Accurate, Non-Invasive Fetal Arterial Oxygen Saturation and Blood Ph Measurement via Diffuse Optics

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OTHER INFORMATION

KEYWORDS

fetal monitoring, non-invasive, blood pH, oxygen saturation, Transabdominal Fetal Oximetry, Exponential Pulsation Ratio, FOSTER, signal processing, neural networks, maternal-fetal health

CATEGORIZED AS

- **Medical**
  - Devices
  - Diagnostics

ABSTRACT

Researchers at the University of California, Davis have developed non-invasive fetal monitoring that enables accurate, continuous measurement of fetal arterial blood oxygen saturation and blood pH.

FULL DESCRIPTION

This technology leverages Transabdominal Fetal Oximetry (TFO) to non-invasively monitor fetal well-being by accurately measuring fetal arterial blood oxygen saturation (fSpO2) and blood pH. The technology uses three key components: (1) a mathematical framework, (2) a signal processing pipeline, and (3) computational models to infer fetal blood pH from temporal dynamics of fSpO2. Together, these components overcome the fundamental challenges of non-invasive accurate intrapartum fetal monitoring, providing a significant advancement over traditional methods like cardiotocography.

APPLICATIONS

- Hospitals and birthing centers for intrapartum fetal monitoring.
- Research in fetal health and development.
- Integration into existing fetal monitoring systems to enhance their accuracy and reliability.
- Use in remote or low-resource settings where invasive monitoring is not feasible.

FEATURES/BENEFITS

- Continuously monitors fetal arterial blood oxygen saturation and pH non-invasively.
- Significantly improves accuracy over conventional methods.
- Reduces unnecessary interventions by providing reliable data on fetal distress.
- Leverages advanced signal processing techniques enhancing measurement reliability.
- First-of-its-kind technology to infer fetal blood pH non-invasively.
- Addresses high rate of false positives and unnecessary interventions (e.g., cesarean operations) in current fetal monitoring methods.
- Provides for lack of continuous, non-invasive monitoring of fetal blood pH and oxygen saturation.
- Overcomes difficulties in accurately isolating fetal signals from maternal-fetal mixed signals.

PATENT STATUS

Patent Pending

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- TransPPGSep: Fetal Signal Separation using Physically and Physiologically Compliant Synthetic Data
- Fetal Oximetry Measurement via Maternal Transabdominal Spectroscopy
- Method and System for Signal Separation in Wearable Sensors with Limited Data (with Applications to Transabdominal Fetal Oximetry)
- Systems, Methods, and Media for Determining Fetal Photoplethysmography Information from Non-Invasively Obtained Mixed Photoplethysmography Signals

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