

Multimodal Learning Analytics Data

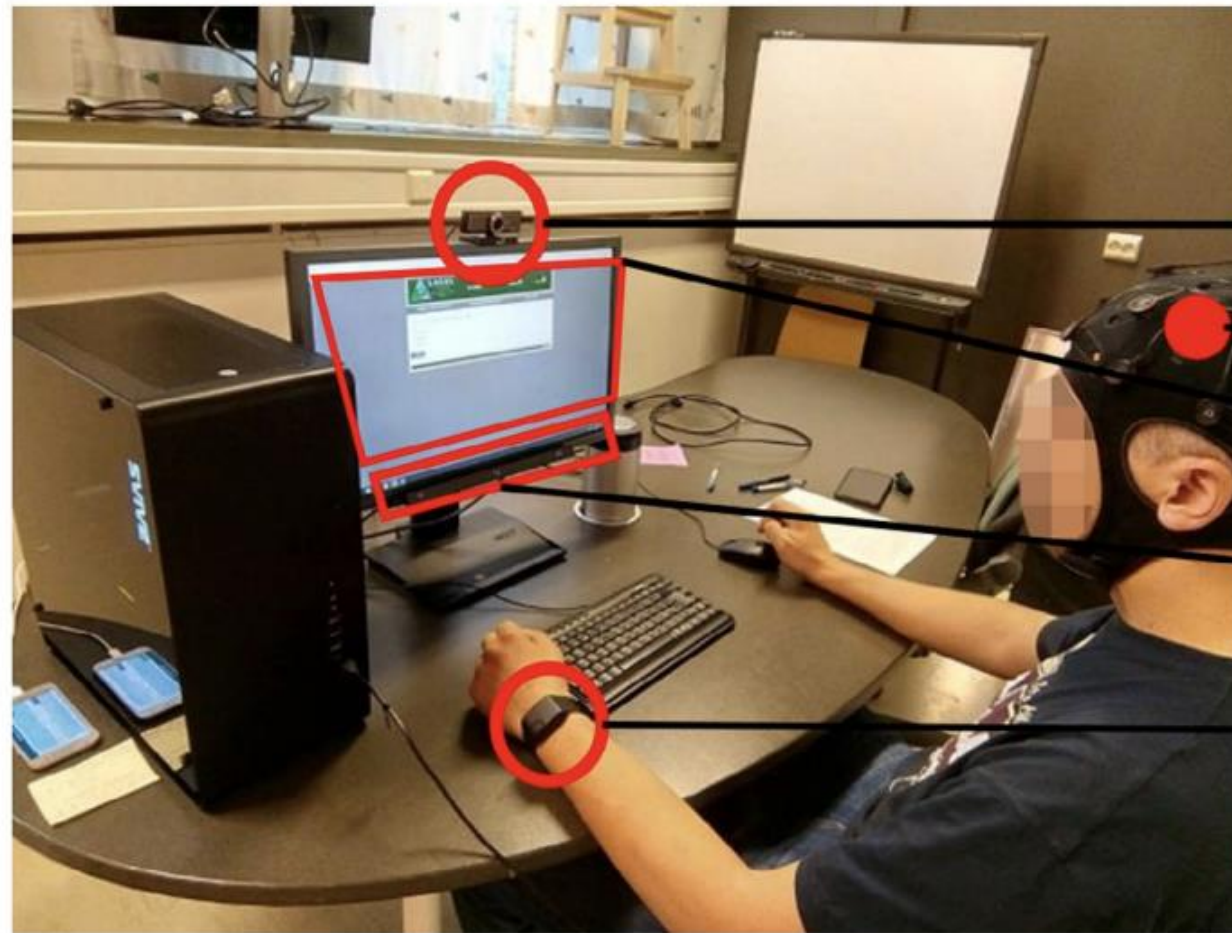
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Data Collection

- 192 students
- Adaptive test
- 30 minutes
- Let's see the data and features



Face

EEG cap

Adaptive test

Eye-tracker

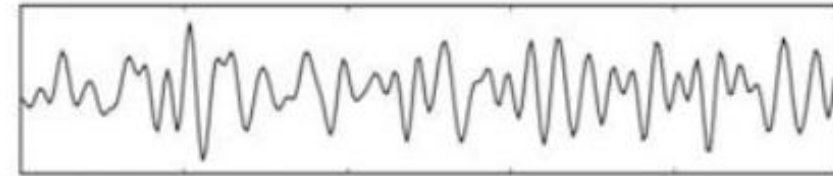
Wristband

EEG

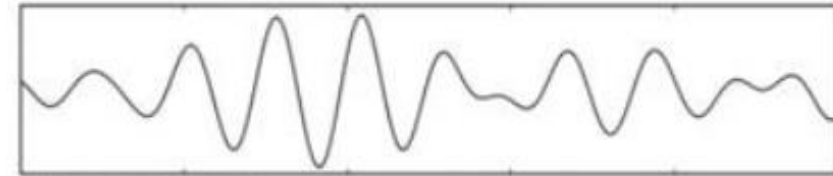
- V1—V51 in the CSV
- Power of the signal from three bands
 - Alpha → anxiety, high stress
 - Beta → high arousal, memory load
 - Theta → inattentiveness
- V1, V4, V7, ... , V49 → alpha
- V2, V5, V8, ... , V50 → beta
- V3, V6, V9, ... , V51 → theta



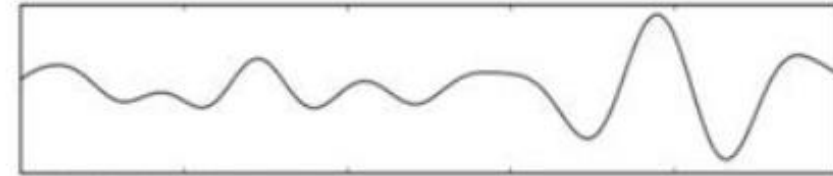
Gamma: 30-100+ Hz



Beta: 12-30 Hz



Alpha: 8-12 Hz



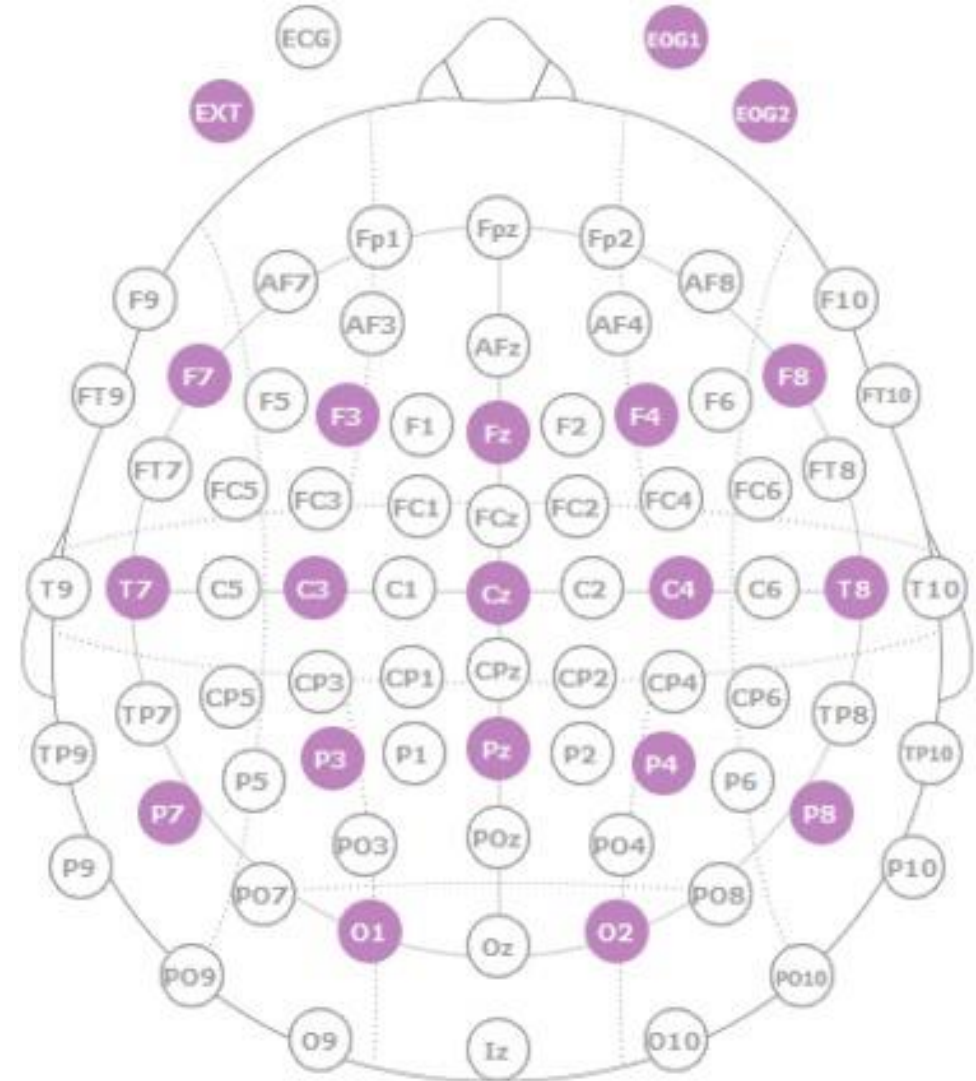
Theta: 4-7 Hz



Delta: 0-4 Hz

EEG

- V1—V51 in the CSV
- Power of the signal from three bands
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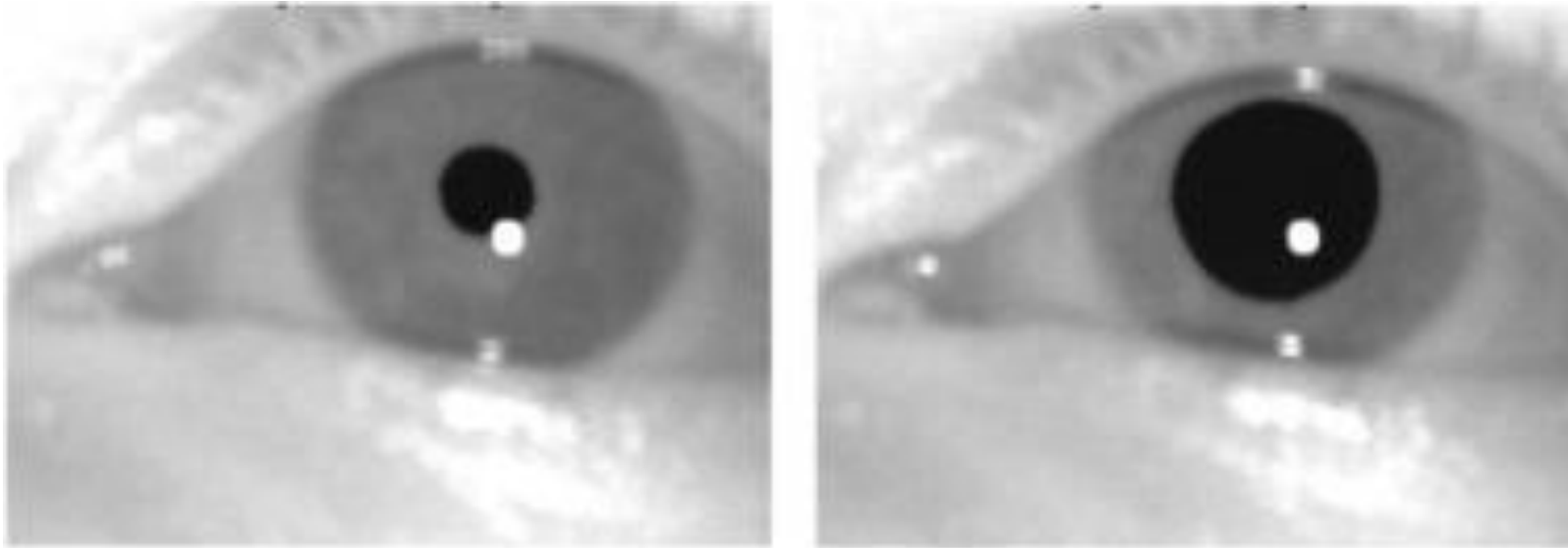
Eye-tracking

- "numFix" (number of fixation)
"numSac" (number of Saccades)
"ratioFixSac"
- "meanFixDur" "sdFixDur"
(Fixation duration)
- "meanSacVel" "sdSacVel"
(Saccade Velocity)
- "meanSacAmp" "sdSacAmp"
(Saccade Amplitude)

```
public static int goolbaka ( int vv )
{
    int c = 0 ;
    while ( vv >= 0 )
    {
        vv /= 10;
        c ++ ;
    }
    return c ;
}
```

Eye-tracking

- "meanPupil" "sdPupil"



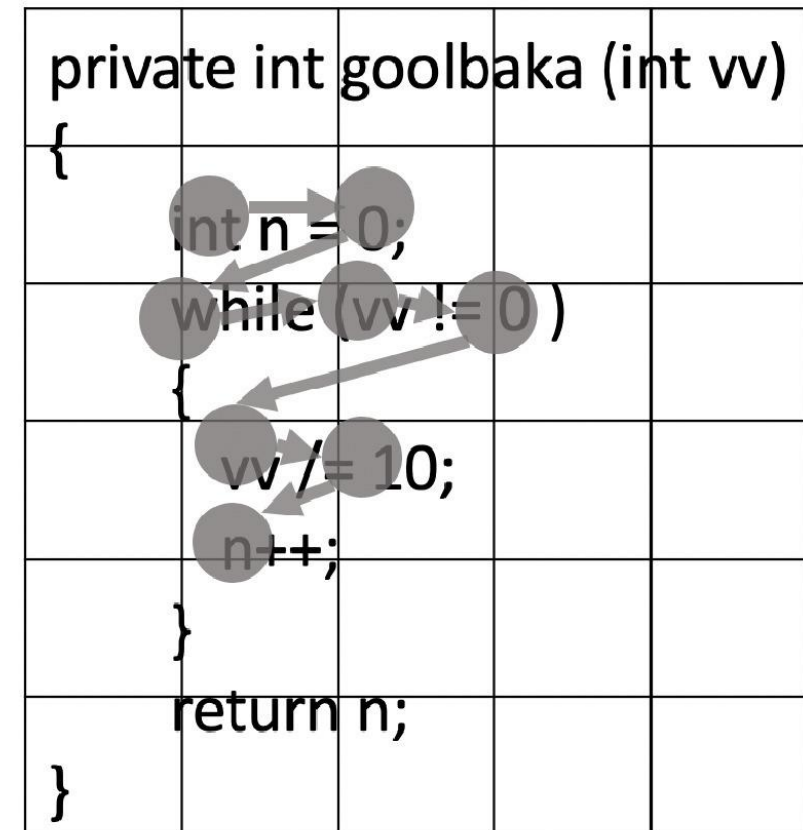
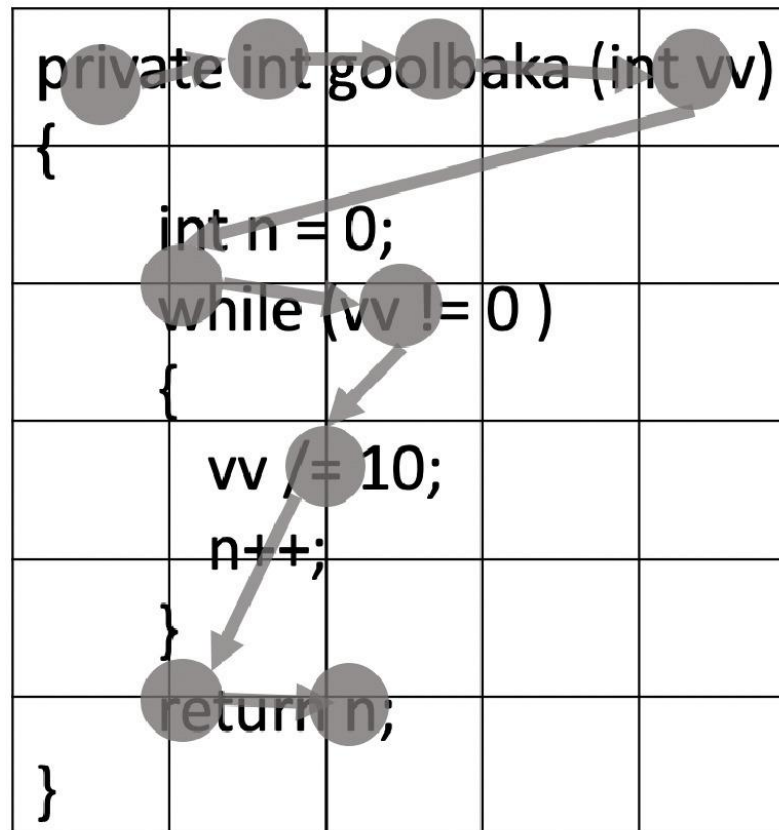
Eye-tracking

- "scanpathVel"

```
public static int goolbaka ( int vv )  
{  
    int c = 0 ;  
    while ( vv >= 0 )  
    {  
        vv /= 10;  
        c ++ ;  
    }  
    return c ;  
}
```

Eye-tracking

- "infoProcess"



Facial video

AU01 AU10 AU20
 AU02 AU12 AU23
 AU04 AU14 AU25
 AU05 AU15 AU26
 AU06 AU17 AU45
 AU07
 AU09



Inner Brow
Raiser
 Outer Brow
Raiser
 Brow
Lowerer
 Upper Lid
Raiser
 Cheek
Raiser
 Lid
Tightener
 Nose
Wrinkler



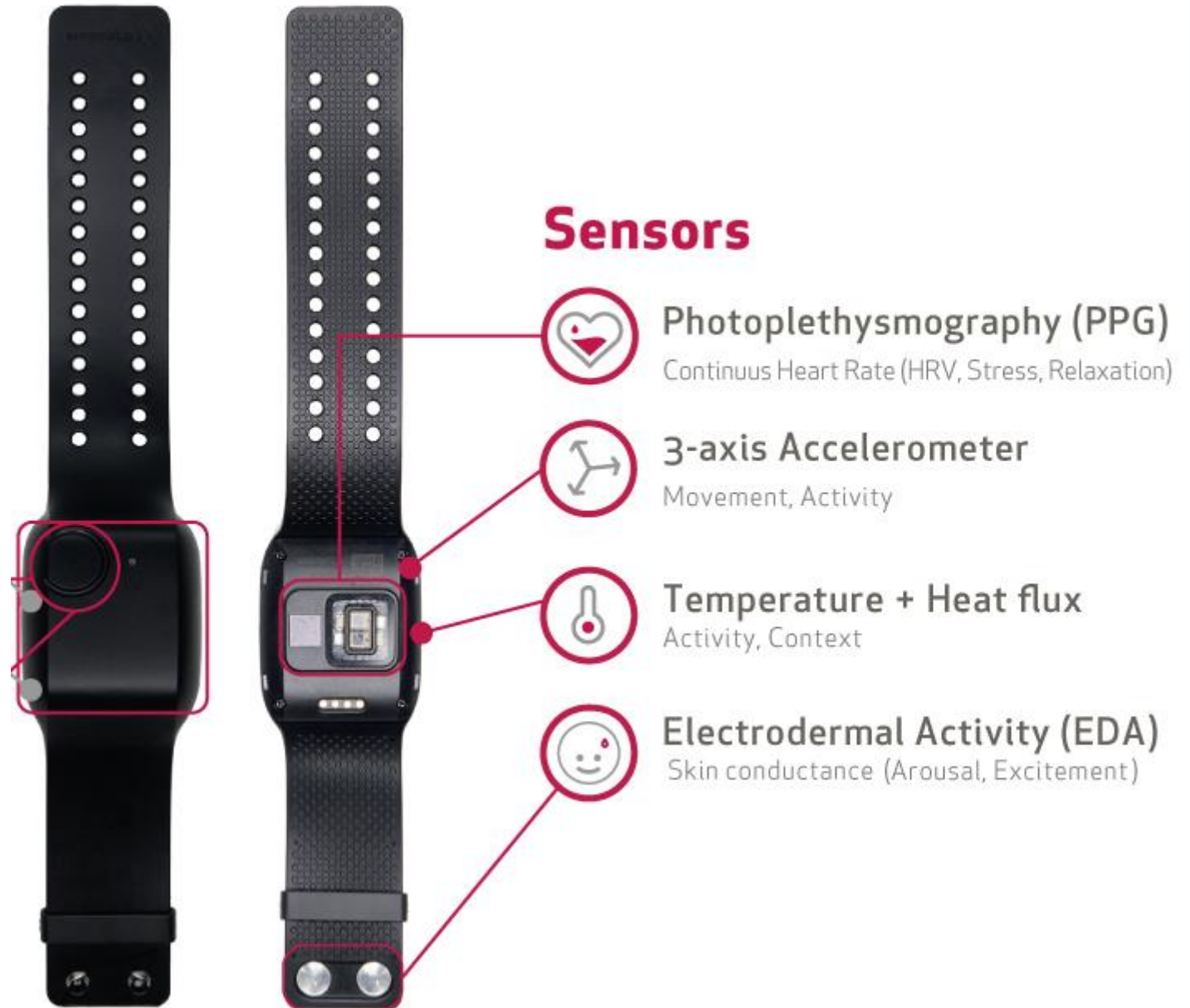
Upper Lip
Raiser
 Lip Corner
Puller
 Dimpler
 Lip Corner
Depressor
 Chin Raiser



Lip
stretcher
 Lip
Tightener
 Lips part
 Jaw Drop
 Lip Suck

Physiological

"bvpMean" "bvpSD"
(blood volume pulse)
"edaMean" "edaSD"
(electrodermal activation)
"hrMean" "hrSD"
(heart rate variability)
"tempMean" "tempSD"
(skin temperature)



Thank you!!
Questions??