Market Opportunity:
Monitoring and controlling brain states under anesthesia are critical in modern medicine. Currently, anesthetics are administered manually by anesthesia care personnel, which can take roughly several hours or days to monitor delivery of anesthetics. Brain-machine interfaces (BMI) for closed-loop anesthetic delivery could automate this process and enable more efficient control. Additionally, a variety of anesthetic states are needed for different scenarios (e.g. general anesthesia, medical coma, etc.).

USC Solution:
USC researchers have developed an adaptive algorithm that can automatically deliver anesthetics based on real-time feedback of the brain’s EEG activity and can be generalized to a wide range of anesthetic states and neural signatures. The brain-machine interface (BMI) takes the neural recordings as the input and adjusts the drug infusion rate accordingly to take the anesthetic state of the patient to a desired level.

Applications
• Automatic controlled anesthetic for patients in medical coma

Stage of Development
• Tested in simulations
• Available for exclusive and non-exclusive license

Intellectual Property
Status:
Patent application filed

Key Publication:

Value Proposition
• First algorithm that controls various states of anesthesia, such as general anesthesia and medical coma
• First stochastic, adaptive, robust system for anesthetic delivery that takes into account noise and time variation
• Removes the need for offline system identification
• Reduced bias and error compared with non-adaptive systems

Keywords:
Algorithms, drug delivery system, brain-machine interface, closed-loop, anesthesia, medical coma

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