



EMOTIVITY

Presentation by Poonnawich Siriwongse Na Ayudhaya (G27)



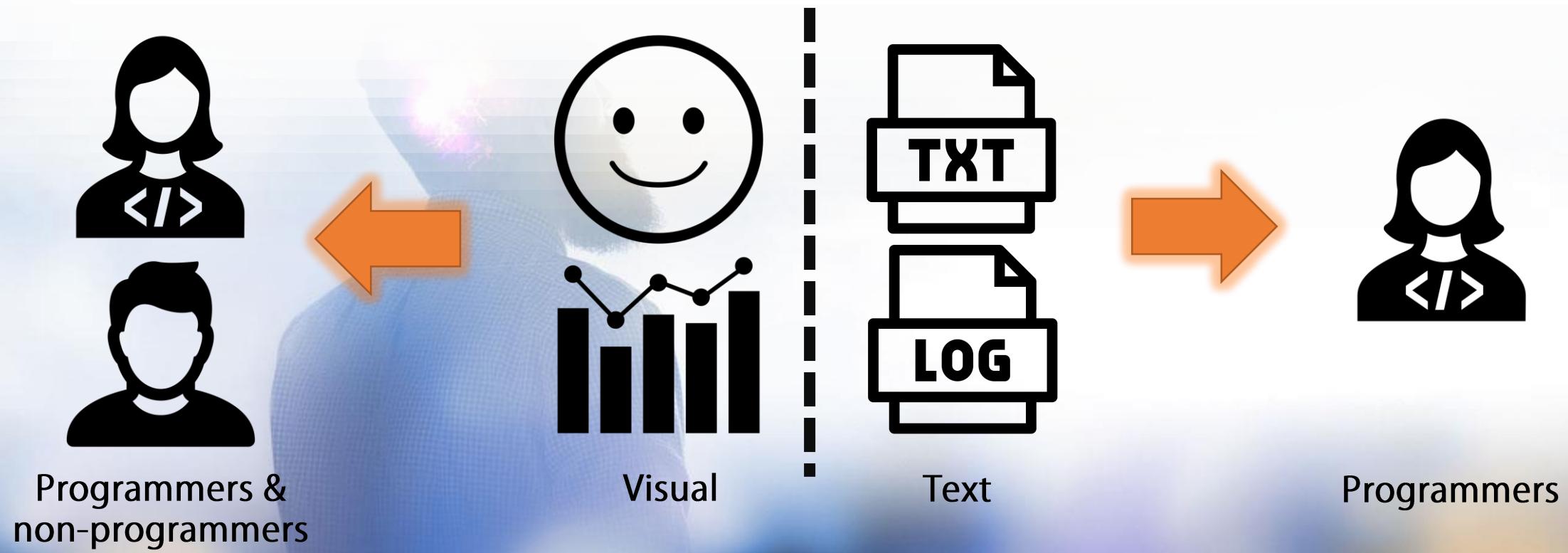
Asst. Prof. Dr. Cholwich Nattee

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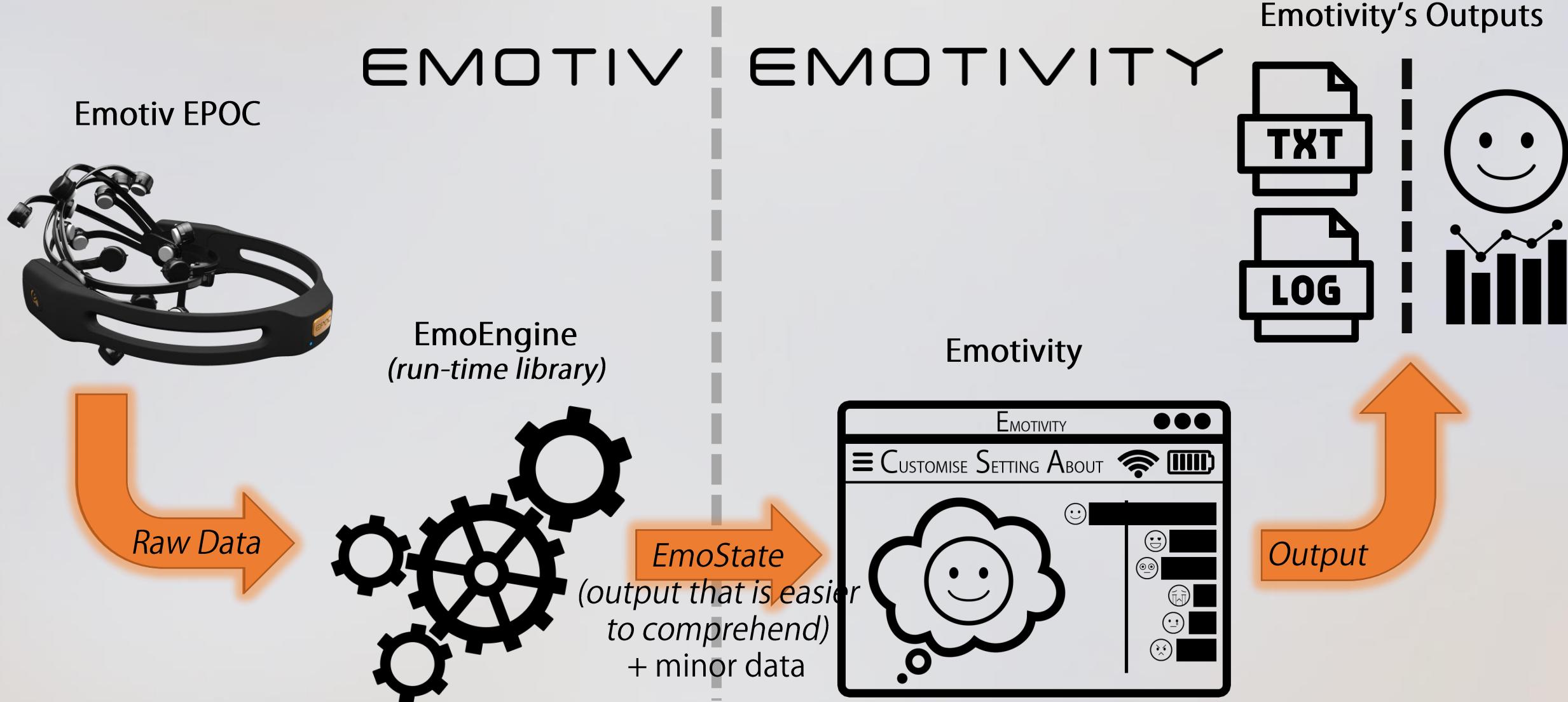
- What is it?
- What features it has?
 - With some short demo videos.
- How does it work?
- What issues did I come across?

What Is it?

- A program which uses your facial expressions to output your current emotion.



The Overall Picture



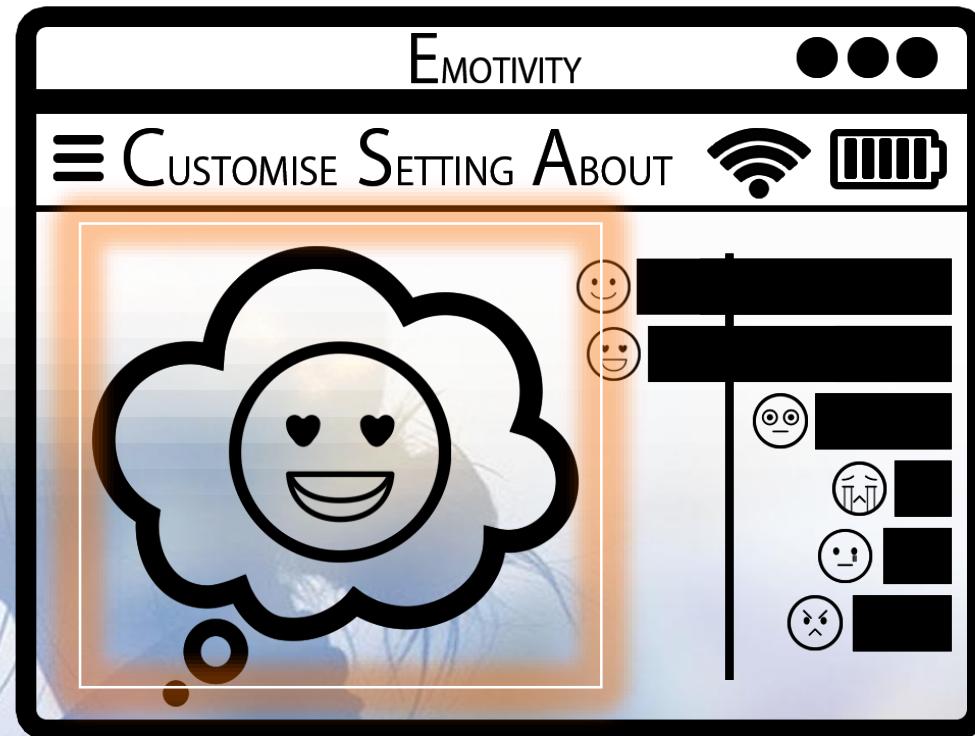
Features



- Output visualisation
- Classification visualisation
- Modifiers customisation
- Program settings
- Headset status display
- Output and logs
- Graphical user interface
- User data management

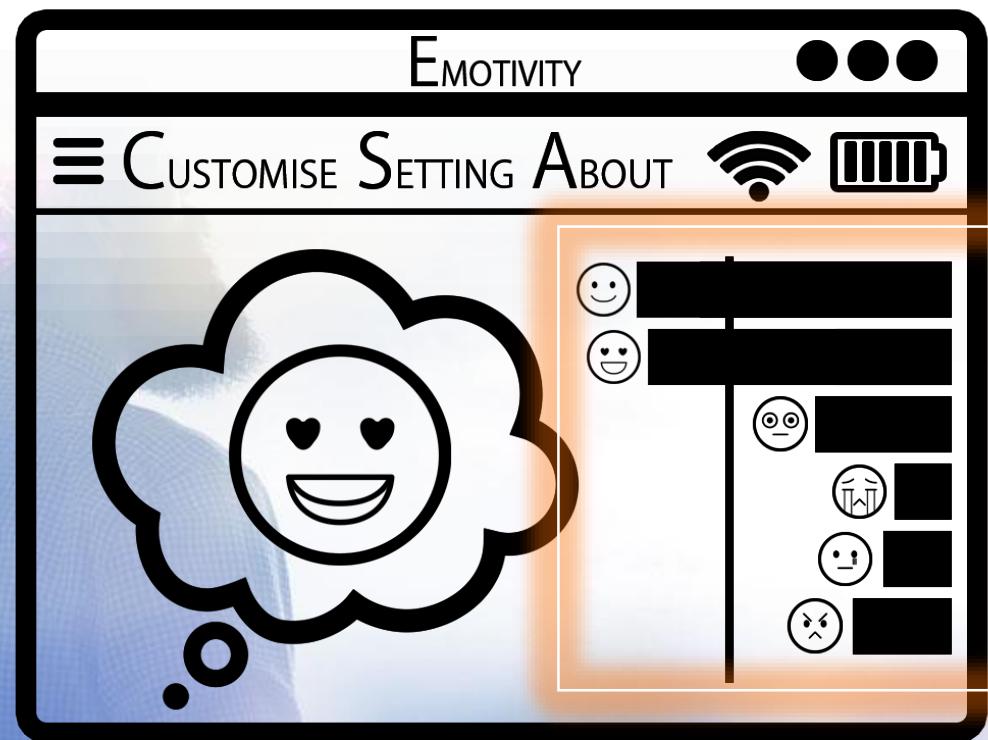
Output Visualisation

- Shows the users the output emotion as a corresponding picture.



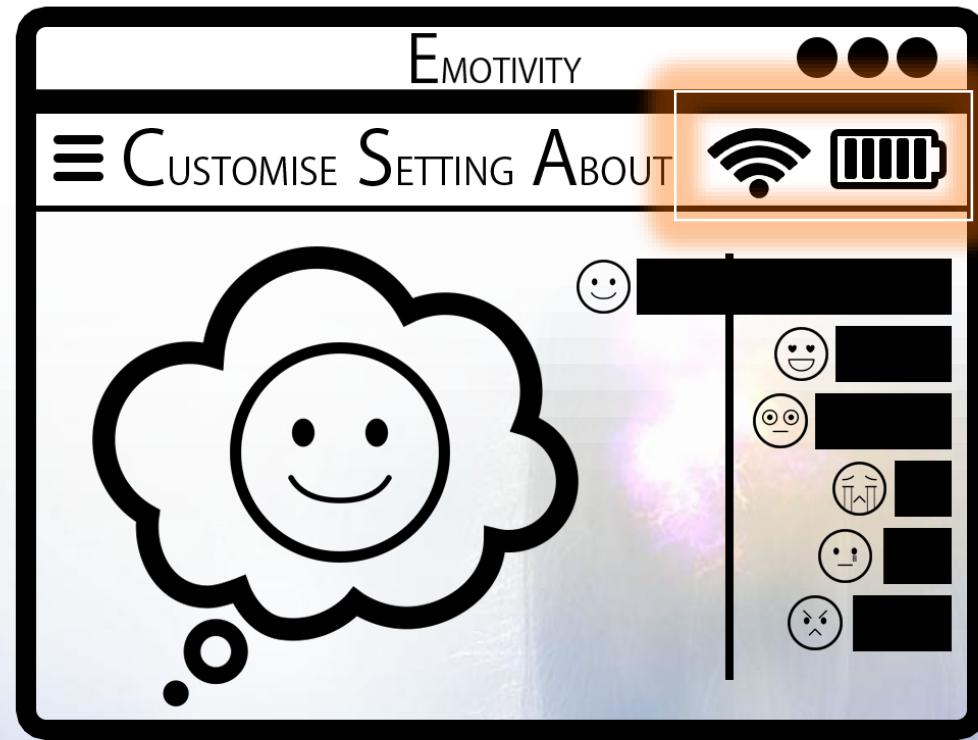
Classification Visualisation

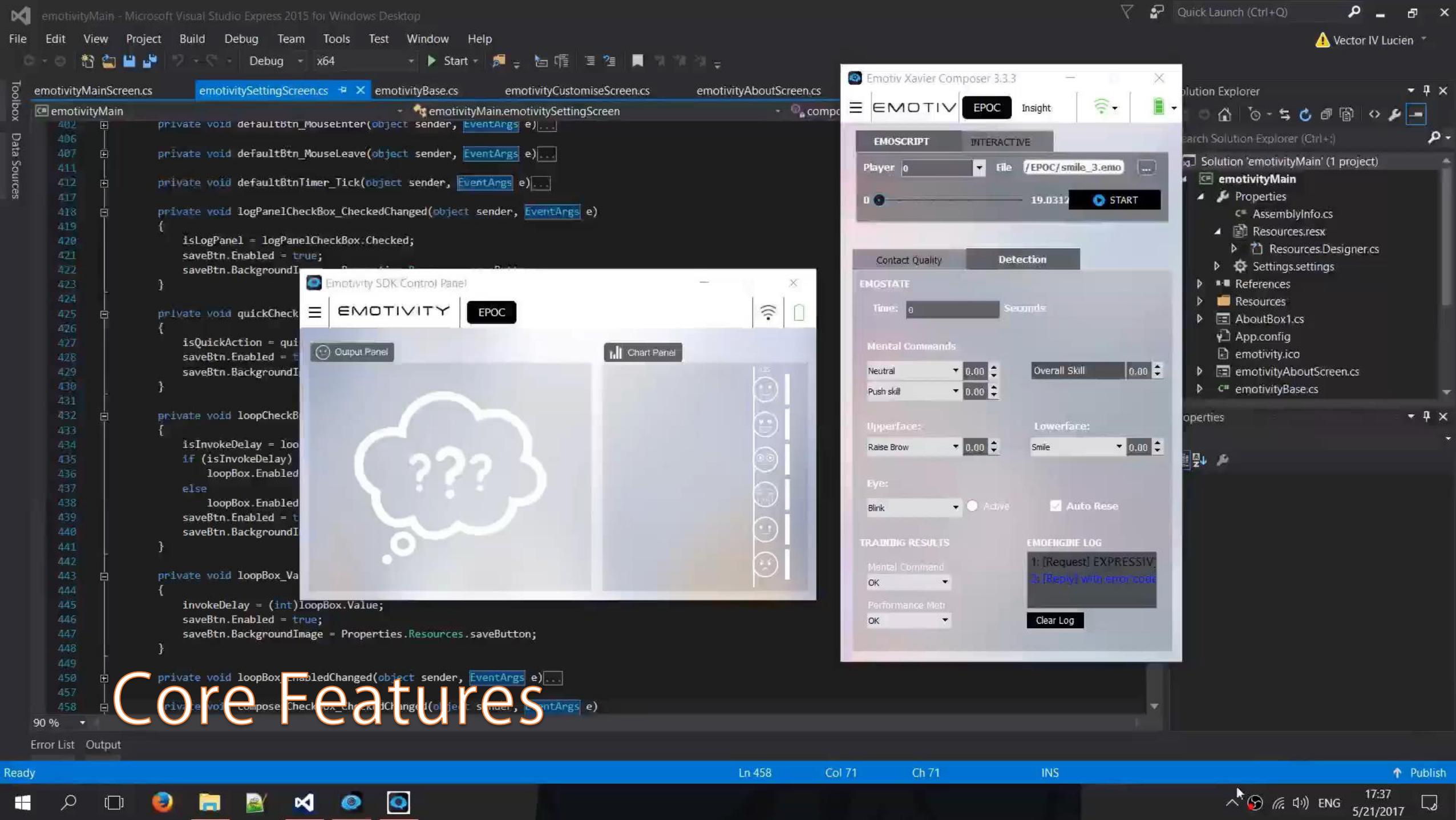
- Shows the users statistical emotion class values as bar charts.

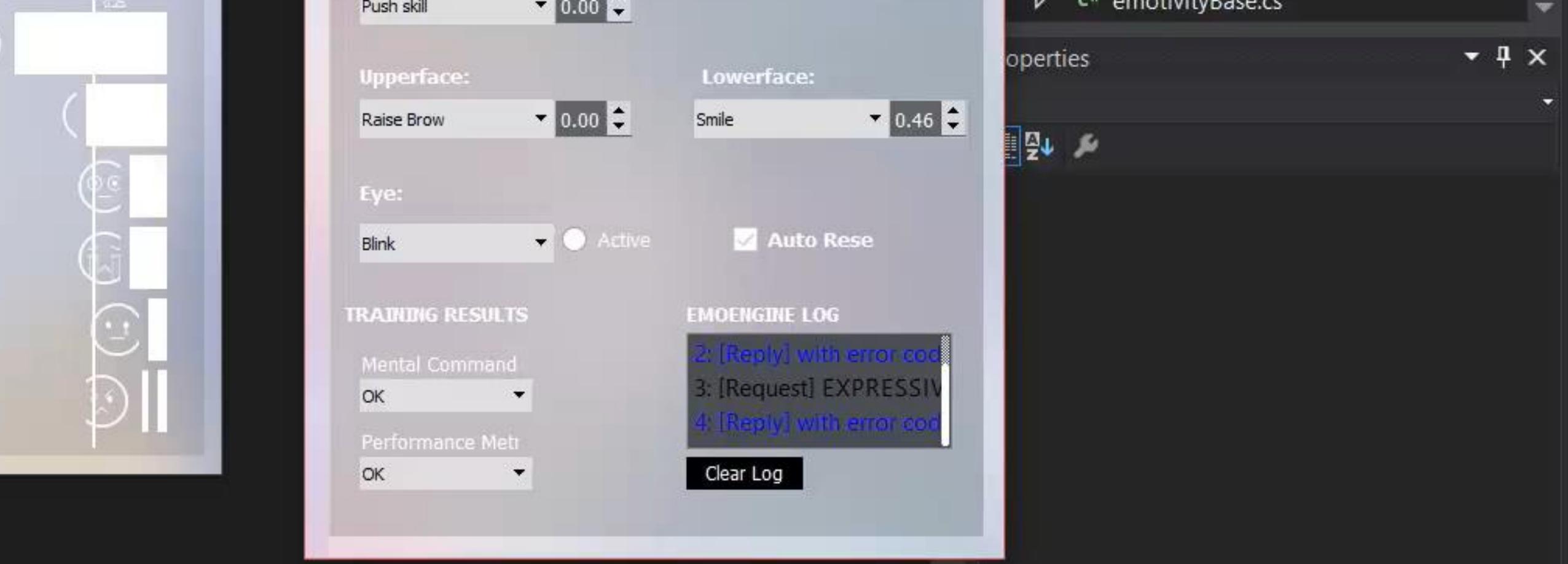


Headset Status Display

- Shows the users the headset's signal strength and battery life.







Tray Output Visualisation

Ln 458

Col 71

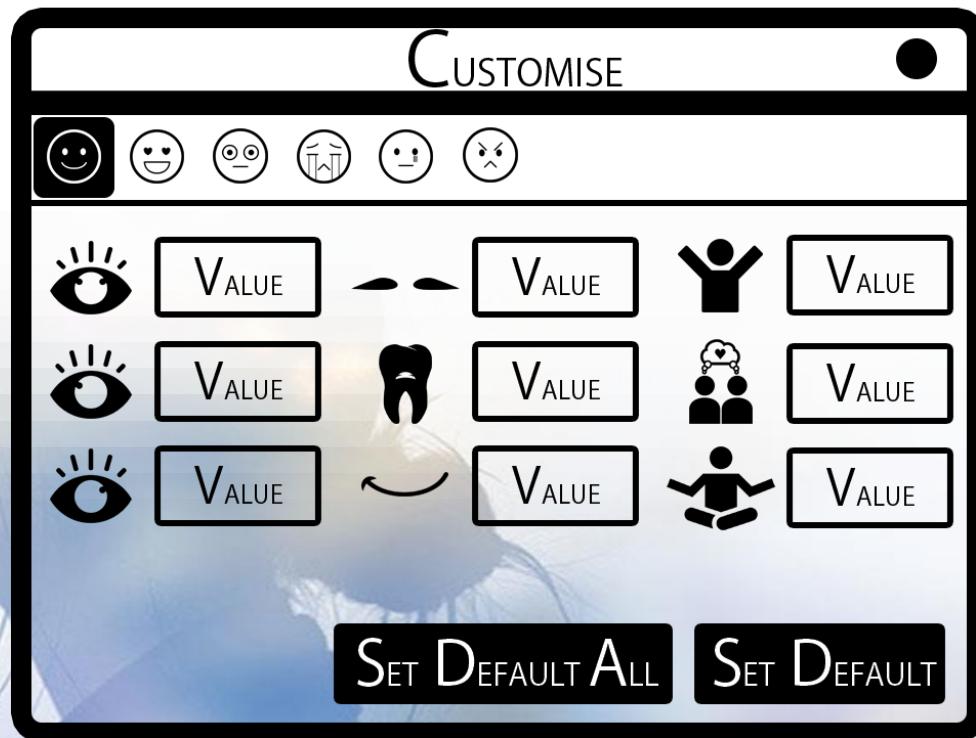
Ch 71

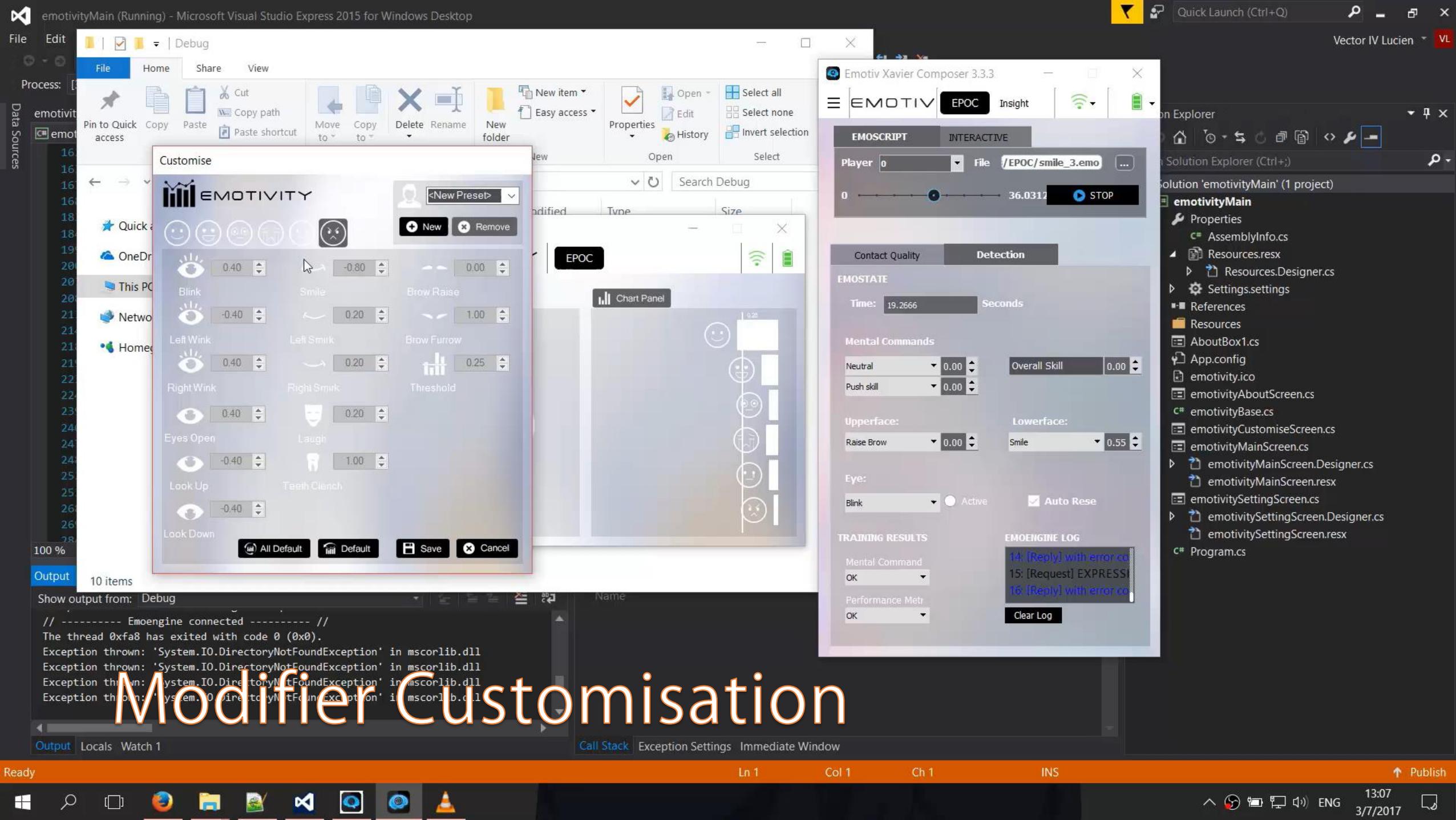
INS

↑ Publish

Modifiers Customisation

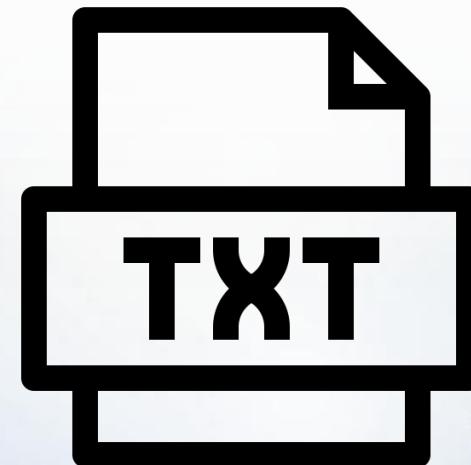
- Allows users to change how each emotion class is determined.

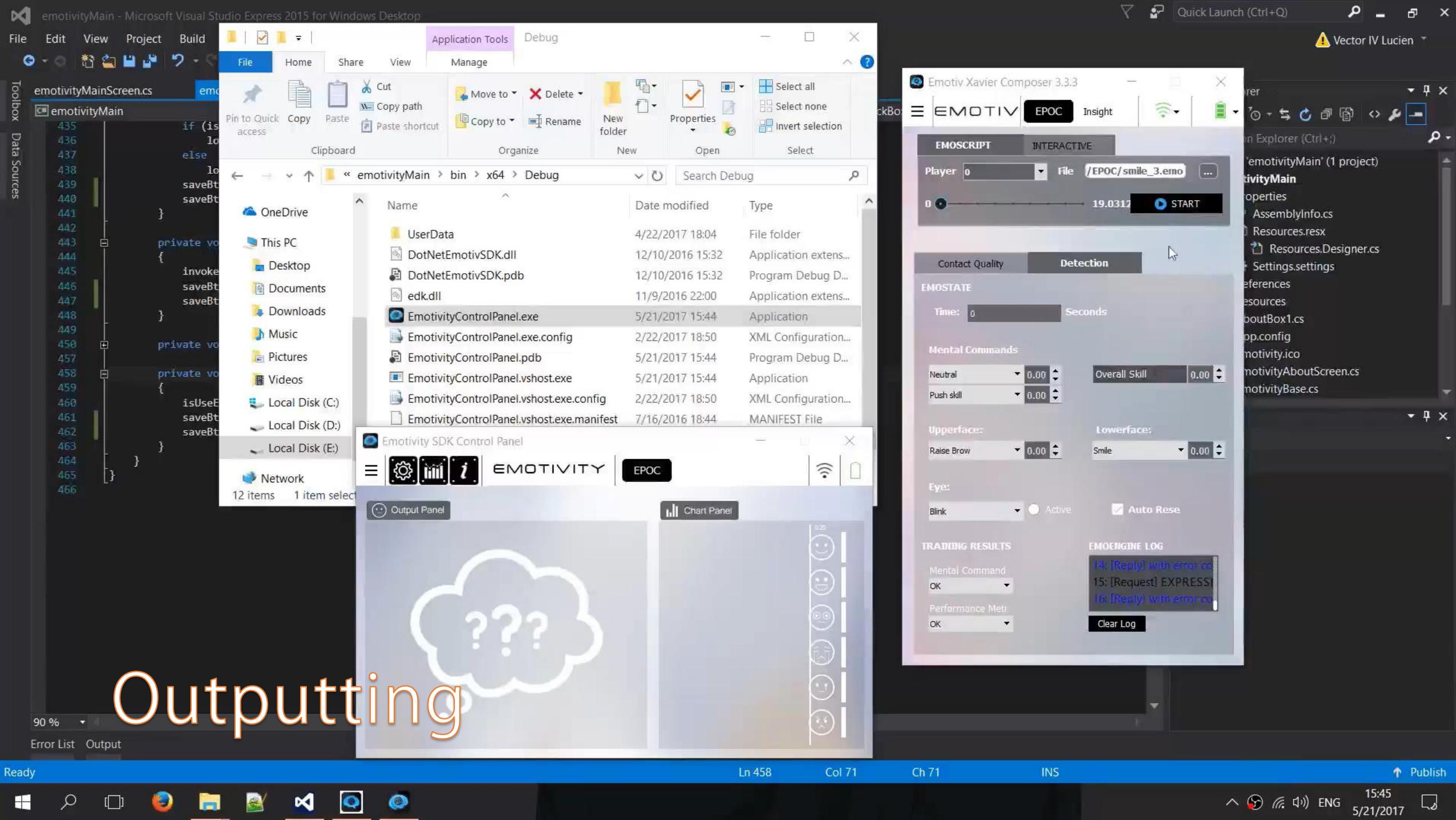


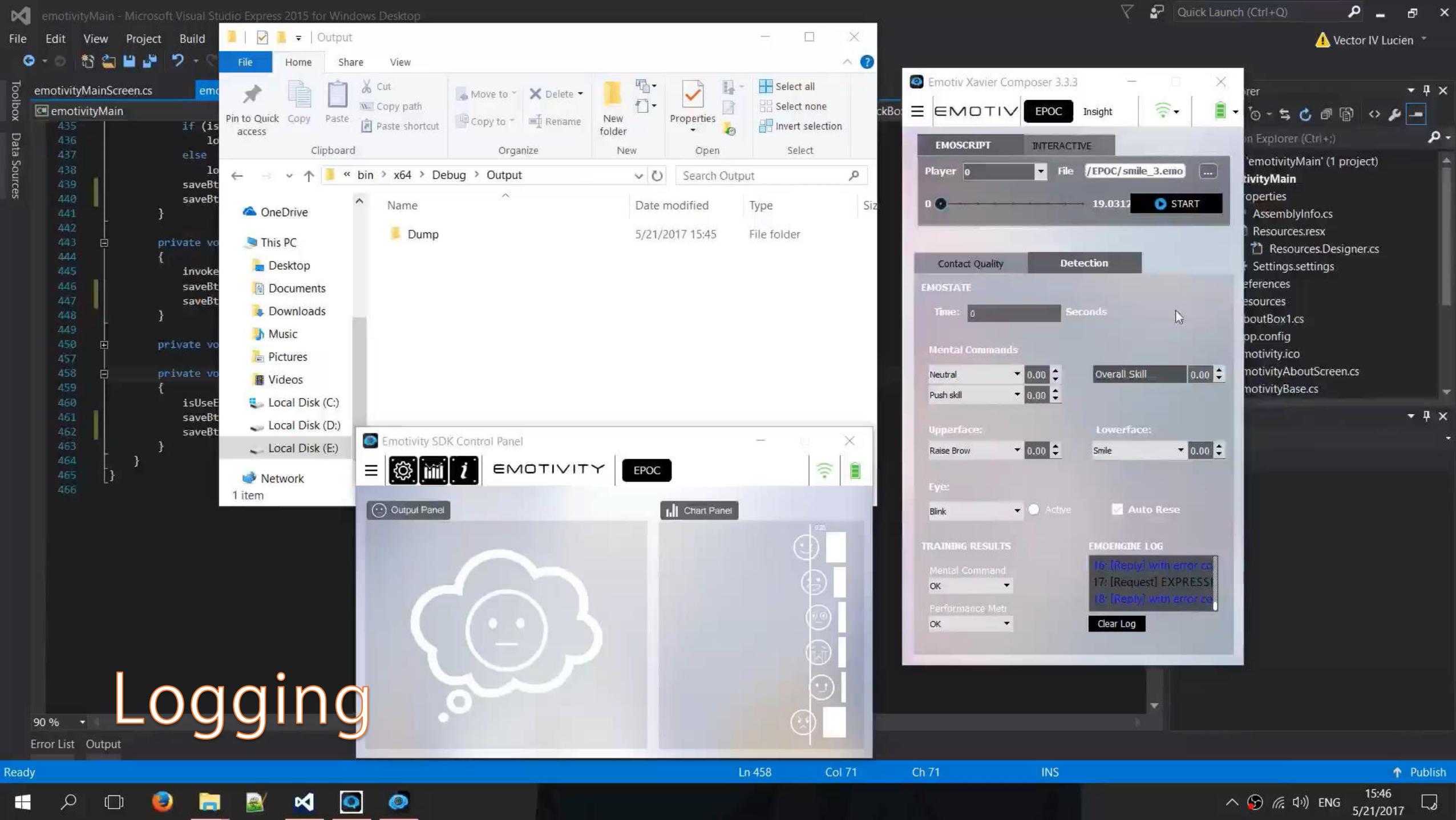


Output & Logs

- Allows users to retrieve the output and emotion class values as text and logs.

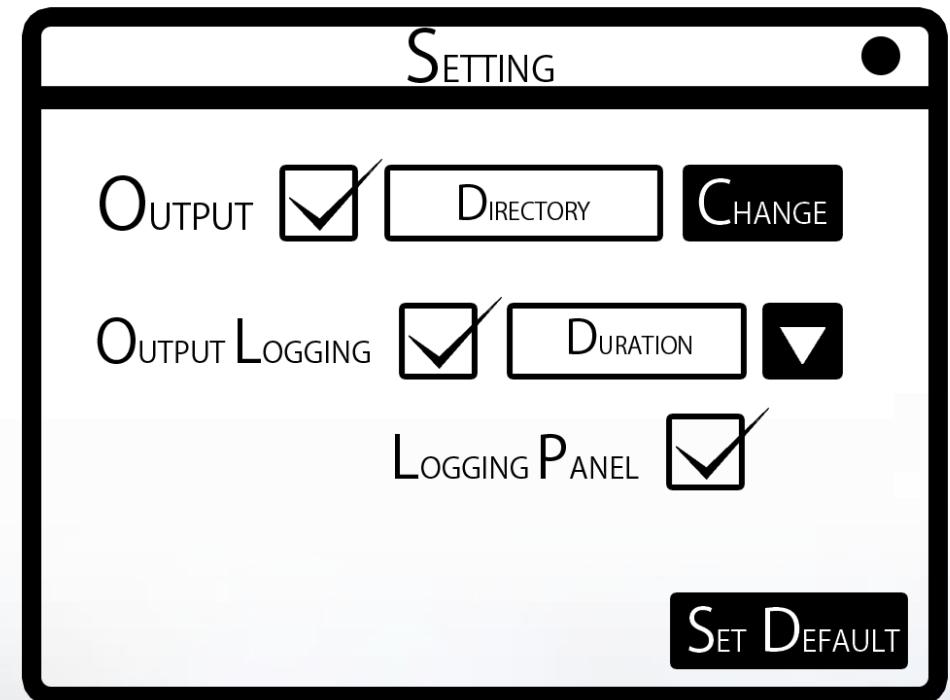






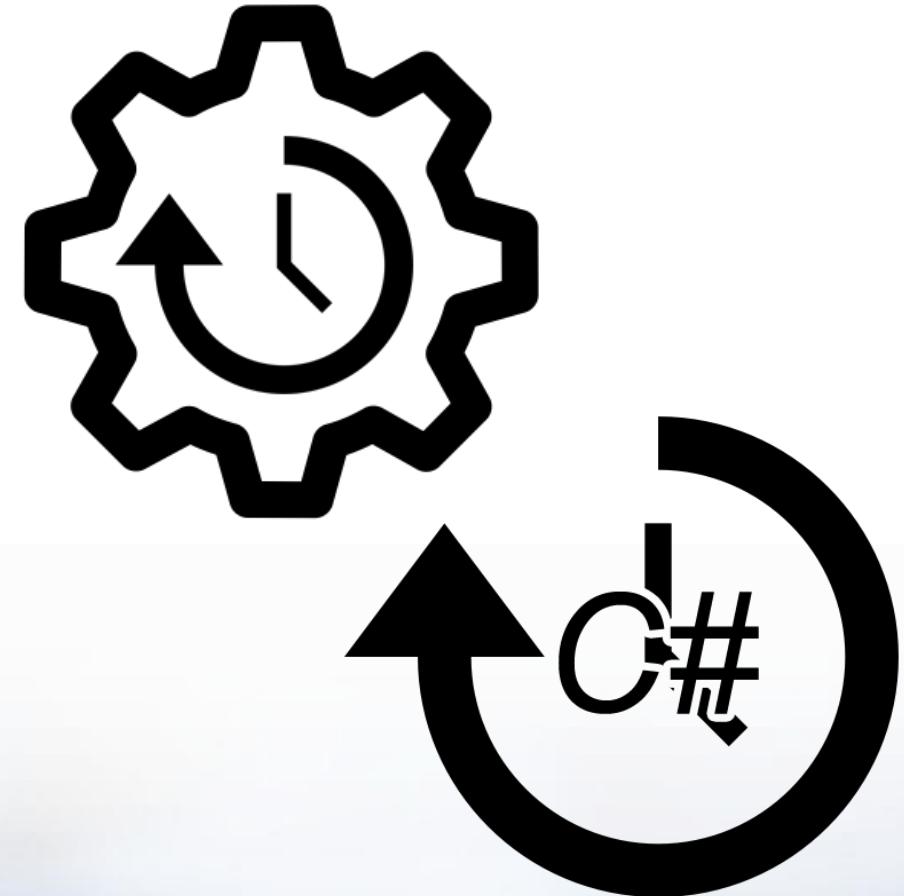
Program Settings

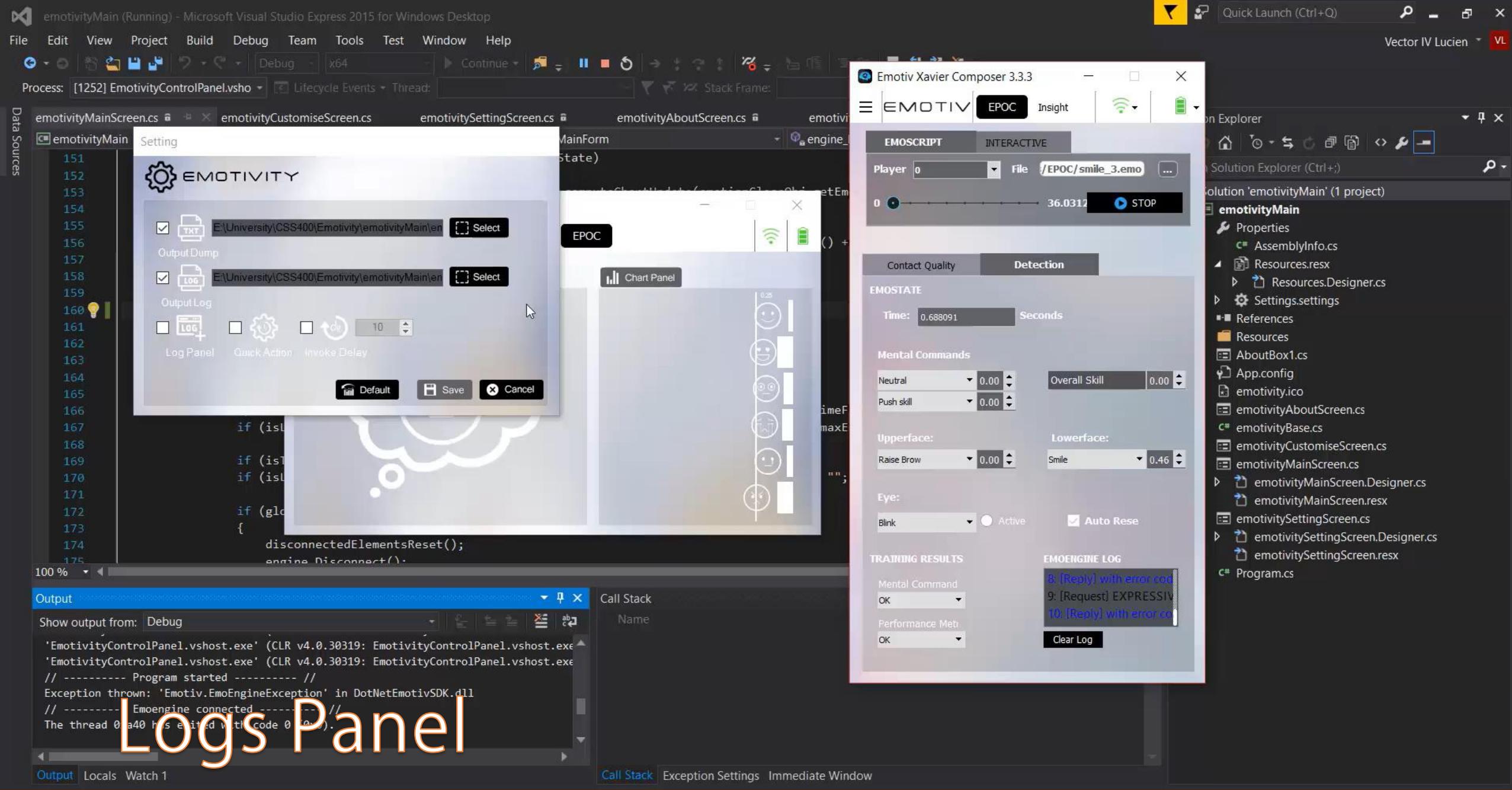
- Allows users to change certain behaviours of the program.
- These behaviours are as followed:
 - Text output
 - Logs output
 - Logs panel
 - Composer mode
 - Quick action
 - Invoke delay

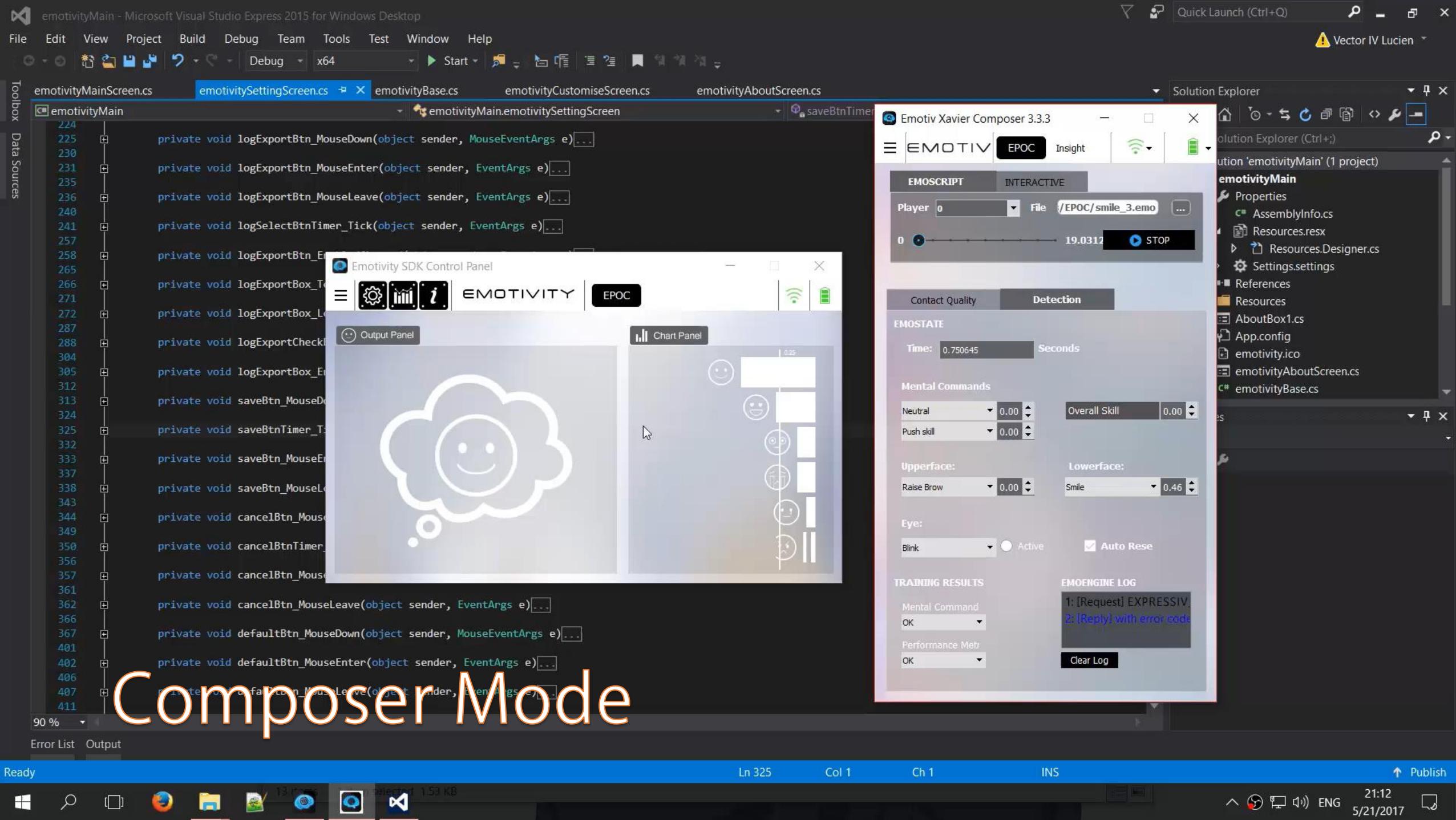


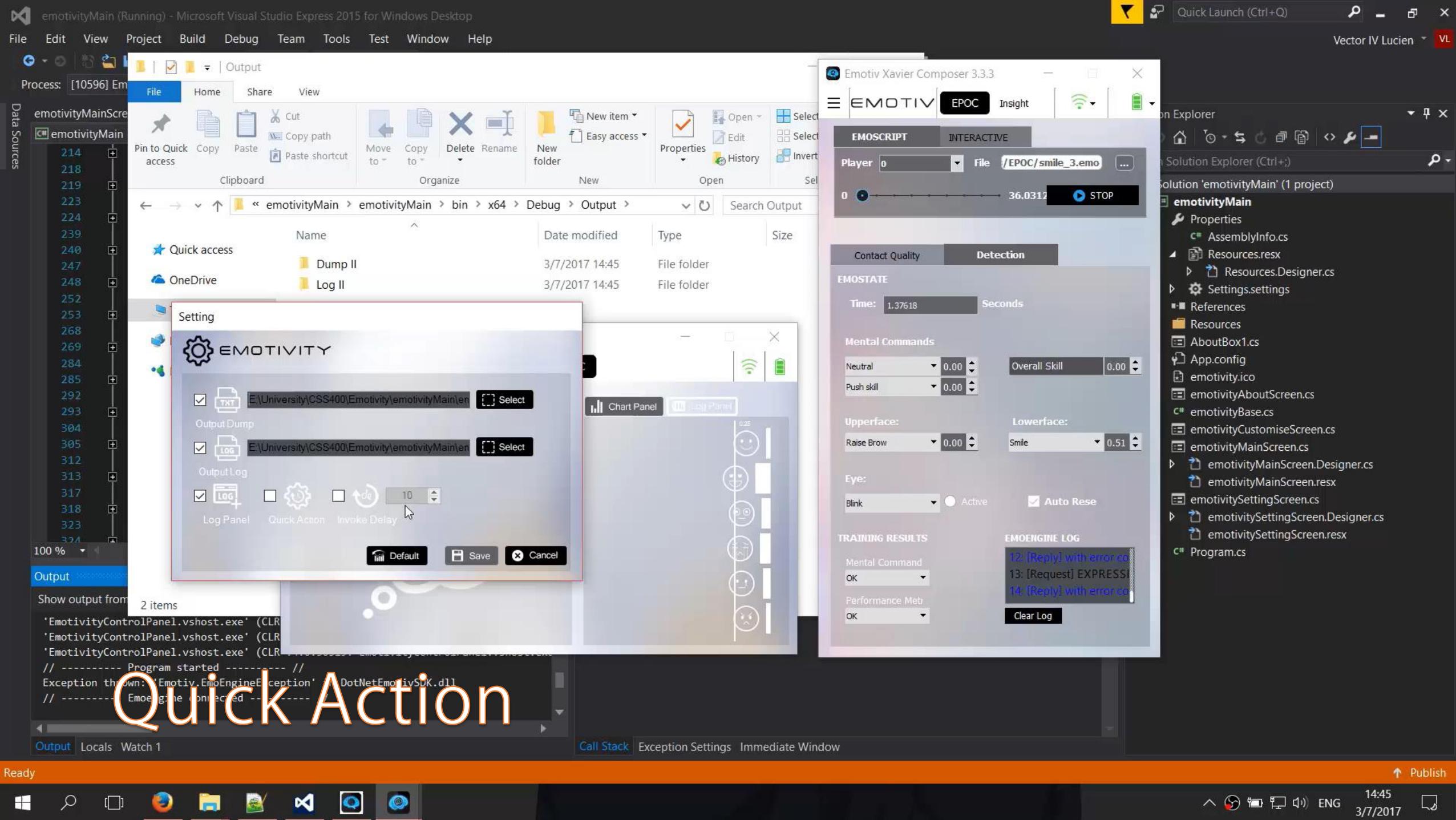
Program Settings

- Quick action – allows for toggling of text output and logs from the main screen.
- Invoke Delay – allows change in computation loop time.









emotivityMain (Running) - Microsoft Visual Studio Express 2015 for Windows Desktop

File Edit View Project Build Debug Team Tools Test Window Help

Process: [10596] EmotivityMain

Data Sources

emotivityMainScreen.cs

emotivityMain.cs

```

214
218
219
223
224
239
240
247
248
252
253
268
269
284
285
292
293
304
305
312
313
317
318
323
324

```

Output

Show output from 1 item 1 item selected 1

```

'EmotivityControlPanel.vhost.exe' (CLR
'EmotivityControlPanel.vhost.exe' (CLR
'EmotivityControlPanel.vhost.exe' (CLR
// ----- Program started -----
Exception thrown: 'Emotiv.EmoEngineException' in DotNetEmotivSDK.dll
// ----- Open in context -----

```

Invoke Delay

Log II

File Home Share View

Pin to Quick access Copy Paste Cut Copy path Copy to Move to Delete Rename New folder New item Open Properties Invert Selected New Open History

Clipboard Organize New Open Properties Invert Selected New Open History

« emotivityMain > bin > x64 > Debug > Output > Log II

Name Date modified Type Size

log-7-Mar-2017-14-45.log 3/7/2017 14:46 Text Document 12

Search Log II

Quick access OneDrive This Network Home

Setting

EMOTIVITY

TXT E:\University\CSS400\Emotivity\emotivityMain\en [Select]

LOG E:\University\CSS400\Emotivity\emotivityMain\en [Select]

LOG + 10

Output Dump Output Log Log Panel Quick Action Invoke Delay Default Save Cancel

Chart Panel

0.562984 Seconds

Contact Quality Detection

EMOSTATE

Mental Commands

Neutral	0.00	Overall Skill	0.00
Push skill	0.00		

Upperface: Lowerface:

Raise Brow	0.00	Smile	0.19
------------	------	-------	------

Eye:

Blink	Active	Auto Rese
-------	--------	-----------

TRAINING RESULTS

EMOENGINE LOG

- 12: [Reply] with error code
- 13: [Request] EXPRESS
- 14: [Reply] with error code

Clear Log

Call Stack Exception Settings Immediate Window

Ready

Quick Launch (Ctrl+Q)

Vector IV Lucien VL

Emotiv Xavier Composer 3.3.3

EMOTIV EPOC Insight

EMOSRIPT INTERACTIVE

Player 0 File /EPOC/smile_3.emx ...

0 36.0312 STOP

EMOSTATE

Time: 0.562984 Seconds

Mental Commands

Neutral	0.00	Overall Skill	0.00
Push skill	0.00		

Upperface: Lowerface:

Raise Brow	0.00	Smile	0.19
------------	------	-------	------

Eye:

Blink	Active	Auto Rese
-------	--------	-----------

TRAINING RESULTS

EMOENGINE LOG

- 12: [Reply] with error code
- 13: [Request] EXPRESS
- 14: [Reply] with error code

Clear Log

Solution Explorer

Solution 'emotivityMain' (1 project)

emotivityMain

- Properties
- AssemblyInfo.cs
- Resources.resx
- Resources.Designer.cs
- Settings.settings
- References
- Resources
- AboutBox1.cs
- App.config
- emotivity.ico
- emotivityAboutScreen.cs
- emotivityBase.cs
- emotivityCustomiseScreen.cs
- emotivityMainScreen.cs
- emotivityMainScreen.Designer.cs
- emotivityMainScreen.resx
- emotivitySettingScreen.cs
- emotivitySettingScreen.Designer.cs
- emotivitySettingScreen.resx
- Program.cs

File Explorer

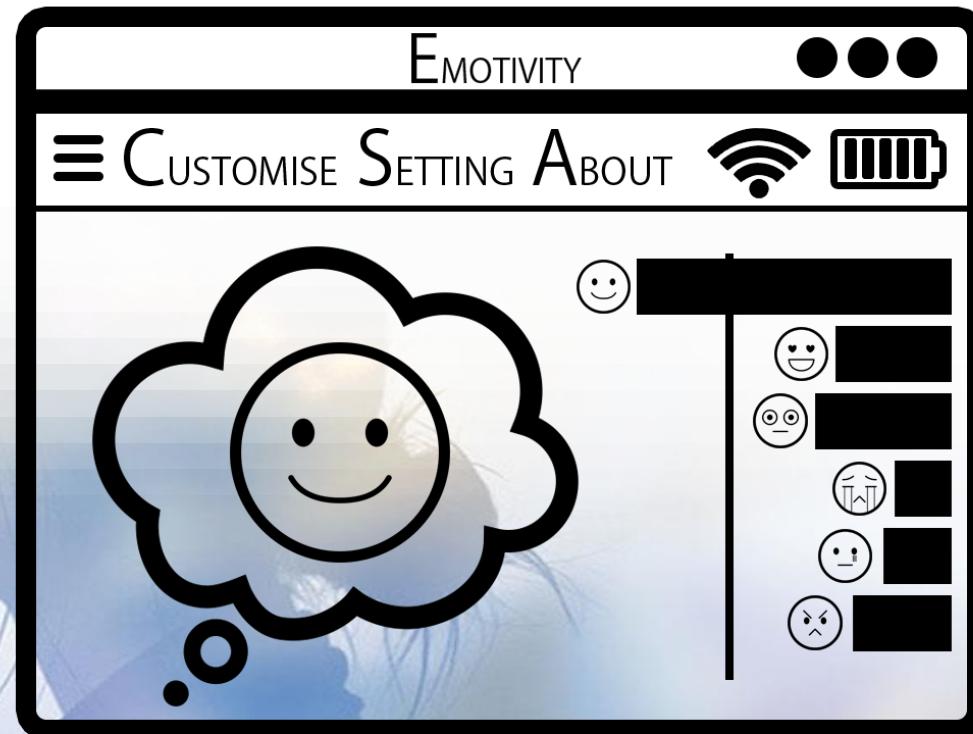
Solution Explorer (Ctrl+I)

Vector IV Lucien VL

14:46 3/7/2017

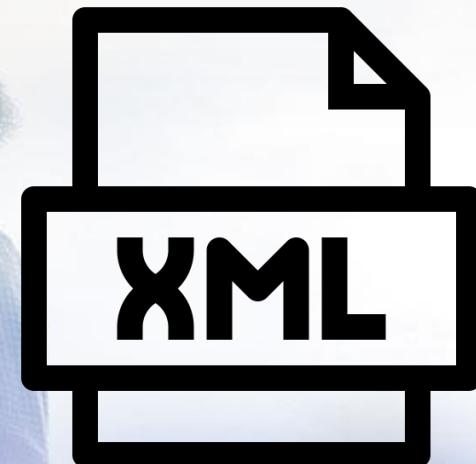
Graphical User Interface

- Allows users to easily navigate through provided features.



User Data Management

- Allows user data to be preserved and relocated.
- Implemented using XML structure.



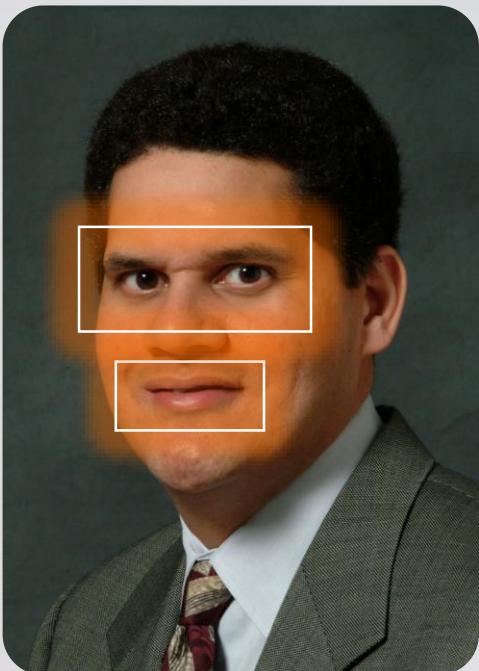


data.xml options.xml

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <settings>
3   <output>
4     b_textOutput="False"
5     b_logOutput="False"
6     s_textOutputPath="E:\University\CSS400\Emotivity\emotivityMain\emotivityMain\bin\x64\Debug\Output\Dump\"/>
7     s_logOutputPath="E:\University\CSS400\Emotivity\emotivityMain\emotivityMain\bin\x64\Debug\Output\Log\" />
8   <system>
9     b_invokeDelay="False"
10    i_invokeDelayAmount="10"
11    b_useEmotivComposer="False" />
12   <misc>
13     b_logPanel="False"
14     b_quickAction="False" />
15 </settings>
```

User Data Management

How Does it Work?



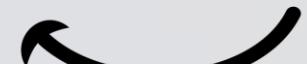
User's Face

Emotion Class



1.0

0.2



1.0

x 1.0



0.0

0.0

EmoStates

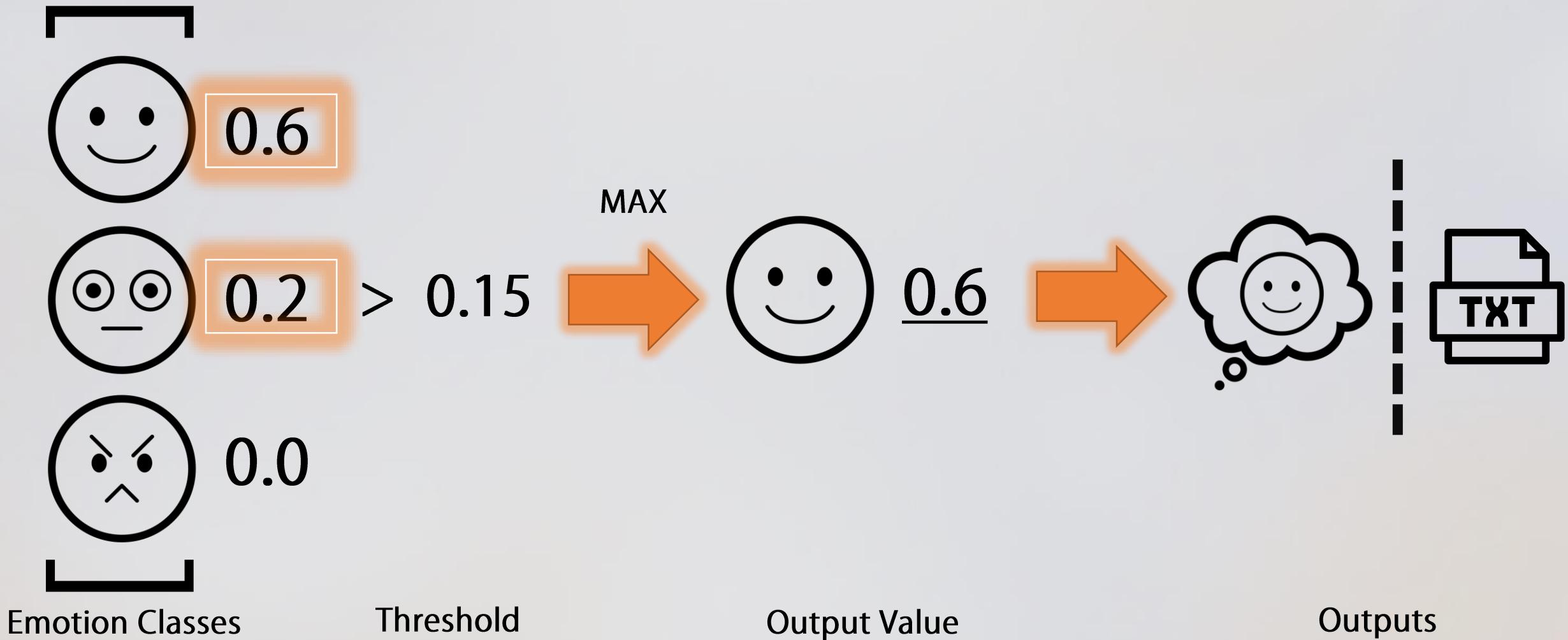
Modifiers

$$(1.0 + 0.2 + 0.0) \div 2 = 0.6$$

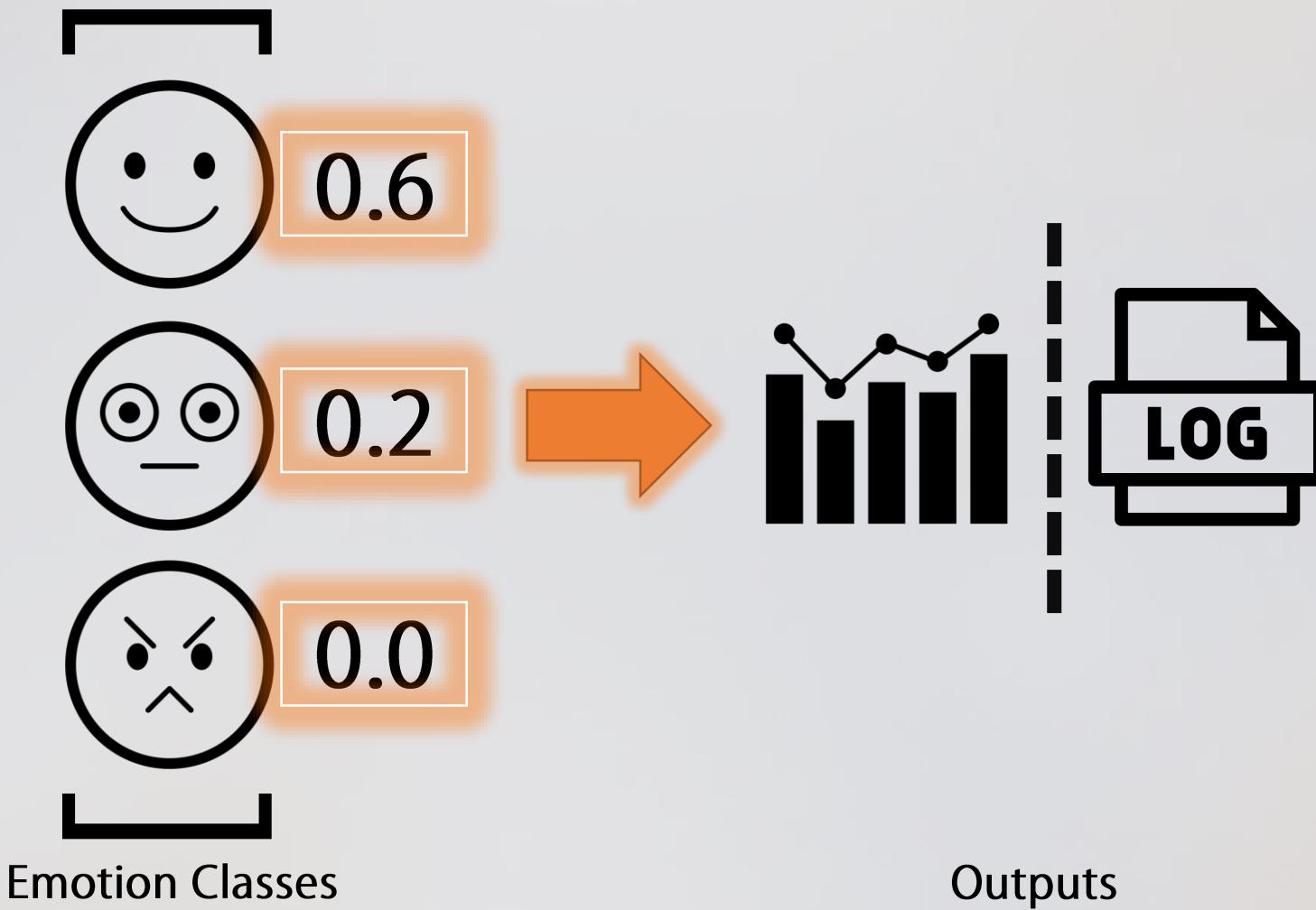
The divider is the
number of non-zero values
post-multiplying

Final Value

How Does it Work?



How Does it Work?

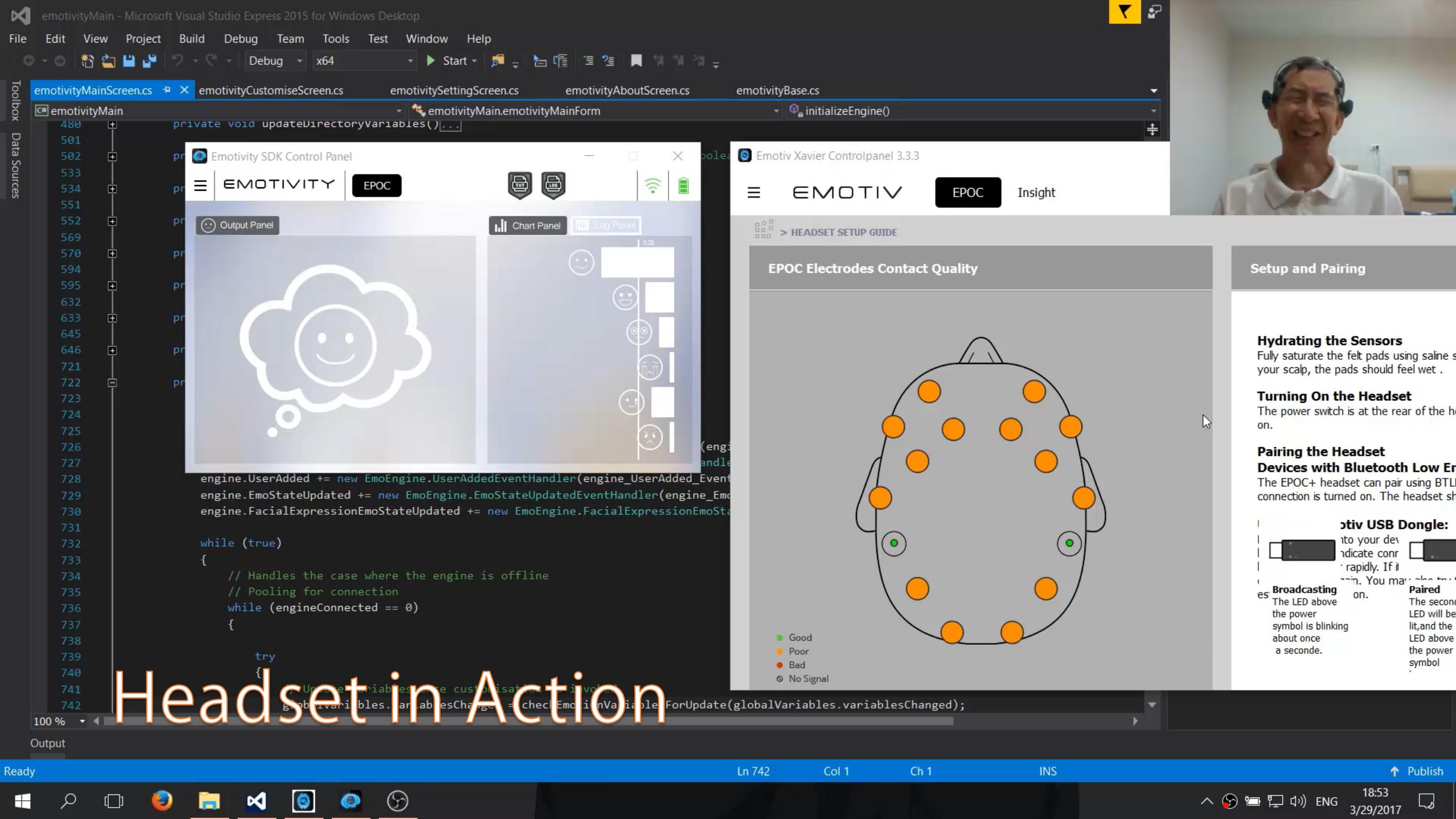


Issues

- The headset is not as perfectly precise as the simulator (during most of the time.)
 - It is poorly designed.
 - This may distort the output when there are hiccups.

Issues

- Missing modifiers: engagement, interest, meditation.
 - Unable to obtain SDK premium version.
 - Staff problems at the developer company.
- Lack of a sufficient variety in EmoStates.
- This makes some emotions very hard to be efficiently captured.



emotivityMain - Microsoft Visual Studio Express 2015 for Windows Desktop

File Edit View Project Build Debug Team Tools Test Window Help

Debug x64 Start

emotivityMainScreen.cs emotivityCustomiseScreen.cs emotivitySettingScreen.cs emotivityAboutScreen.cs emotivityBase.cs

Toolbox Data Sources

emotivityMain

```
private void updateDirectoryVariables() {  
    // Emotivity SDK Control Panel  
    // EPOC  
    // Output Panel  
    // Chart Panel Log Panel  
    // EPOC Electodes Contact Quality  
    // Setup and Pairing  
    // Hydrating the Sensors  
    // Turning On the Headset  
    // Pairing the Headset  
    // Devices with Bluetooth Low Energy  
    // Emotiv USB Dongle:  
    // Broadcasting  
    // Paired  
    // Ready
```

480 501 521 533 544 551 569 570 594 595 632 633 645 646 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742

Emotivity SDK Control Panel

EMOTIVITY EPOC

Output Panel Chart Panel Log Panel

0.25

HEADSET SETUP GUIDE

EPOC Electodes Contact Quality

Setup and Pairing

Hydrating the Sensors

Fully saturate the felt pads using saline solution. Your scalp, the pads should feel wet.

Turning On the Headset

The power switch is at the rear of the headset. Turn it on.

Pairing the Headset

Devices with Bluetooth Low Energy

The EPOC+ headset can pair using BTLE connection is turned on. The headset should connect to your device.

Emotiv USB Dongle:

into your device. The LED above the power button will indicate connection status rapidly. If it blinks green, you may also turn on the power button.

Broadcasting

The LED above the power button will be lit, and the symbol will be blinking about once a second.

Paired

The second LED above the power button will be lit, and the symbol will be blinking about once a second.

Headset in Action



Ln 742 Col 1 Ch 1 INS

Ready

18:53 3/29/2017

Solutions

- 1) Wait for an unlikely better headset and library.
 - 2) Open source this, and hope for the best.
-
- Any good solutions are welcomed.

Thank You for Your Attention

