8. BÖLÜM

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GİRİŞ

İnme, şiddetli amyotrofik lateral skleroz (ALS), beyin sapı felci ve omurilik yaralanması dahil olmak üzere çeşitli yaralanma ve bozukluklar, bireylerin istemli kas kontrolünü tamamen kaybetmesine veya sınırlanmasına sebep olabilir. Bu sinir sistemi bozukluklarına sahip kişiler genellikle bilişsel olarak sağlamdır, ancak günlük rutin aktiviteleri gerçekleştirmek için bir bakıcının sürekli bulunması gerekir. Bazı durumlarda, iletişim kurma yeteneği bile tamamen kaybolur, bu da sorunun önemini vurgular ve bir çözüm arayışını doğurur. Nöro-mühendislik alanı, şiddetli konuşma ve motor bozuklukları olan insanlara kendi çevreleriyle iletişim ve etkileşim kurma araçları sağlamak için beyin-bilgisayar arayüzleri (BBA) kullanımını önermiştir. Bu hedef doğrultusunda BBA sistemleri, kullanıcının gönüllü olarak modüle edilmiş sinirsel aktivitesi ile seçtikleri yardımcı teknoloji arasında arayüz oluşturacak şekilde tasarlanmıştır. Tipik bir BBA sisteminin üç ana bileşeni: nöral aktiviteyi toplamak için bir sensör, kaydedilen nöral aktiviteyi çözmek için bir algoritma ve amaçlanan nihai eylemleri gerçekleştiren bir efektör. Ham voltaj sinyalleri, doğrudan beynin içine implante edilen, beynin üstüne yerleştirilen veya kafa derisine yerleştirilen elektrotlar aracılığıyla kaydedilir. Bu sinyaller, genellikle kullanıcının motor hareketlerle ilgili alanlarından beyin korteks aktivitesini yansıtır ve bu nedenle kullanıcının hareket planı hakkında bilgi içerir. Sinyal-gürültü oranını artırmak ve anlamlı bilgilerin çıkarılmasını kolaylaştırmak için kaydedilen bu voltajlara bir dizi sinyal işleme tekniği uygulanır. Nöronal aktivasyon hızı veya

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