be interpreted as jaundice without controlling image capture and confirming clinical signs. Wearable signals vary by sensor placement and activity. A longitudinal model should therefore estimate the smallest reliable change for each modality before claiming that a new observation reflects disease. Preprocessing, calibration and consistent acquisition are central to causal credibility.

Proposed Biological or Explanatory Model

The conceptual architecture separates data quality, baseline estimation, deviation detection and clinical interpretation. A model might flag a new tremor pattern or sustained resting heart-rate shift, but it must distinguish benign variability from potentially concerning change. Multimodal agreement can improve confidence in some settings, yet correlated measurement errors can create false reassurance. Machine learning should support triage rather than pretend to know an underlying diagnosis from nonspecific features.

Mechanism-Specific Interpretation

A body generates signals at different temporal resolutions. Skin changes may evolve over weeks, resting heart rate can shift over hours, and movement patterns vary by task and medication timing. A longitudinal health record should therefore preserve the time scale and measurement reliability of each modality. Combining every feature into a single daily health score risks losing information and treating correlated artifacts as independent evidence. For example, travel can simultaneously change sleep, temperature, resting heart rate and lighting in photographs without producing a new disease. A model that attributes all changes to a systemic pathology would be sophisticated in appearance but wrong in practice.

Competing Explanations and Limits of Inference

The opposite hypothesis is that longitudinal accumulation mainly amplifies artifacts and spurious correlations. That concern is real: repeated monitoring increases the number of opportunities for a false-positive flag and can worsen anxiety. Good validation therefore requires longitudinal test-retest reliability, external cohorts, clinically meaningful outcomes and evidence that the alert improves decisions.

Discriminating Observations and Evidence Thresholds

A scientifically serious system should define baseline stability, thresholds for sustained change and a strategy for periods when data quality is poor. It should also state whether a flagged deviation is merely interesting, requires routine clinical follow-up or warrants urgent care. The difference among those three actions is more important than an attractive dashboard. External prospective validation remains necessary.

Implications for Interpretation and Future Inquiry

This paper supplies a conceptual foundation for Signals as a research direction, not evidence that the current product can diagnose or predict any specific disease. Public claims should be limited to functions that have been independently validated. The promise is disciplined tracking of change, not medical clairvoyance.

Selected Evidence and Further Reading

1. [Quer et al. Wearable sensor data and self-reported symptoms for COVID-19 detection](#)
2. [Esteve et al. Dermatologist-level classification of skin cancer with deep neural networks](#)

Source lineage: Absurd Signals web app; Healthy Selfie; daily checks and trend comparison

Editorial note: Conceptual scientific commentary; not an original clinical trial, systematic review, peer-reviewed publication, or medical advice. Hypotheses are not established treatment effects.