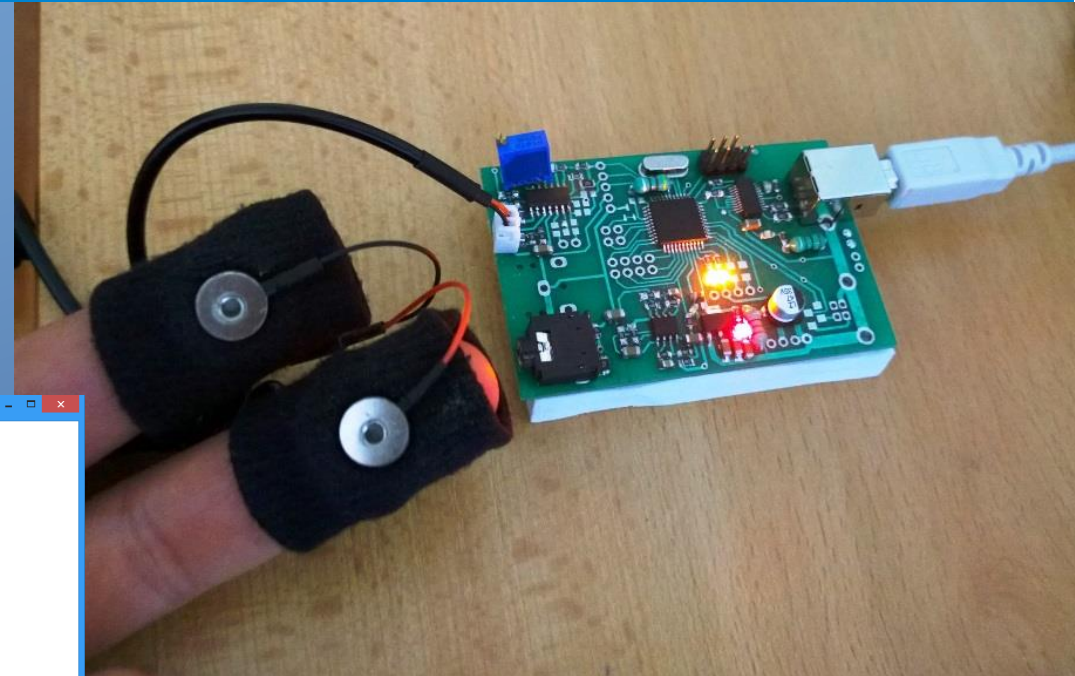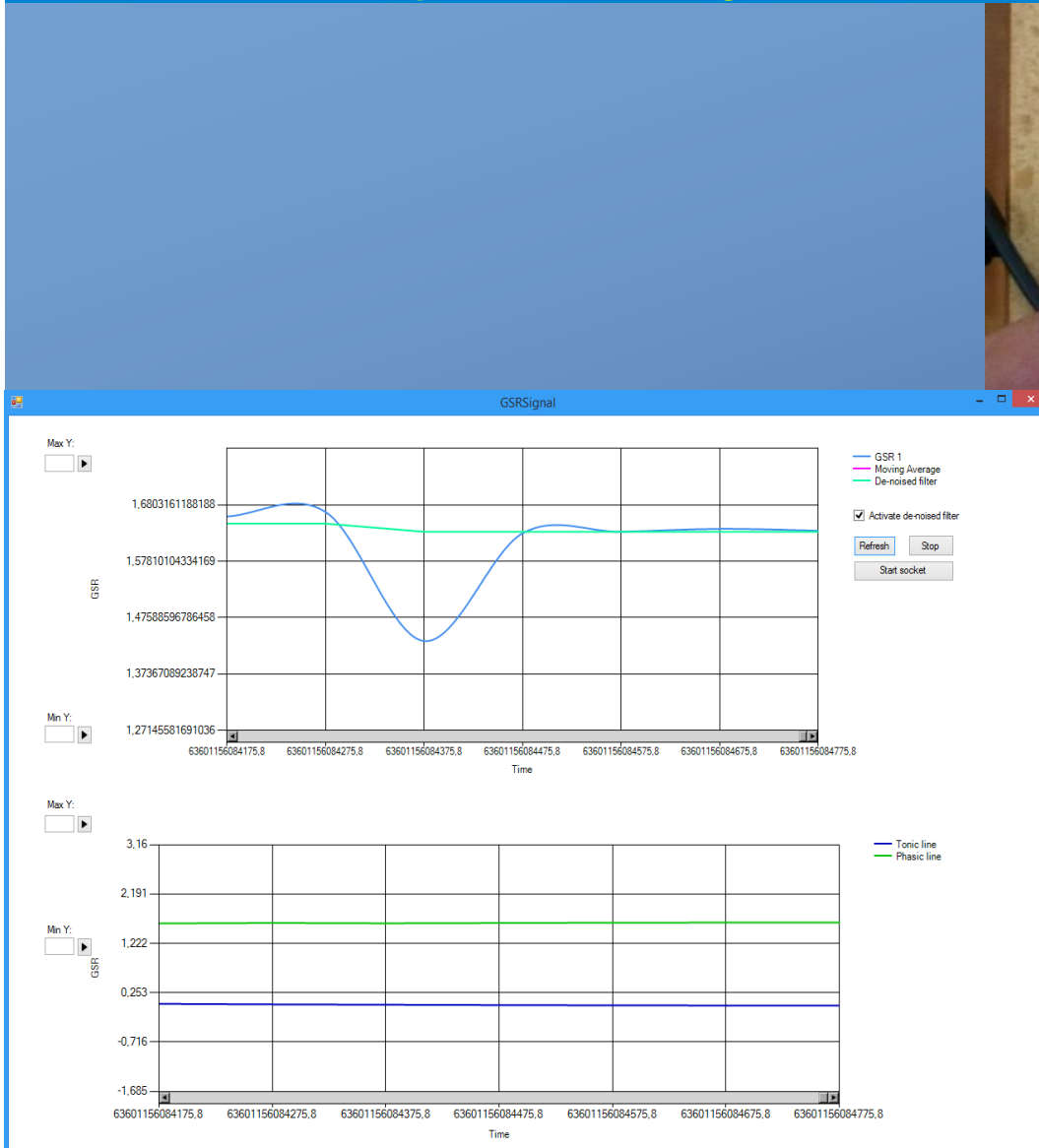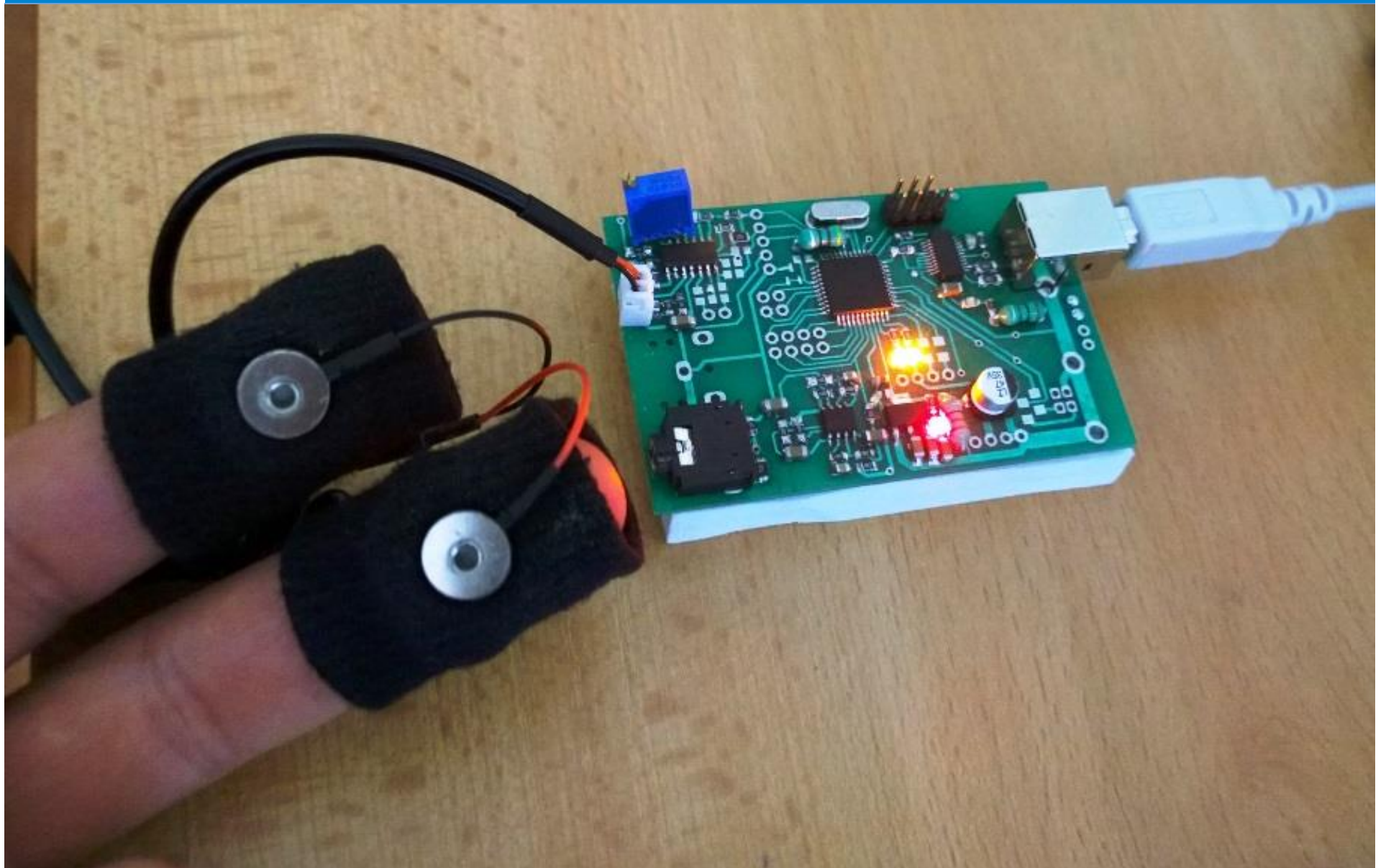# Real-Time Arousal Detection Using Galvanic Skin Response Asset usage for game adaptation of the "Rush for Gold" game (in the scope of the ADAPTIMES project)
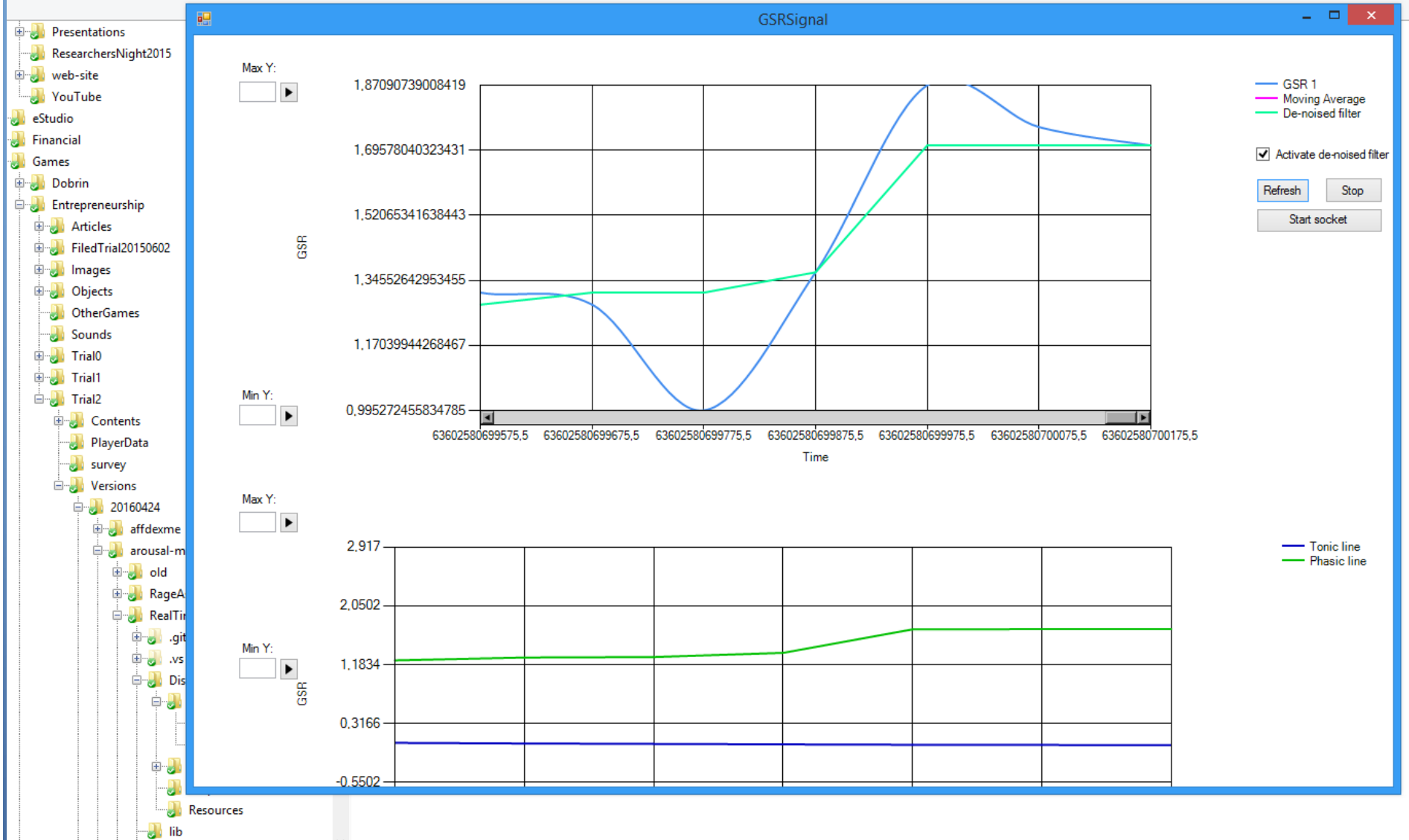
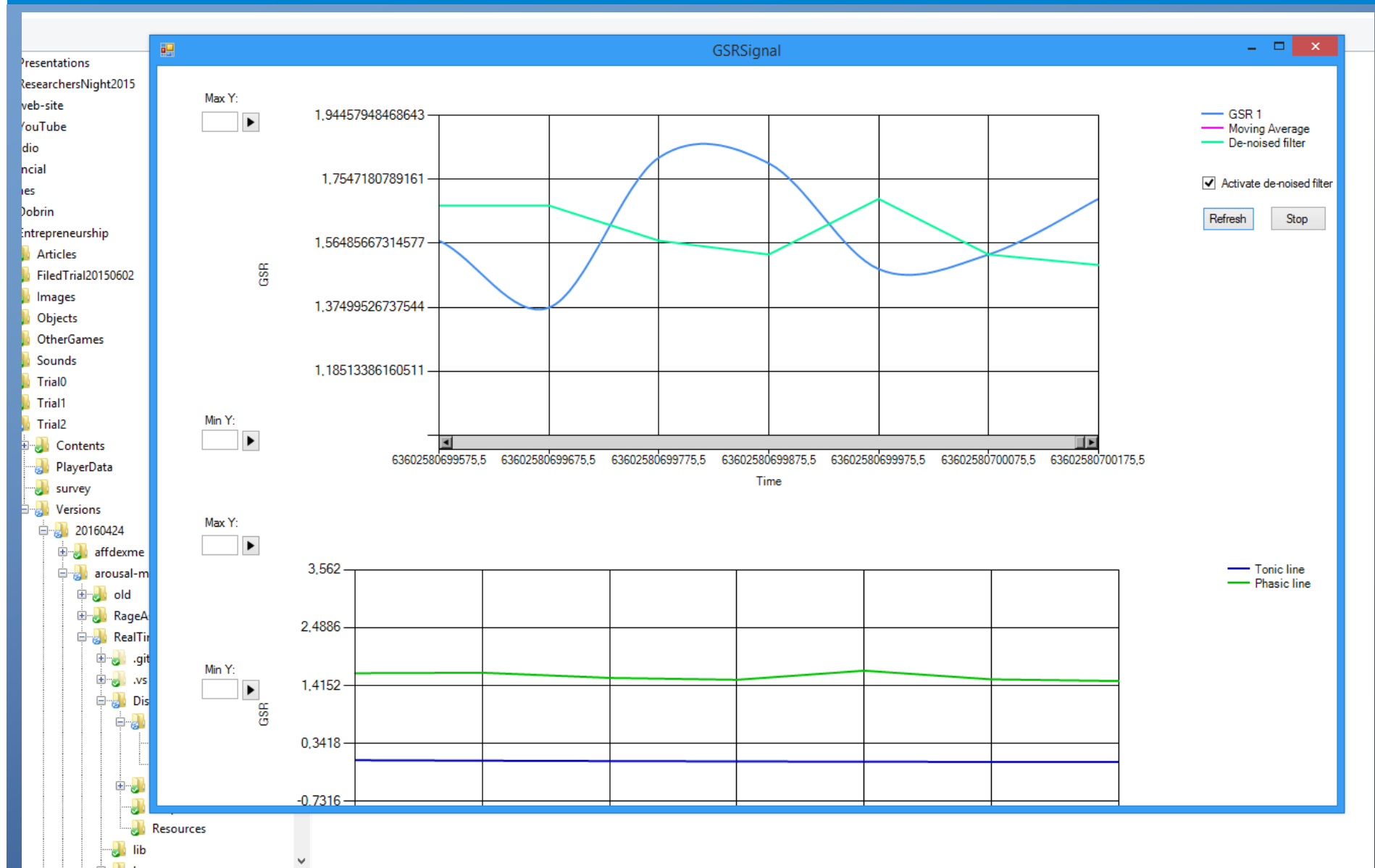# Step 1: Starting the GSR measuring device

Step 2: Starting the GSR asset

Step 3: Starting the GSR signal visualization

Step 4: Starting the socket for asset integration

Socket communication

 The measured and calculated from the asset emotional arousal status of the current gamer/user can be access by a socket client. For this purpose following messages are expected:

- EOCP - this is the message for end of calibration period. After this message the calibration settings (CalibrationMinArousalArea, CalibrationMaxArousalArea, CalibrationMinTonicAmplitude and CalibrationMaxTonicAmplitude) are calculated (for the last time window) and saved.

- GET_EDA - when the asset receives "GET_EDA" it returns a json object with information for the emotional arousal level of the player (in last time window);

- EOM - this is the command for end of measurement for the current gamer/user. After this message the statistical values for the SCR and SCL arousal (*MinAbsoluteArousalArea, MinAverageArousalArea, MaxAbsoluteArousalArea, MaxAverageArousalArea, MinAbsoluteTonicAmplitude, MinAverageTonicAmplitude, MaxAbsoluteTonicAmplitude, MaxAverageTonicAmplitude* and *NumberParticipants*) are updated.

Example of a JSON object returned by the asset in socket communications

```
{"SCRArousalArea":770.88437500000009,
  "SCRAmplitude":{
    "Minimum":0.0010000000000001119,
    "Maximum":1.283,
    "Mean":0.428,
    "StdDeviation":0.604576435752062,
    "Count":0.375,
    "Name":"Amplitude"
  },
  "SCRRise":{
    "Minimum":50,
    "Maximum":5300,
    "Mean":1350,
    "StdDeviation":6.25,
    "Count":0.5,
    "Name":"Rise time"
  },
  "SCRRecoveryTime":{
    "Minimum":25,
    "Maximum":25,
    "Mean":18.75,
    "StdDeviation":0,
    "Count":0.5,
    "Name":"Recovery time"
  },
  "SCRAchievedArousalLevel":2,
  "TonicStatistics":{
    "Slope":0,
    "MeanAmp":0,
    "MinAmp":0,
    "MaxAmp":2.266,
    "StdDeviation":1.133
  },
  "SCLAchievedArousalLevel":1,
  "MovingAverage: 0.76491874999999976
}
```

Step 5: Starting the Rush for Gold action game

Brainstorm eStudioGlobal 12.10-432:c72b16-release, [XD], as boyan, pipe

Welcome to the RUSH FOR GOLD game
for evaluation of your playing style!

In this game you have to collect 12 bars of gold by
shooting the flying bars (press 'c' for cockshy and
Space for shooting), finding bars hidden in the temple,
or solving logic puzzles (click on a puzzle image to
enter your answer).
Click on shot/found/solved bars to collect them.
At any time, you can plan/replan the number of bars of
each type by clicking the gold cube.
For starting a new game press the yellow button.
For finishing this game before collecting all 12 gold
bars, press the red button.
Navigation: mouse+right button (or Left, Right, Up and
Down keys) for rotations,
'w' and 's' for forward and backward.
Be quick & smart! Press HERE to start!

Collected: 0

--------->EDA asset message: Received at 27/06/2016 0:05:14

{"SCRArousalArea":843.99374999999986,"SCRAmplitude":{"Minimum":-0.231,"Maximum":-0.231,"Mean":-0.231,"StdDeviation":0,"Count":0.125,"Name":"Amplitude"},"SCRRise":{"Minimum":0,"Maxi
mum":0,"Mean":0,"StdDeviation":0,"Count":0,"Name":"Rise time"},"SCRRecoveryTime":{"Minimum":0,"Maximum":0,"Mean":0,"StdDeviation":0,"Count":0,"Name":"Recovery time"},"SCRAchievedAr
ousalLevel":1,"TonicStatistics":{"Slope":0.0002277,"MeanAmp":1.1385,"MinAmp":0,"MaxAmp":2.277,"StdDeviation":0},"SCLAchievedArousalLevel":4,"MovingAverage":0.84876250000000009}
Found SCRArousalArea= 843.994 Tonic MinAmpl= 0 Tonic MaxAmp= 2.277
SCLAchievedArousalLevel= 4   SCRAchievedArousalLevel= 1
Will call get_emotions_by_face()
Will call get_arousal_by_EDA()
--------->EDA asset message: Received at 27/06/2016 0:05:25

Arousal levels (SCL left, SCR right)

Step 6: Playing the Rush for Gold game with lower SCR arousal

Step 7: Playing the Rush for Gold game with higher SCR arousal

408750000001>
Found SCRArousalArea= 32042.856 Tonic MinAmpl= -44.179 Tonic MaxAmp= 46.783
SCLAchievedArousalLevel, 1 SCRAchievedArousalLevel= 7
Will call get_emotions_by_face()
Will call get_arousal_by_EDA()
-------------->EDA asset message: Received at 26/06/2016 23:45:04

{"SCRArousalArea":26103.407716796868,"SCRAmplitude":{"Minimum":0,"Maximum":0,"Mean":0,"StdDeviation":0,"Count":0,"Name":"Amplitude"},"SCRRise":{"Minimum":0,"Maximum":0,"Mean":0,"St
dDeviation":0,"Count":0,"Name":"Rise time"},"SCRRecoveryTime":{"Minimum":0,"Maximum":0,"Mean":0,"StdDeviation":0,"Count":0,"Name":"Recovery time"},"SCRachievedArousalLevel":6,"Toni
cStatistics":{"Slope":-0.00014895144976399192,"MeanAmp":-22.0895,"MinAmp":-44.179,"MaxAmp":46.783,"StdDeviation":37.3679210872404},"SCLAchievedArousalLevel":1,"MovingAverage":26.54
18625}
Found SCRArousalArea= 26103.408 Tonic MinAmpl= -44.179 Tonic MaxAmp= 46.783
SCLAchievedArousalLevel, 1 SCRAchievedArousalLevel= 6