



Team 51



## Shortcomings

- Further **Pre-processing** is required to achieve better accuracy
- **Hardware** is required for real time inputs



### Future Scope

- Increase economy of processing
- Scale to more functions for the media player
- Embed the user profiles in other software



### Results Achieved

- Preserving accuracy of 34% was achieved
- Created a *swish* player that can be operated using inputs from GDL using off-line datasets and string inputs
- Derived a regular expression to validate all combinations of strings



### Results targeted

- *Active processing* means avoid *its work* for the SOC
- Create a *media player* that can be *operated using inputs* from SOC in real time
- Creating an appropriate *regular expression* to *validate all combinations of inputs*



### Proposed Approach

The same situation exists with *multisyllabic* and *multisyllabically*. Although, strictly speaking, someone says that an individual multisyllabically says a word, the word multisyllabically is not a word in English. These things are then subject to errors to be avoided (30).

The word *disyllabic* refers to multisyllabic words. In English (and I'll generalize to each language), the use of *disyllabic* and *multisyllabic* for large numbers of syllables parallels, in many respects, such as the multisyllabic discussion.



## Problem Statement

Our project aims to enable **severely impaired patients** interact with computers via BCL. We are using a **media player** as a sample **Proof of concept**. The idea can be extended further to other software.



## BCI-Operated Media Player

**Types of content**  
 Branches of content (CDS/CDMS)  
 Database? (CDS/CDMS)  
 Access to CDS/CDMS  
 Access to CDS/CDMS

**Access to content**  
 Access to CDS/CDMS

**Guide**  
 Access to CDS/CDMS



# BCI operated Media Player

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## Shortcomings

- Further **Pre-processing** is required to achieve better accuracy
- **Hardware** is required for real time inputs



## Future Scope

- Increase accuracy of processing
- Develop more functions for the media player
- Extend the user privileges to other systems



## Results Achieved

- Processing accuracy of 90% was achieved
- Created a media player interface operated using mind's 8-mi BCI setup
- Offered clear and concise output
- Created a regular response to multiple all combinations of outputs



## Results targeted

- To have processing accuracy of 95% or more for the BCI
- Create a media player that can be operated using mind's BCI to real time
- Develop more precise output response to various combinations of inputs



## Proposed Approach

The user will be able to control the media player using their mind's BCI setup. The user will be able to control the media player using their mind's BCI setup. The user will be able to control the media player using their mind's BCI setup.



## Problem Statement

Our project aims to enable severely impaired patients interact with computers via BCI. We are using a **media player** as a sample **Proof of concept**. The idea can be extended further to other software.



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# BCI-Operated Media Player

## Team members

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## Acknowledgement

*Dr. Snehanshu Saha*

## Guide

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# Problem Statement

*Our project aims to enable **severely impaired patients** interact with computers via BCI. We are using a **media player** as a sample **Proof of concept**. The idea can be extended further to other software.*

# Proposed Approach

*The main idea is to establish a **combination of binary digits**, wherein left hand movement maps to a '0' and right hand movement maps to a '1', thereby creating a language. These strings are then mapped to inputs to the computer system.*

*The current approaches scale to multiple dimensions by using different BCI paradigms for each dimension. This can be tedious and ineffective for large dimensions. Our approach provides an **easy way to scale up to multiple dimensions**.*

## Results targeted

- *Achieve processing accuracy around **80-90%** for the BCI*
- *Create a **media player** that can be operated using inputs from BCI in real time*
- *Creating an appropriate **regular expression** to validate all combinations of inputs*



# Results Achieved

- Processing accuracy of **74%** was achieved
- Created a **media player** that can be operated using inputs from BCI using **offline data sets and string inputs**
- Derived a **regular expression to validate all combinations of strings**

BCI media player



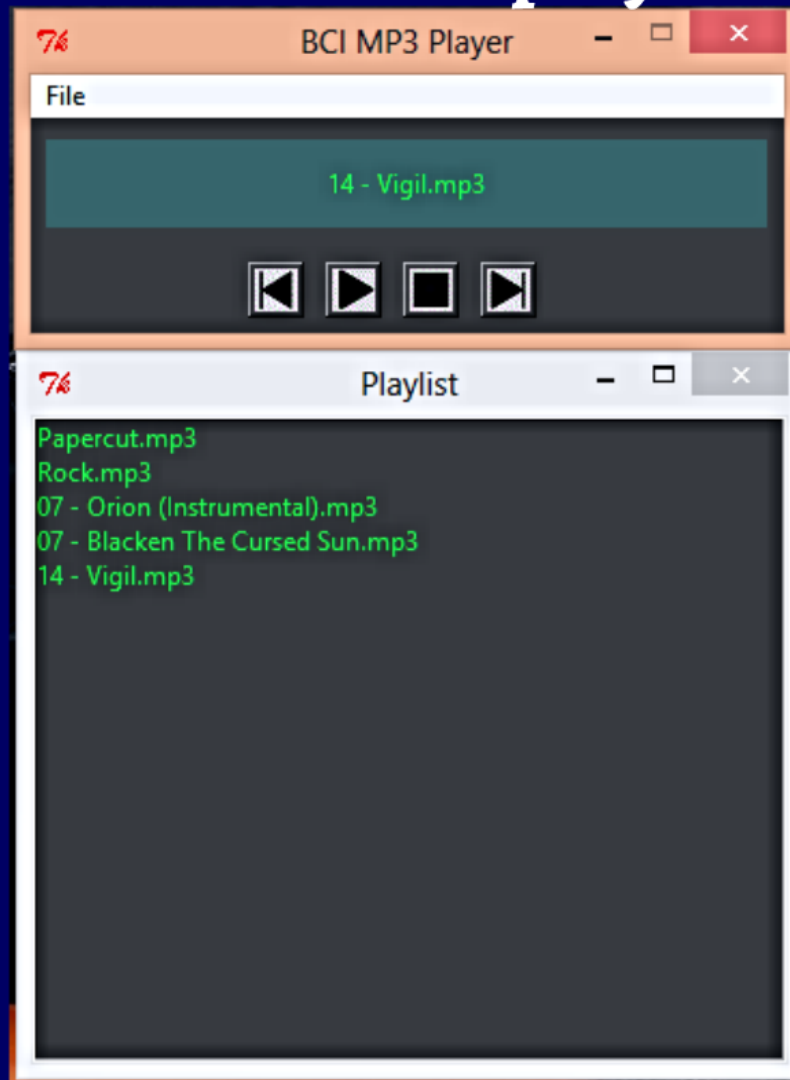
Result of processing module



Regular Expression:

```
A -> 01 play  
B -> 10 stop  
C -> 11 next  
D -> 00 previous  
S1 -> AB | AC | AD | A(epsilon)  
S2 -> BA | BC | BD | B(epsilon)  
S -> (S1 | S2 | C | D)*
```

# BCI media player





## Result of processing module

```
bhooms@bhooms-desktop: ~/BCI_code
bhooms@bhooms-desktop:~/BCI_code$ python bci_final.py
[0 0 0 0 1 1 0 1 1 0 1 0 0 1 1 0 1 1 1 1 1 1 0 1 0 0 0 0 1 1 1 1 1 1 0 0 0
0 1 0 0 1 1 1 1 1 0 0 1 1 1 0 0 0 1 1 1 0 0 1 1 1 0 1 1 0 1 1 0 0 1 0 1 0
0 1 0 1 1 0 0 0 1 1 1 0 0 1 0 0 1 0 0 0 0 1 0 0 0 1 0 1 0 1 0 1 0 0 1 1 0
0 0 0 0 1 1 1 1 1 0 1 0 1 0 1 1 0 1 0 0 0 1 0 1 1 0 0 1 0]
WARNING:wyrn.misc:apply_csp is deprecated since version 1.1. Please use apply_spatial_filter instead.
WARNING:wyrn.misc:apply_csp is deprecated since version 1.1. Please use apply_spatial_filter instead.
[ 0.  0.  1.  0.  1.  1.  0.  1.  1.  0.  1.  0.  0.  1.  0.  0.  1.  0.  0.  1.
  1.  1.  0.  1.  0.  1.  0.  0.  1.  1.  1.  1.  0.  1.  1.  1.  1.  0.
  0.  1.  1.  0.  0.  1.  1.  0.  0.  0.  0.  0.  0.  1.  0.  0.  0.  0.
  1.  0.  1.  0.  1.  1.  0.  0.  0.  0.  1.  0.  1.  1.  0.  1.  1.  0.
  1.  0.  0.  1.  1.  1.  1.  0.  1.  0.  1.  1.  1.  1.  1.  0.  1.  0.
  1.  0.  1.  0.  0.  1.  0.  0.  1.  1.  1.  0.  0.  1.  0.  1.  0.  1.
  1.  1.  0.  0.  0.  0.  1.  0.  0.  0.  1.  1.  1.  1.  0.  1.  0.  1.
  1.  0.  1.  0.  1.  1.  1.  0.  0.  0.  0.  0.  1.  1.]
LDA Accuracy 0.74
bhooms@bhooms-desktop:~/BCI_code$
```

## Regular Expression:

$A \rightarrow 01 \text{ play}$

$B \rightarrow 10 \text{ stop}$

$C \rightarrow 11 \text{ next}$

$D \rightarrow 00 \text{ previous}$

$S_1 \rightarrow AB \mid AC \mid AD \mid A(\text{epsilon})$

$S_2 \rightarrow BA \mid BC \mid BD \mid B(\text{epsilon})$

$S \rightarrow (S_1 \mid S_2 \mid C \mid D)^*$

## Shortcomings

- *Further **Pre-processing** is required to achieve better accuracy*
- ***Hardware** is required for real time inputs*

# Future Scope

- Increase *accuracy of processing*
- **Scale** to more functions for the media player
- Extend the same paradigm to **other software**

**THANK YOU!**



# BCI operated Media Player

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- Further **Pre-processing** is required to achieve better accuracy
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## Future Scope

- Increase accuracy of processing
- Develop more functions for the media player
- Extend the user privileges to other systems



## Results Achieved

- Processing accuracy of 90% was achieved
- Created a media player interface operated using mind's 8-mi BCI setup
- Offered clear and concise output
- Created a regular response to multiple all combinations of outputs



## Results targeted

- To have processing accuracy of 95% or more for the BCI
- Create a media player that can be operated using mind's BCI to real time
- Develop more precise and regular responses to various combinations of inputs



## Proposed Approach

The user will be able to control the media player using their mind's BCI setup. The user will be able to control the media player using their mind's BCI setup. The user will be able to control the media player using their mind's BCI setup.



## Problem Statement

Our project aims to enable severely impaired patients interact with computers via BCI. We are using a **media player** as a sample **Proof of concept**. The idea can be extended further to other software.



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2023-2024