



EEG TABANLI NONİNVAZİF BEYİN-MAKİNE ARAYÜZÜ KULLANILARAK BİR SANAL ROBOTİK KOL MANİPÜLATÖRÜNÜN KONTROLÜ

(Erkan ÖZBAY, Yuriy MISHCHENKO, Hilmi YANAR, Murat KAYA)

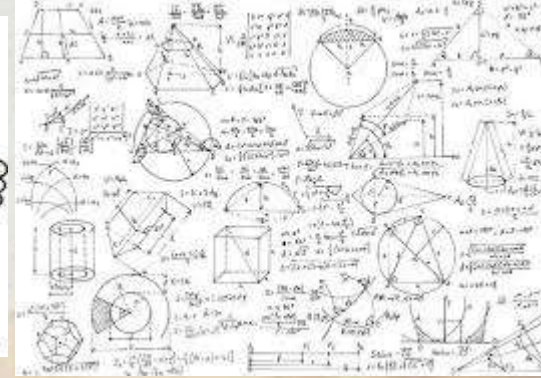
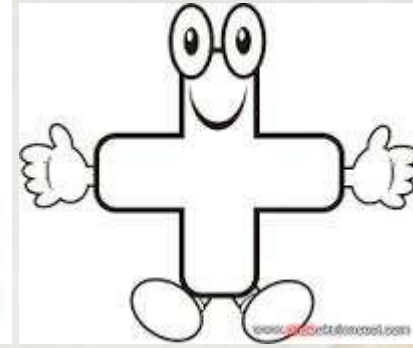
EKİM 2016



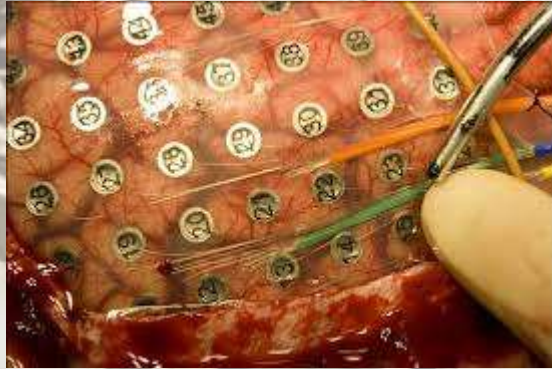
**ERKAN ÖZBAY
MERSİN ÜNİVERSİTESİ
TIP FAKÜLTESİ
BİYOFİZİK ANABİLİM DALI**



- BMA, nöro bilim, istatistik ve sayısal yöntemler ile birlikte ortaya çıkan bir araştırma alanıdır.
- BMA, iletişim ve kontrol için bir bireyin beynindeki nöral aktiviteyi doğrudan kullanan insan-bilgisayar iletişim sistemleri sağlayacak konular ile ilgilenir



ECOG



EMG



fMRI

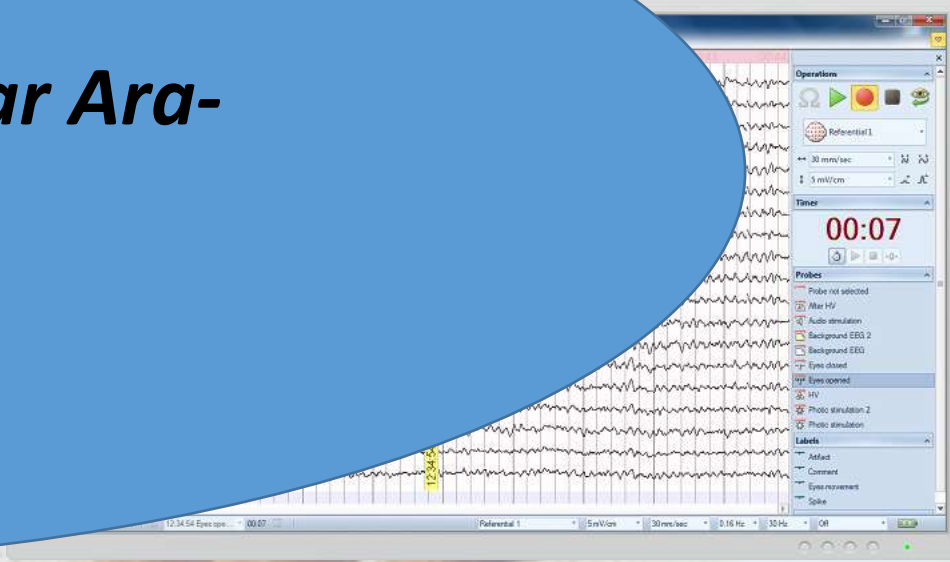


Noninvaziv tekniklerinin arasında BCI'da en fazla
elektroensefalografi (EEG)
görüntüleme tekniđi kullanılır

***Daha Verimli
Non-İnvasiv Beyin Bilgisayar Ara-
Yüzlerinin
Geliştirilmesi***

EEG

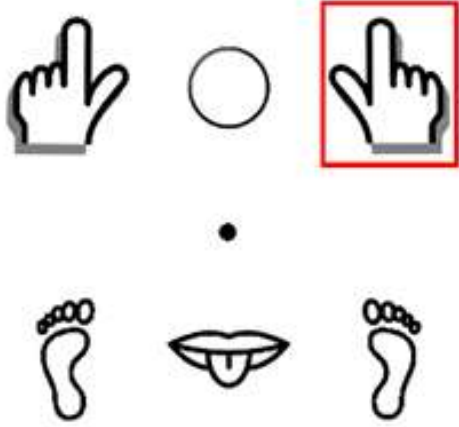
görüntüleme, beyindeki nöronların elektriksel aktivitesi tarafından üretilen elektrik potansiyel değışikliklerini kafatası yüzeyinden kayıtlar.



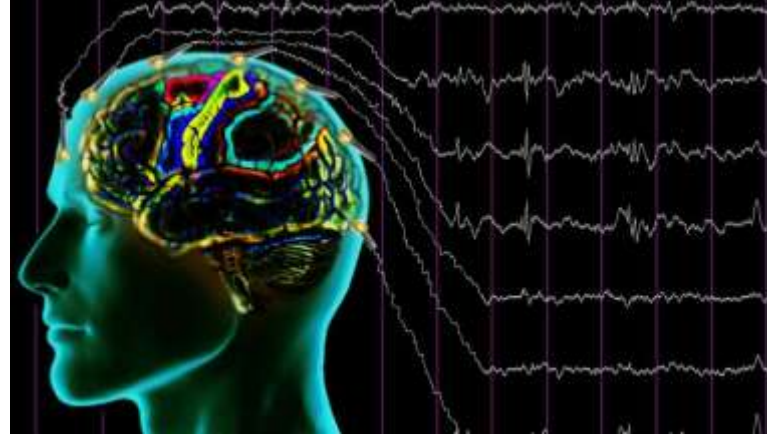
Verileri Elde Etme

Görsel Komut Başlatıcısı

Motor Eylem



Görsel
Komutlar

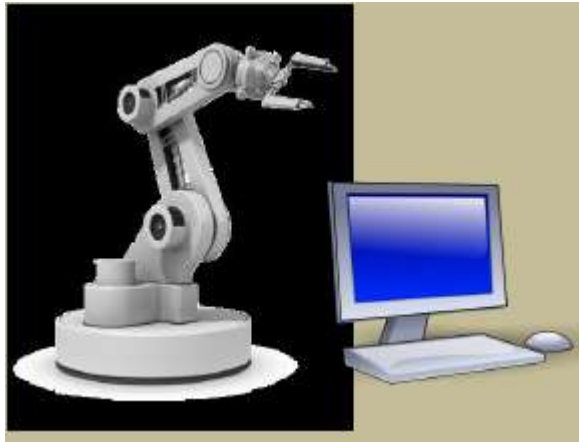


22.
Kanal

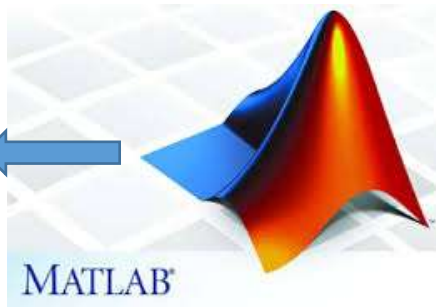
EEG verileri



Sinyal İşleme ve Robotik Kolun
Kumanda edilmesi



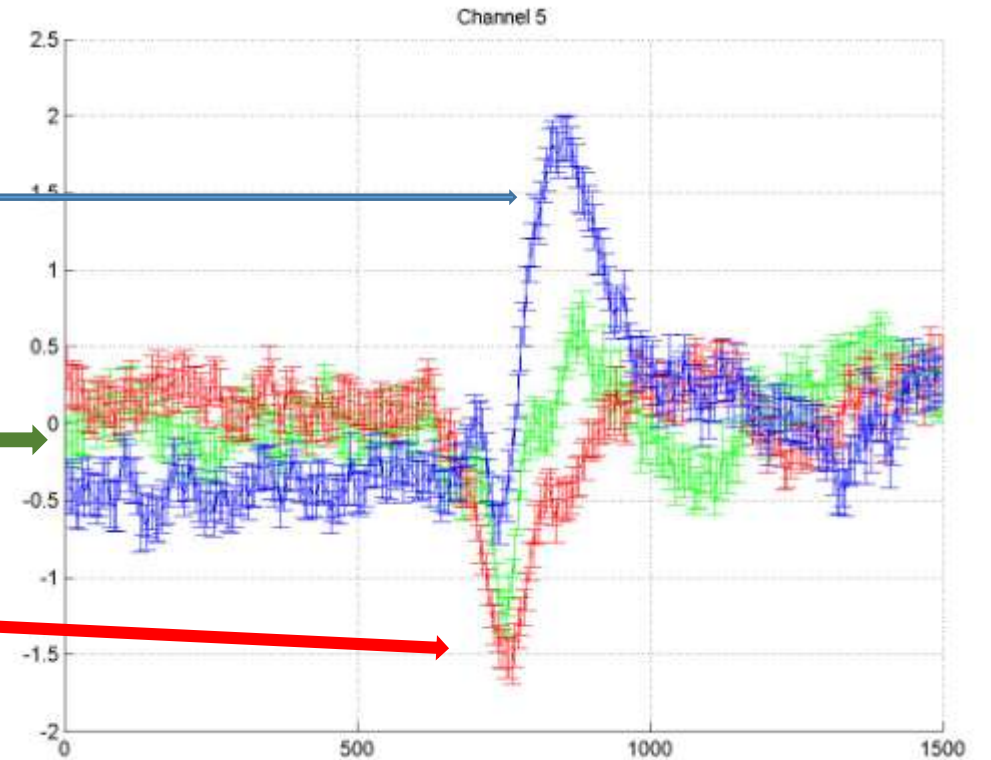
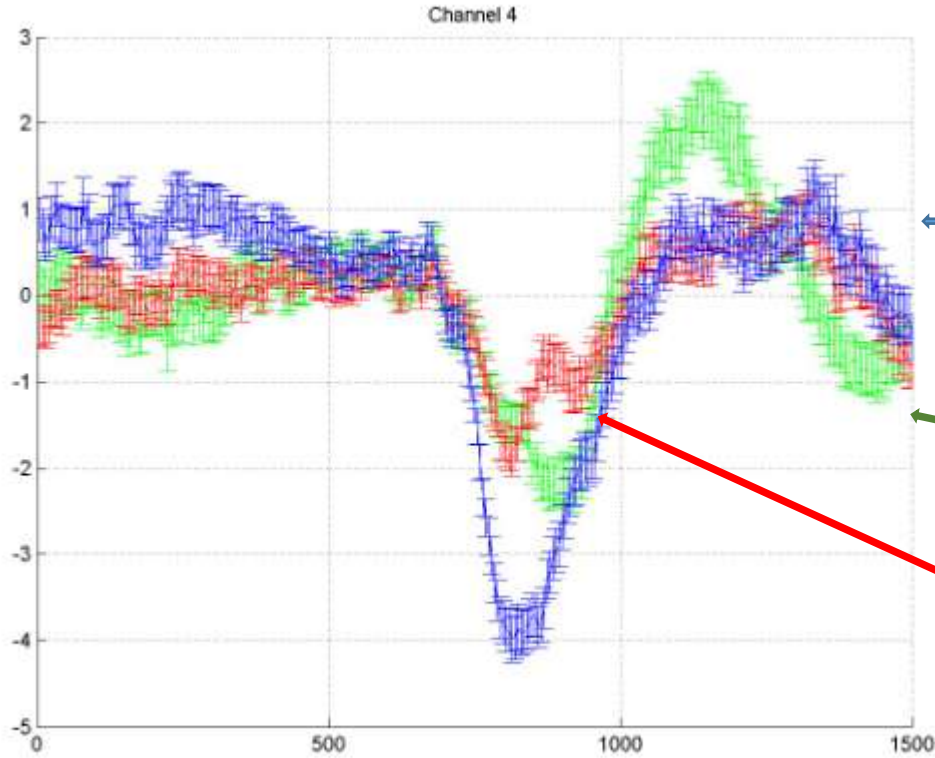
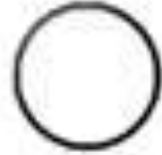
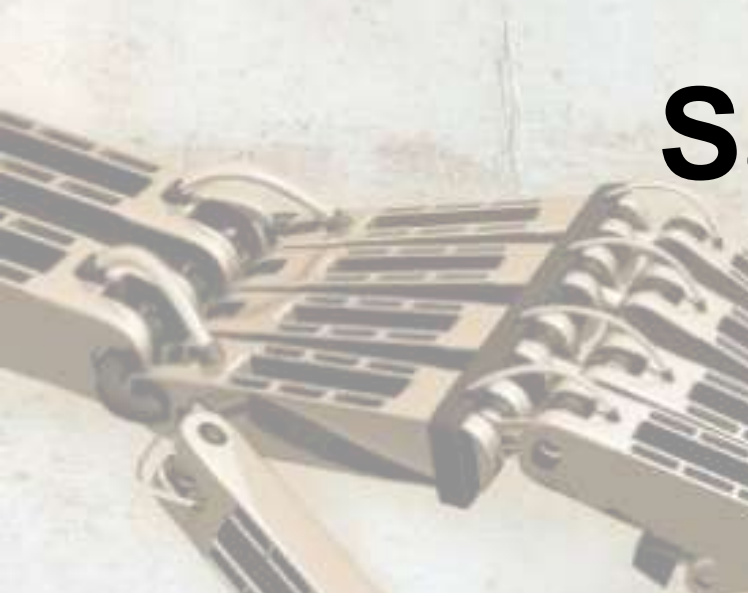
EEG verilerinin
dönüşümü

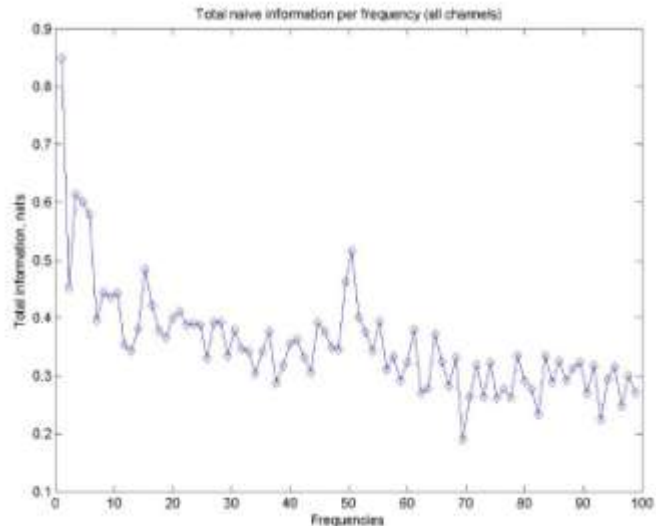


EEG
verilerinin
kaydı

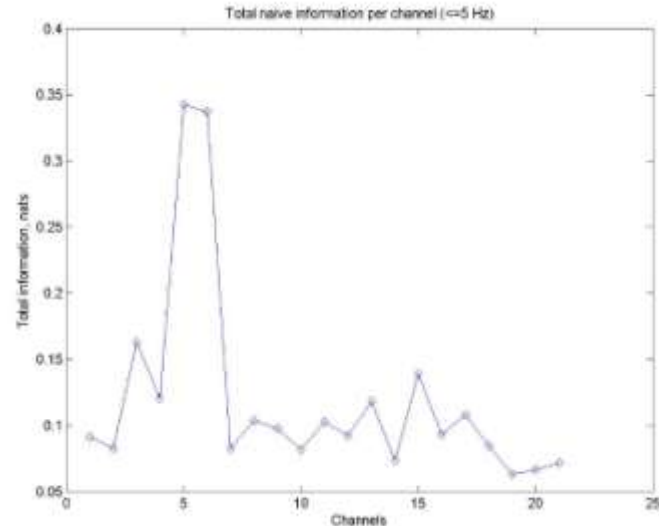
Nihon Kohden EEG-1200
medical grade EEG
system, 38 channels
max, 1000Hz samplig
rate, 0,01 μ V resoltion

Sağ/sol El Protokolü

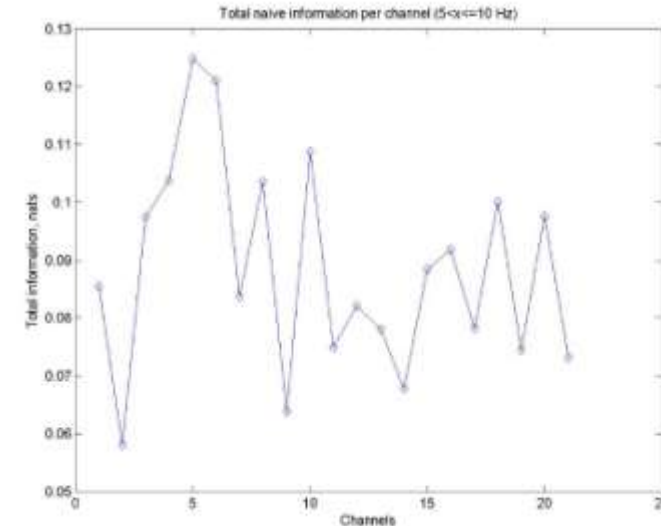




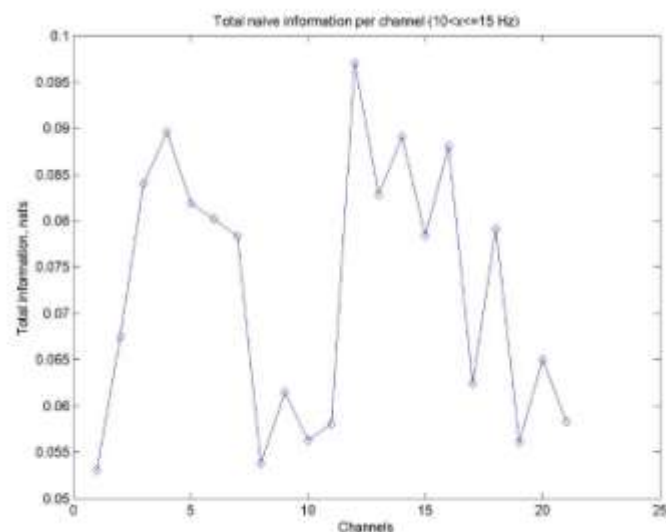
Tüm frekanslar



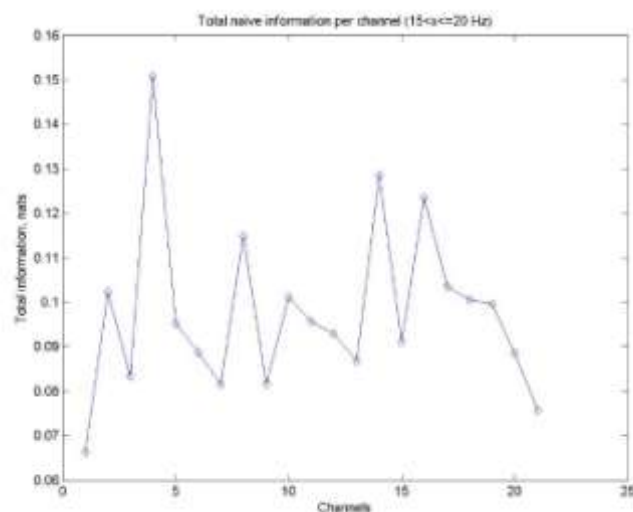
0-5Hz



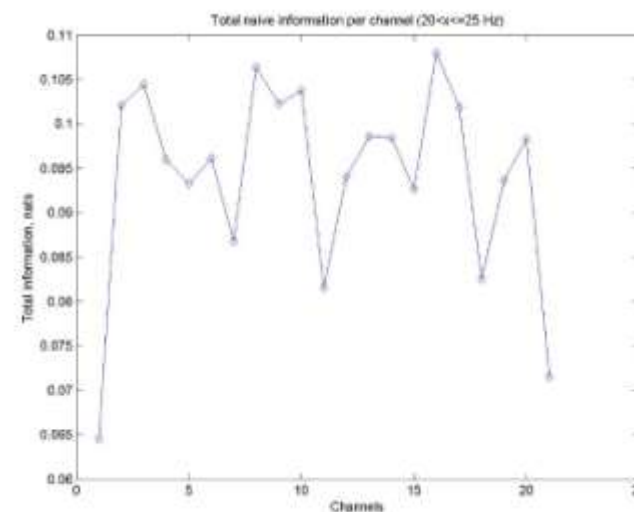
5-10Hz



10-15Hz

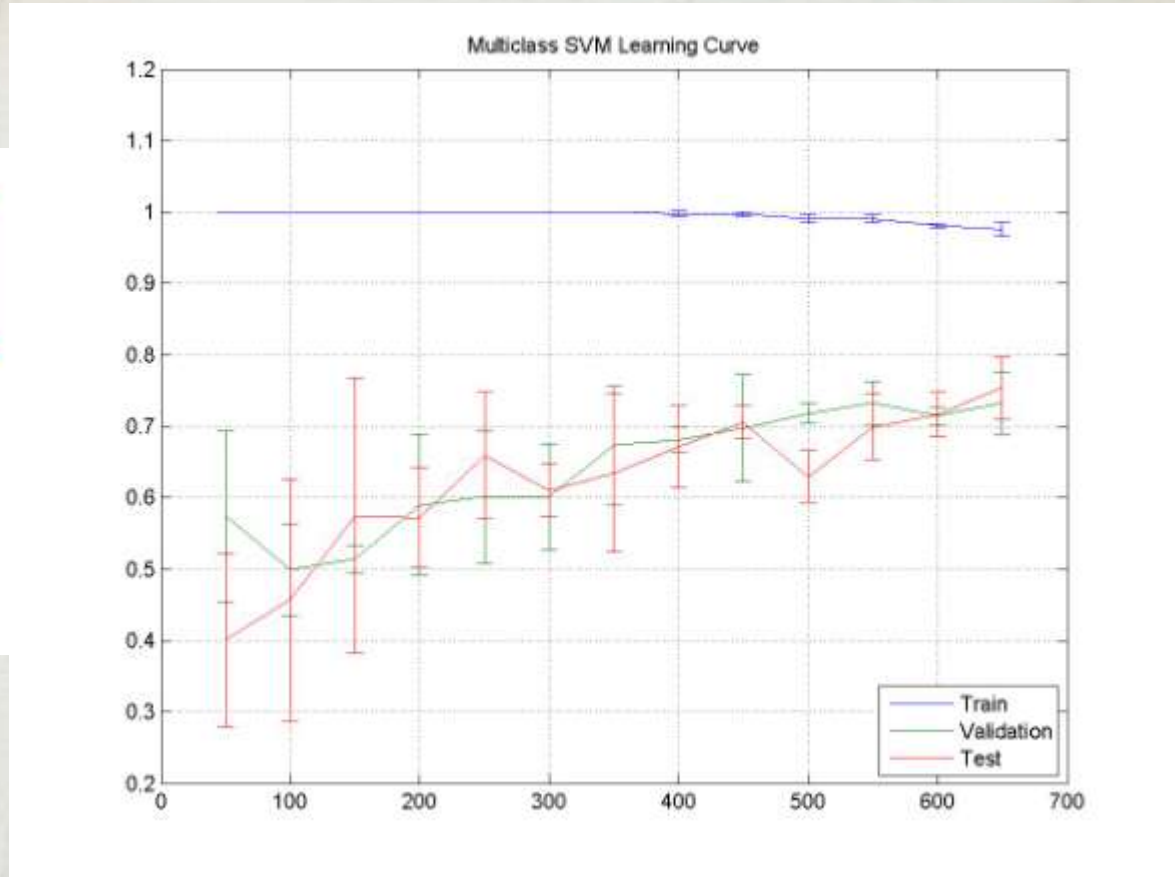
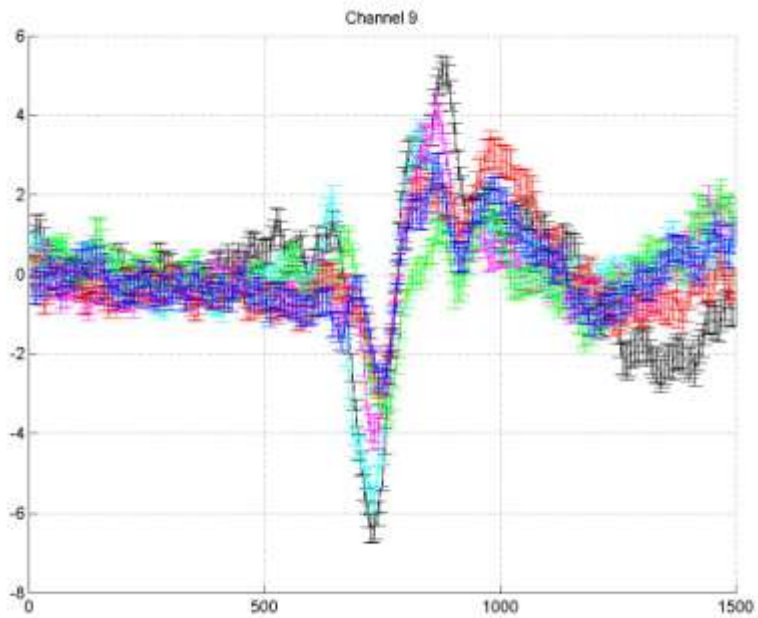
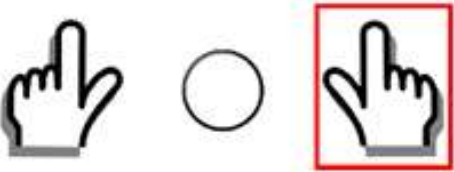
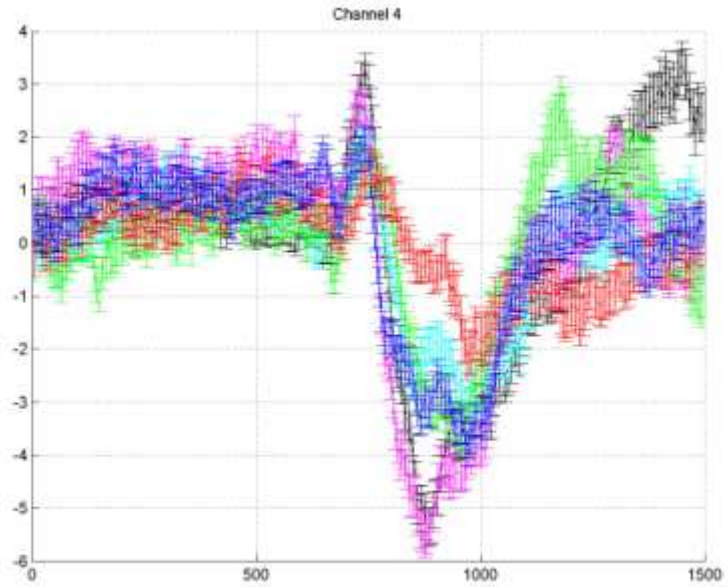


15-20Hz



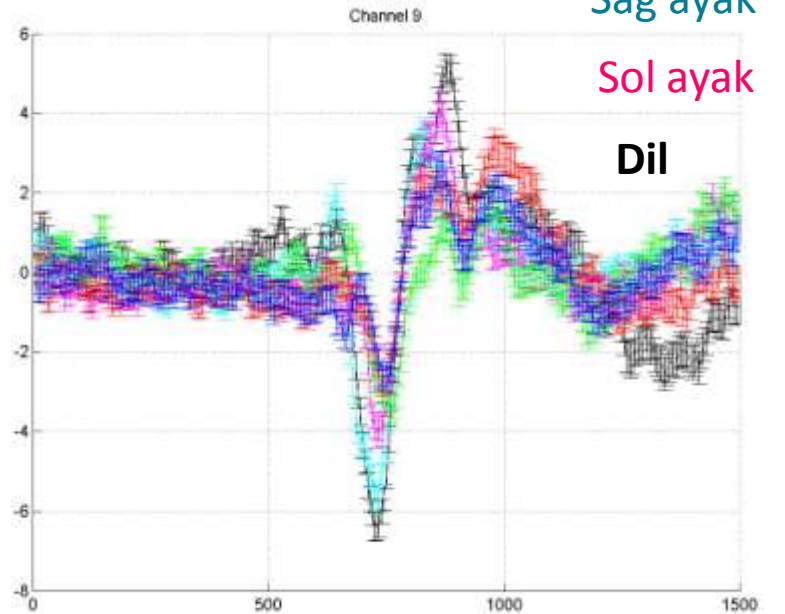
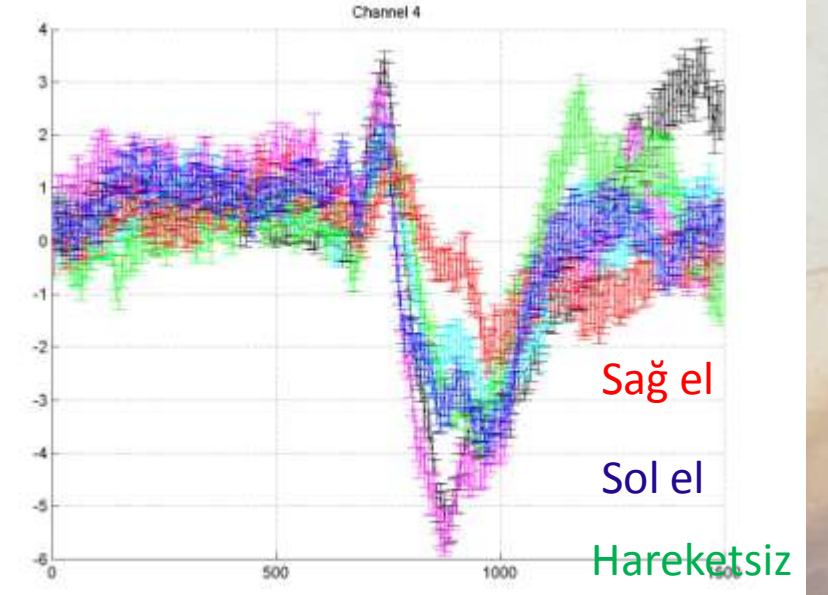
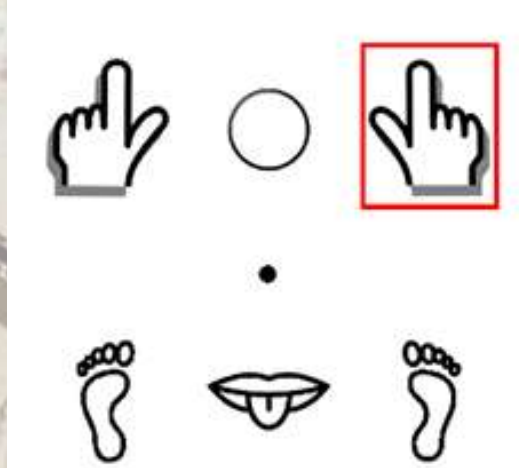
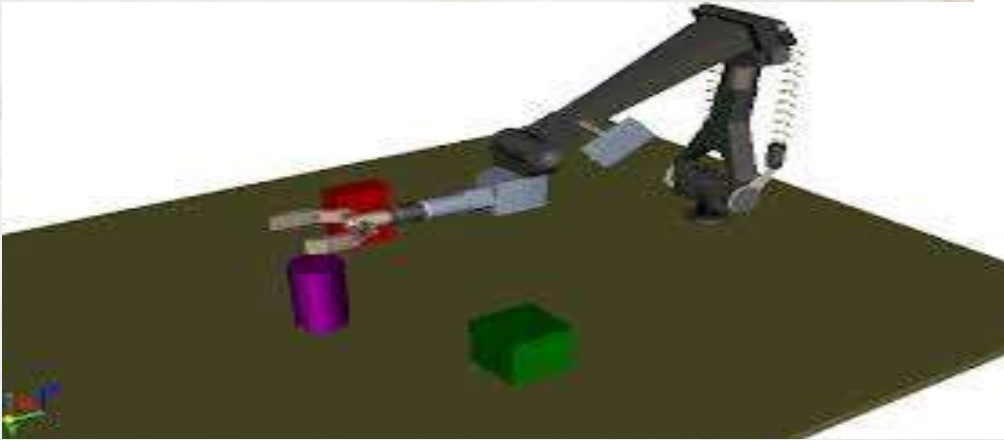
20-25Hz

Sag/sol El+Sag/sol Ayak+Dil Protokolü



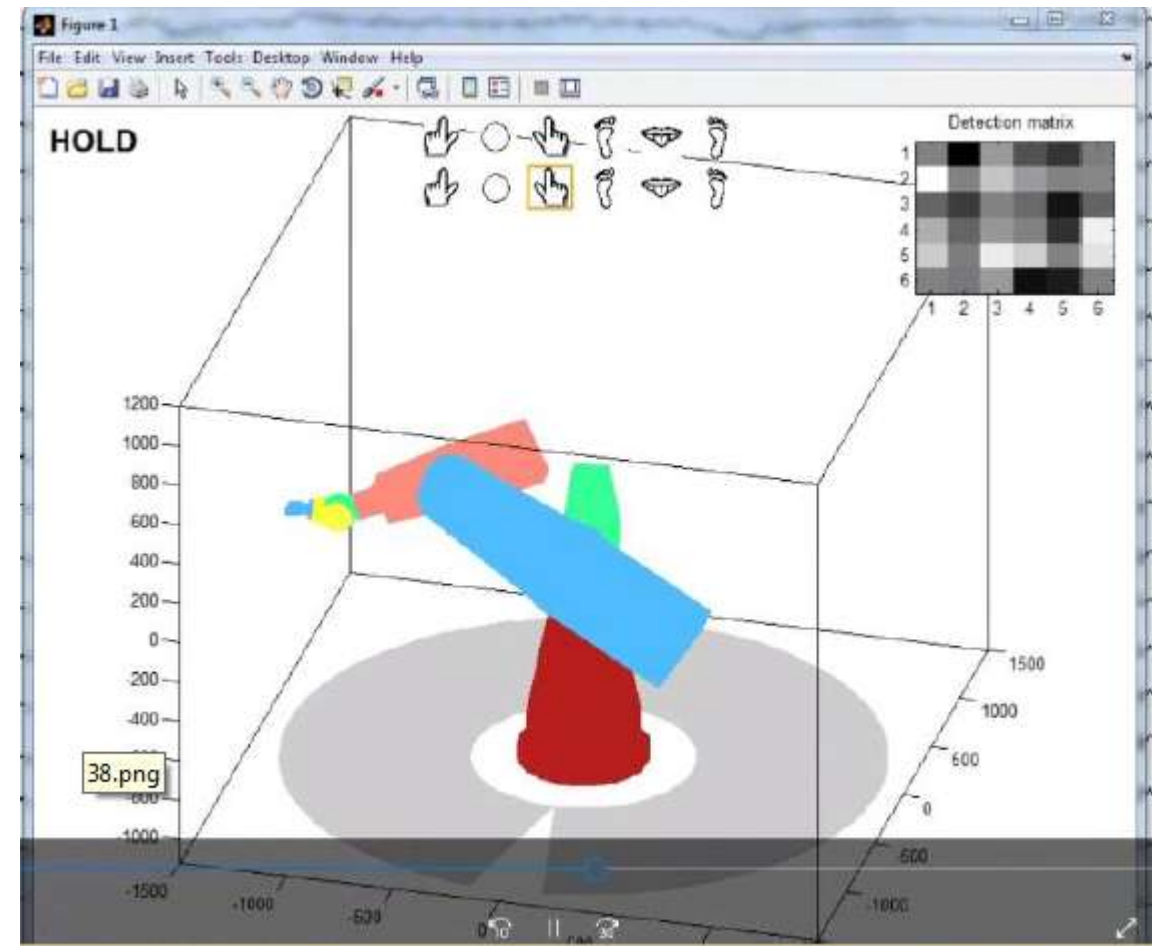
Canlı(Live) Deney Protokolü

1. Bilgisayarın öğrenmesi
2. Deneğin öğrenmesi
3. Robotik kolu komuta etme





Sağ/Sol El Protokolü Live



%80-85 Başarı



%50-55 Başarı



DİNLEDİĞİNİZ İÇİN

TEŞEKKÜRLER

Proje Yürütücüsü

Yuriy MISHCHENKO

Proje Çalışanları:

Erkan ÖZBAY

Hilmi YANAR

Murat KAYA

Destekleyen Kuruluş:

TUBITAK ARGEB 1001 (113E611)

«Daha Verimli Non-İnvasiv Beyin
Bilgisayar Ara-Yüzlerinin Geliştirilmesi»

