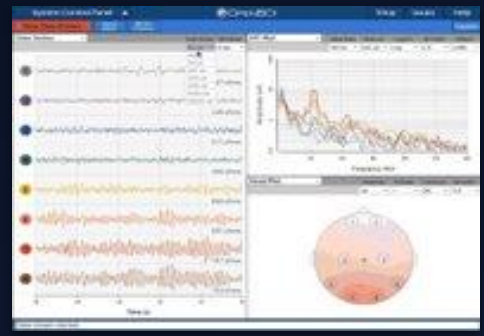
Project Interdependency

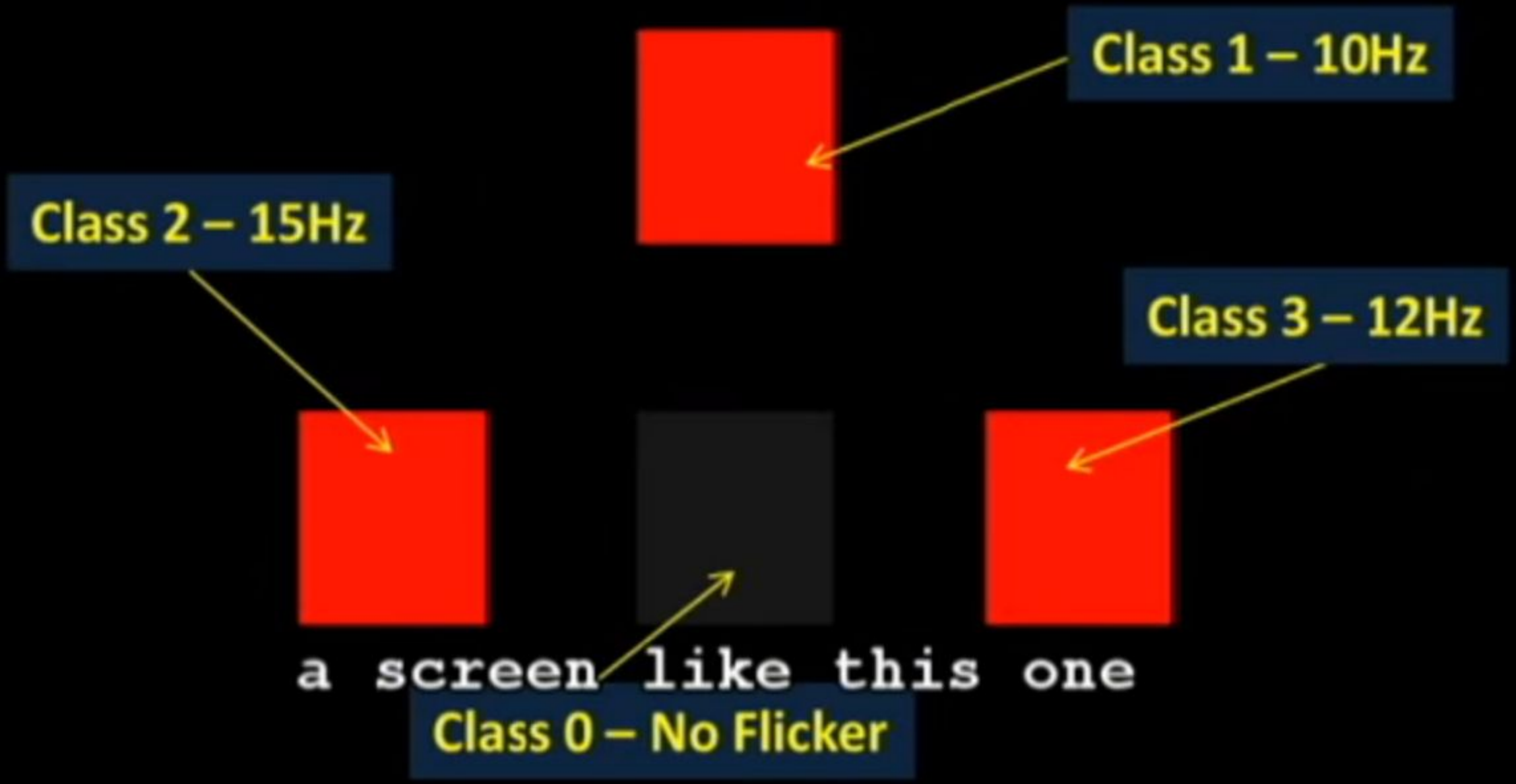
BCI ROBOT ARM CONTROL & RC CAR

LESLIE AFEDO
ALI BALOCH
MOHAMMED BENHAMMOU
MARTEN FIDLER
MATTHEW SELIN

Brain-Computer Interface Summary

- Interface to receive and process brainwave features from a subject.
- Once processed the signals are classified into a desired action.
- Classification is translated into operation instructions for the control output.
- The goal for this project is to achieve a system that can exhibit a degree of control through the use of brain waves. It is desired to have a system that can be adapted to a variety of outputs with a main focus on motorizing prosthetic control.




Class 1 – 10Hz
Class 2 – 15Hz
Class 3 – 12Hz
a screen like this one
Class 0 – No Flicker

RC Car Summary

Create alternative controls and assisted driving systems that allows users, who are unable to use conventional controls, to fully operate a vehicle.

- Gesture Based Control
- Voice Based Control
- Wireless Communication
- Obstacle Avoidance
- Speed Regulation
- Preset Maneuvers

Potential Links

- Using accelerometer to filter out EMG artifacts
- Interfacing robot arm with gesture or voice control
- Interfacing RC car with brain-computer interface

Interfacing RC car with BCI

- Provide user with visual control system
- Acquire bio-signal from user
- Process signals (perform fft to extract frequency components)
- Determine user’s intent based on frequency measure detected
- Send intent to microcontroller
- Relay command over an RF channel to the car
- Determine if the car can execute the command

Specifications

SIGNAL ACQUISITION

- 4-channel input
- Maximum of 16 user intents
- ASCII or text format
- Visual feedback

COMMUNICATION

- From processing unit to user microcontroller using USART
- 9600 baud rate
- user microcontroller to car micro (wireless RF channel)

Protocol

- 4-bit encoder for commands to car micro
- Max of 16 movements

Linkage Practicality

- The visual control system can be developed to give a user full control of the rc car.
- The visual control system needs to be developed so that the user can control the car and watch the car as it drives.

QUESTIONS