



*Group 8*



# OUTLINE

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- ❖ Motivation
- ❖ What we are going to do
- ❖ Required techniques
- ❖ Progress



# MOTIVATION

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# 實作 咒語

以 *mindwave* 代替魔杖






# *Expelliarmus*

## 去去，武器走

繳械咒

使中咒者手中的物品飛離掌握





# *Wingardium Levios*

## 溫咖癲啦唯啊薩

飄浮咒

使物體在半空飄浮或是緩緩飛過





# *Expecto Patronum*

## 疾疾，護法現身

護法咒

召喚出一隻銀色的閃亮護法





獨一無二, 因人而異 ⇨ 腦波辨識



# MINDWAVE MODULE

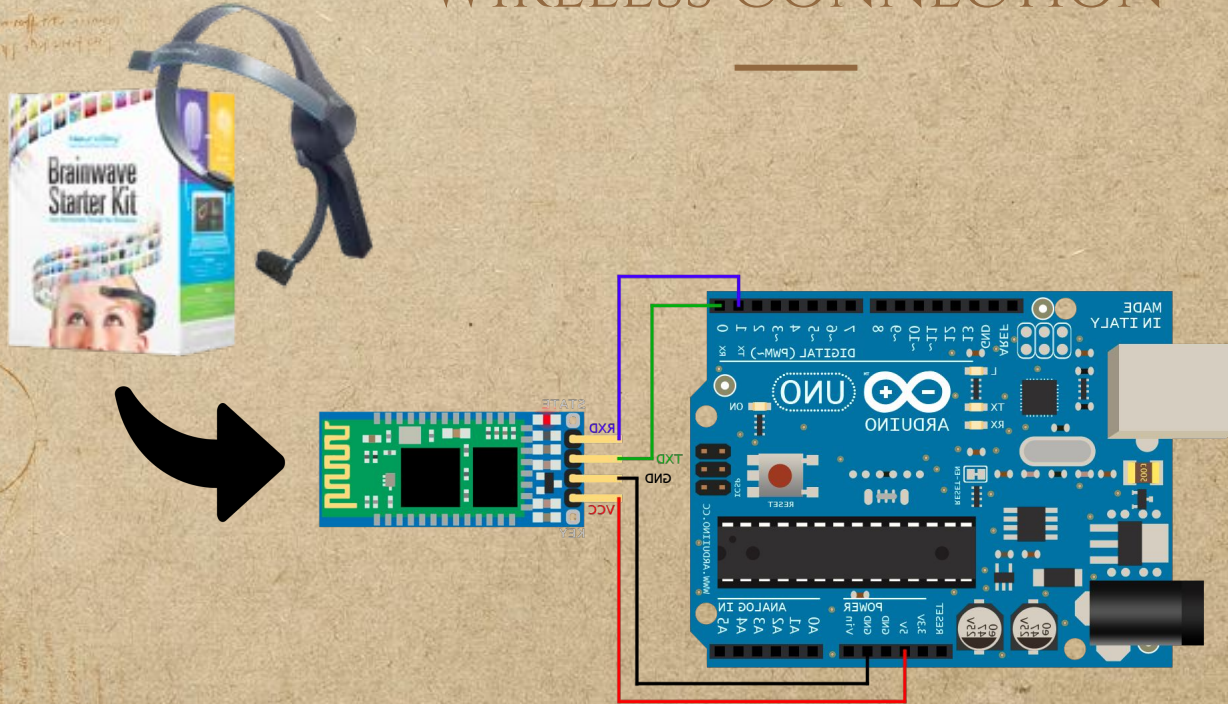
## 腦電演算法 (eSense)

目的在於量測  
及調適大腦功  
能，演算法運  
算後，可以解  
譯出並反映人  
們心理狀態變  
化。





# WIRELESS CONNECTION





# HOLOGRAM

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# 腦波辨識

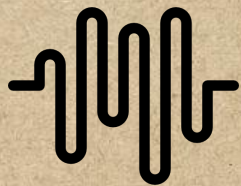
## EEG RECOGNITION



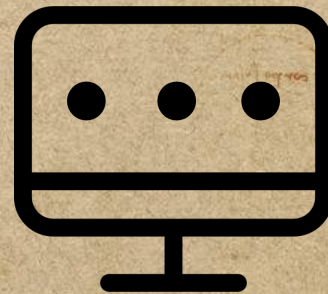
## 腦波分類

<b><math>\alpha</math> 波 (8-14 Hz)</b>	<b><math>\beta</math> 波 (12-28 Hz)</b>
放鬆、平靜、閉眼但清醒時 想像力來源	思考、處理接收到外界訊息 智力來源
<b><math>\theta</math> 波 (4-8 Hz)</b>	<b><math>\delta</math> 波 (0.1-3 Hz)</b>
受到壓力時, 失望或挫折 創造力、靈感來源	深度睡眠且沒有做夢時 直覺、第六感











# PAPER SURVEY

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## Data Features

- ❖ Noise & Outlier
- ❖ High dimension
- ❖ Time information
- ❖ Non-stationarity
- ❖ Small training set

## Classifiers

- ❖ LDA
- ❖ SVM
- ❖ NN
- ❖ HMM
- ❖ kNN

## Needs

- ❖ Real-time
- ❖ Two classes
- ❖ Stable
- ❖ Single Tester
- ❖ Multiple Testers
- ❖ One-shot



# PROGRESS

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設定 Mindwave  
搜集資料

串接各步驟  
Demo!

訓練分類模型  
架設全息投影



## REFERENCE

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- ❖ Lotte, Fabien, et al. "A review of classification algorithms for EEG-based brain-computer interfaces." *Journal of neural engineering* 4.2 (2007): R1.
- ❖ Bashivan, Pouya, et al. "Learning representations from EEG with deep recurrent-convolutional neural networks." *arXiv preprint arXiv:1511.06448* (2015).



THANKS!

*Any questions?*

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