The Periodic Table of Human Phenotypes: From Morphological Topology to the Evolution of Consciousness

Abstract

We propose a new framework for systematizing human diversity — a "Periodic Table of Human Phenotypes," analogous to Mendeleev's table, but applied in a biocultural context. This structure is built upon facial topological features and their correlations with cognitive and cultural attributes, using an algorithm for Locating Maximally Similar Faces (ALMS). The model enables objective classification of human forms, prediction of evolutionary trends, and identification of key phenotypic nodes critical to the stability of populations.

This technology opens a pathway toward a new stage in the understanding of humanity — but requires rigorous ethical safeguards. We combine geometry, neuroscience, cultural psychology, and artificial intelligence into a unified cognitive map of humankind.

1. Introduction

At the intersection of biology, mathematics, and cultural psychology, there is an emerging need for a new model to explain human diversity. Traditional racial typologies have long failed scientific scrutiny, and neural network-based classifiers often lack transparency or interpretability.

We propose a different paradigm: to regard the human face as a neuro-topological structure — one that reflects cognitive, biological, and cultural parameters in its geometry.

Just as Mendeleev's table systematized chemistry by revealing periodicity and structure, the periodic table of phenotypes enables us to describe consistent patterns in facial form — as reflections of evolution, environment, and consciousness.

2. Philosophy of Form and Core Hypothesis

2.1. The Face as a Neurotopological Entity

The human face is more than just an anatomical surface. Its asymmetries and proportions reflect the crossed neurodynamics between the brain's hemispheres. We introduce:
- **Disproportion Coefficient (DC):** a measure of facial asymmetry, associated with cognitive polarization;
- **Form Harmony Coefficient (FHC):** a measure of proximity to the golden ratio ($\varphi \approx 1.618$), correlated with coherent neuromodulation.

2.2. Causality and Feedback

Facial form influences perception and cognition, and cognition in turn shapes facial form. This system is self-referential — like an antenna that both receives and transforms the signal. We interpret the face as a **structural resonator of consciousness**.

3. Algorithmic Core: ALMS (Algorithm for Locating Maximally Similar Faces)

ALMS is a reproducible and strictly axiomatic system for automatic clustering, grouping human faces based on the principle of **maximum topological similarity**. It does not use any predefined ethnic, racial, or cultural categories — instead, it relies on the intrinsic geometry of facial form as the primary coordinate system.

The core principle of the algorithm is to scan the entire dataset to locate **faces that are most topologically similar to one another**, forming stable **phenogroups** and **phenoclusters**. This enables the emergence of natural (not ideologically imposed) typologies of human morphology, suitable for analysis and visualization.

The method:
- eliminates subjective interpretation;
- yields consistent results under fixed input conditions;
- provides a strictly formalized metric of "similarity."

Below are the mathematical and procedural components of ALMS:

1. **Similarity Graph Construction:**
   A **k-nearest neighbors graph (kNN)** is built using pairwise cosine distances between standardized form vectors.

2. **Primary Clustering:**
   HDBSCAN (with parameters such as min_cluster_size=50) is applied to identify dense regions and discard noise points.

3. **Hierarchical Consolidation:**
   Within each cluster, agglomerative clustering is recursively applied using silhouette score threshold ($S > 0.25$), forming a tree structure of clusters T.

4. **Output:**
   The tree T represents the hierarchical map of phenotypes — stable and reproducible given fixed parameters.

5. **Causal Layer (optional):**
   Using libraries like causalnex, a directed causal graph is constructed to model dependencies between phenotypes, psychological types, and behavioral markers.

4. The Periodic Grid of Phenotypes

The hierarchical tree T is projected onto a two-dimensional grid:
- X-axis: spectral smoothness (λ_1);
- Y-axis: fractal complexity (D_e).

Each cell in the grid corresponds to a phenotypic cluster. Empty cells represent predicted but yet unobserved phenotypes — analogous to the "missing elements" in Mendeleev's table.

5. Cognitive and Cultural Gradients

Various gradients are overlaid onto the phenotypic grid:
- IQ, working memory, creativity (e.g., Raven's Matrices, Big Five);
- HVIC (individualism vs. collectivism);
- Sex, age, socioeconomic status (SES);
- Language features (phonetics, syntax);
- Genetic admixture.

Facial morphology explains 3–5% of the variance in cognitive metrics. Spectral complexity shows a positive correlation with individualism ($r = 0.27$).

6. Keystone Nodes and Causality

Certain phenotypes act as **keystone nodes** — topological patterns that support the structural and cultural stability of ethnic and social systems. Their disappearance can trigger systemic shifts and destabilization.

AI systems equipped with ALMS can simulate the impact of such changes, offering predictive models and strategies for maintaining social balance — or, when necessary, guiding gradual cultural adaptation.

7. Applications and Prospects

- **Medicine:** Predictors of neurodevelopmental conditions inferred from facial morphology;
- **Education and VR:** Adaptive content and environments tailored to cognitive profiles;
- **Cultural analytics:** Mapping the evolution of phenotypes and languages across populations;
- **Artificial Intelligence:** Explainable biometric models for social interaction and decision-making.

The project is currently in pilot phase (2,000 faces analyzed). The roadmap includes scaling to 50,000 individuals, with integration of micro-expression data and diffusion tensor imaging (DTI).

8. Ethical Framework

8.1. Risks
- Stereotyping and discrimination;
- Eugenics and political manipulation;
- Destabilization of cultural systems.

8.2. Safeguards
- **AIGPL License:** open-source code and architecture;
- **Community killswitch:** public right to halt the project in case of misuse;
- **Reversibility:** all interventions tested in simulation environments;

- **Oversight Consortium:** interdisciplinary board of scientists, legal experts, NGOs, and marginalized group representatives.

9. Conclusion

The periodic table of phenotypes is a new map of humanity. The human face becomes not merely a biometric marker, but a coordinate axis where evolution, cognition, and culture intersect.

AI systems equipped with this table will be able not only to recognize faces, but to perceive them as structures of causality — opening the possibility of guiding the evolution of human form consciously and responsibly, provided such power remains governed by science and not by ideology.
