Multi-Expert Discovery of Personalized Optimal Biomedical Solutions (patent pending)
AI-Driven Framework for Discovery of Multi-Expert Personalized Biomedical Models & Indicators

High-Capacity Engine for Multi-Factor Simulation and Multi-Objective Optimization of Treatment, Wellness & Rehabilitation Strategies

24/7 Automated Personalization, Monitoring & Decision Support

Optimal Combination of All Available Biomedical Resources, Novel Research Results & Personal Data to Solve Your Current Problems

Clear Explanation & Interpretation of the Discovered Personalized Treatment and Wellness Strategies

Early Detection of the Emerging Medical Abnormalities, Health-Critical & Acute Events, Overtraining and Psychological Conditions

Predictive Indications of Personalized Zones of Optimal Performance in Sport and Other Competitive Fields
System Outline and Workflow

- **MEDICAL DATA**
  - physiological
  - -omics
  - imaging
  - -test results

- **SPORT & HEALTH ACTIVITY**

- **VITAMINS & SUPPLEMENTS**

- **MEDICATIONS**

- **ENVIRONMENTAL FACTORS**
  - (weather, geomagnetic conditions, pollution etc)

- **CHANGING & FIXED BODY PARAMETERS**
  - (weight, age, height)

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- **HISTORICAL & CURRENT**

- **SCENARIOS**
  - (deterministic, stochastic, from deep generative models)

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- **ALL AVAILABLE BIOMEDICAL RESOURCES**
  - (databases, models, algorithms and empirical knowledge)

- **AI-DRIVEN MULTI-EXPERT FRAMEWORK**
  - FOR EARLY ABNORMALITY DETECTION,
    DIAGNOSTICS, MONITORING & EXPLANATION
  - (optimal combination of analytics, deep learning, boosting and other machine learning techniques)

- **SIMULATIONS ENGINE FOR DISCOVERY OF OPTIMAL WELLNESS STRATEGY**

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**REPORTS**
Selected Applications

- Early Detection of Emerging Abnormalities or Overtraining from Wearable-Device Data
- Early Detection of Treatment Effects for Personalization of Treatment Strategy and Regimen
- Predictive Personalization by Matching Current Biomedical State to Existing Cases
- Predictive Alerts for Rare & Hard-to-Quantify Best-Performance or Critical States
- Discovery of Optimal Regimen from the Long History of Personal Data
- Discovery of Personalized Health-Critical Geo-Magnetic / Weather Events and Predictive Alerts
- Quantitative Description and Monitoring of Individual Zones of Optimal Functioning (IZOF)
- Monitoring and early detection of emerging life-threatening abnormalities
- Integrated Decision Support Solutions for Athletes and Coaches
- Early Diagnostics and Monitoring of Emerging Neurological, Psychological, Psychotic, and Developmental Abnormalities from Wearable-Device (ECG and gait) and Multi-Modal Clinical Data
- Discovery of Optimal Personalized Protocols in Neurofeedback and Other Alternative Therapies
- Discovery of Optimal Nutraceutical or Drug Combinations
- Engine for forward simulation and multi-objective discovery of optimal wellness strategies:
  - Uses all available data to quantify current psycho-physiological personal state
  - Using analytical and deep generative models, creates multi-horizon scenario paths incorporating potential environment and weather effects, probability of genomic mutations, probability of developing different abnormalities given current state and other factors.
  - Using simulation results, multi-objective optimization engine discovers complementary sets of optimal wellness-maintenance strategies
Synergy of physics-based reasoning and machine learning in biomedical applications: towards unlimited deep learning with limited data (2019)

Leveraging domain-expert knowledge, boosting and deep learning for identification of rare and complex states (2019)


Multi-expert evolving system for objective psychophysiological monitoring and fast discovery of effective personalized therapies (2017)

Generic Ensemble-Based Representation of Global Cardiovascular Dynamics for Personalized Treatment Discovery and Optimization (2016)


Universal multi-complexity measures for physiological state quantification in intelligent diagnostics and monitoring systems (2013)

Robust algorithmic detection of cardiac pathologies from short periods of RR data (2013)

GENOTYPE CLASSIFICATION AND ALLELIC PATTERN RECOGNITION USING KOHONEN SELF-ORGANIZING MAPS (2002)

Boosting-based discovery of multi-component physiological indicators: Applications to express diagnostics and personalized treatment optimization (2010)

Ensemble learning frameworks for the discovery of multi-component quantitative models in biomedical applications (2010)

Robust algorithmic detection of the developed cardiac pathologies and emerging or transient abnormalities from short periods of RR data (2011)

Ensemble Decomposition Learning for Optimal Utilization of Implicitly Encoded Knowledge in Biomedical Applications (2011)

Diagnostics of complex and rare abnormalities using ensemble decomposition learning (2011)

Multi-complexity measures for early detection and monitoring of neurological abnormalities from gait time series (2013)