


## References

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# EEGLAB System

## A.1. Sample Screens

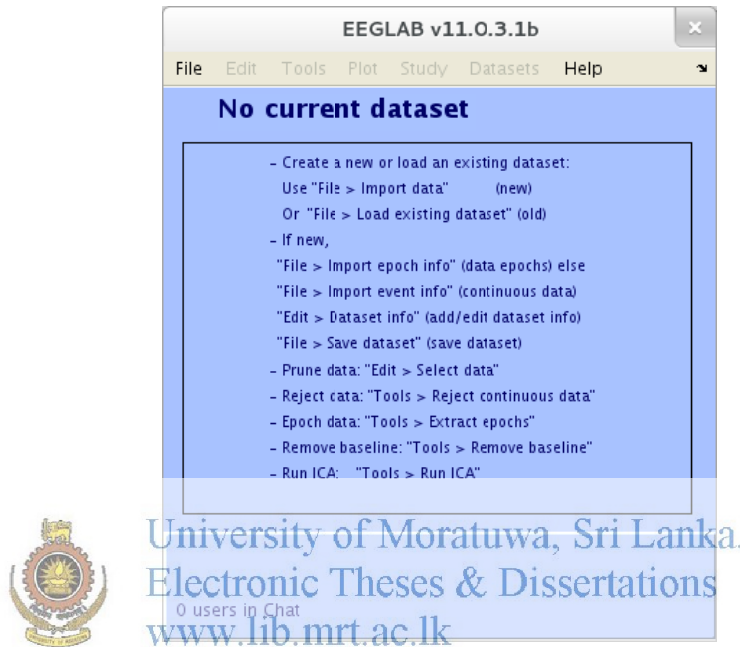


Figure A.1: EEGLAB GUI Main Interface  
(Source: <http://scn.ucsd.edu/>)

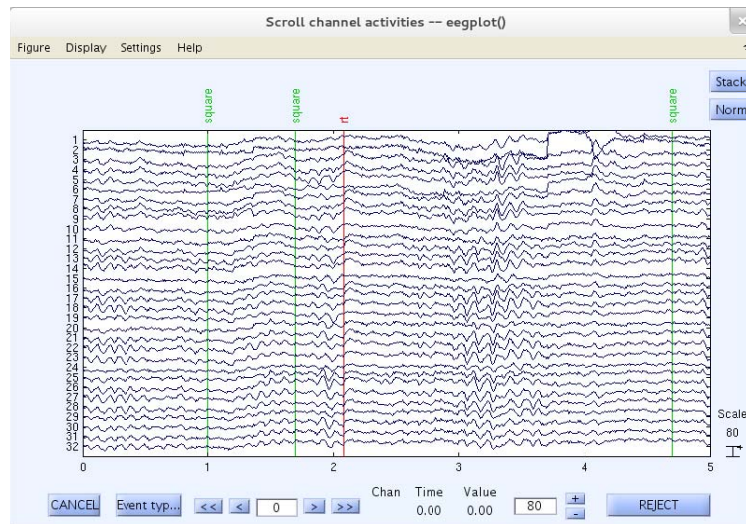


Figure A.2: EEG Signal Data view  
(Source: <http://scn.ucsd.edu/>)

## Sequence Diagrams

### B.1. Find Cluster Behavior Sequence

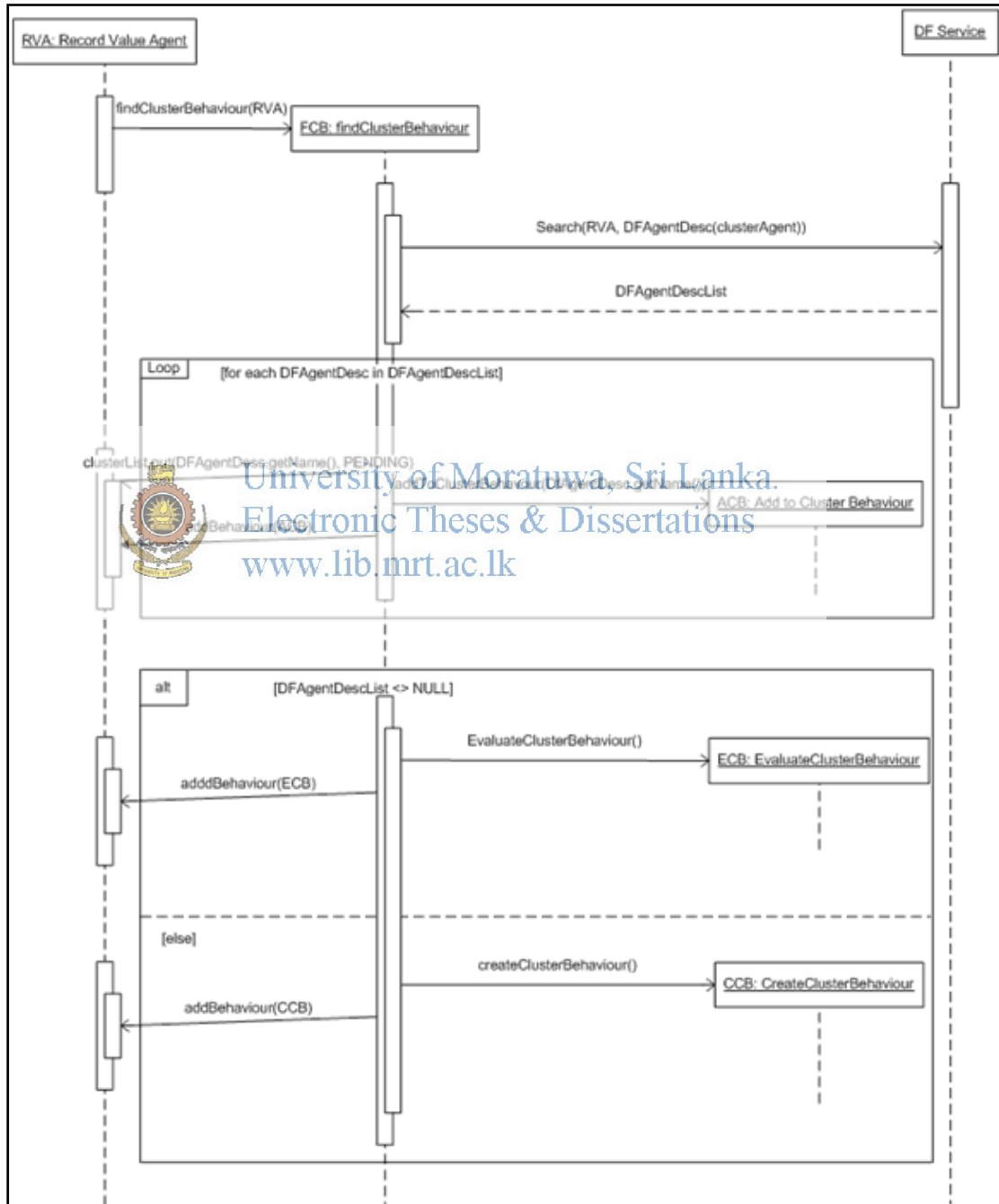


Figure B.1: Find Cluster Behavior Sequence

## B.2. Add to Cluster Behavior Sequence

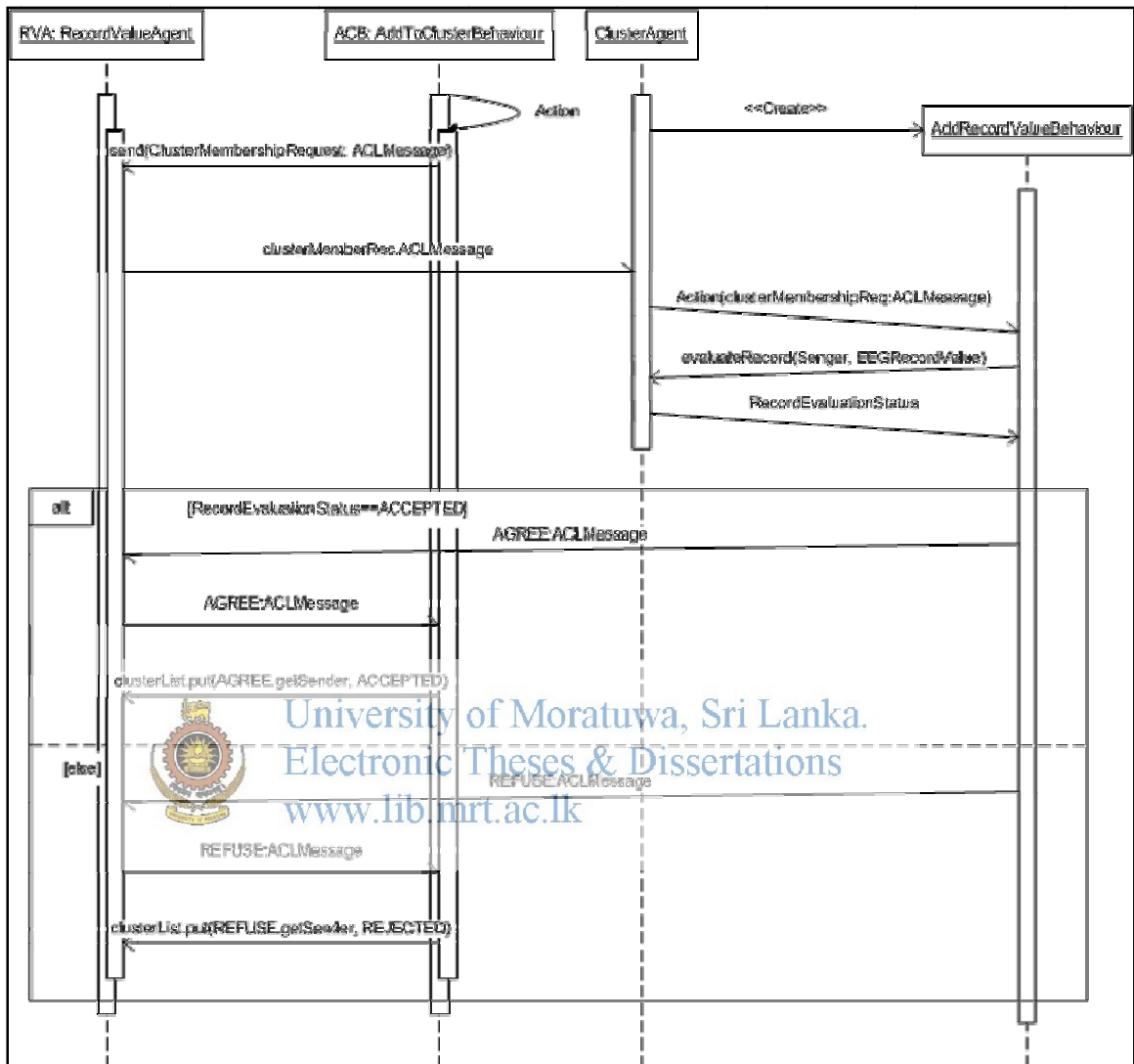


Figure B.2: Add to Cluster Behavior Sequence

### B.3. Evaluate Cluster Behavior Sequence

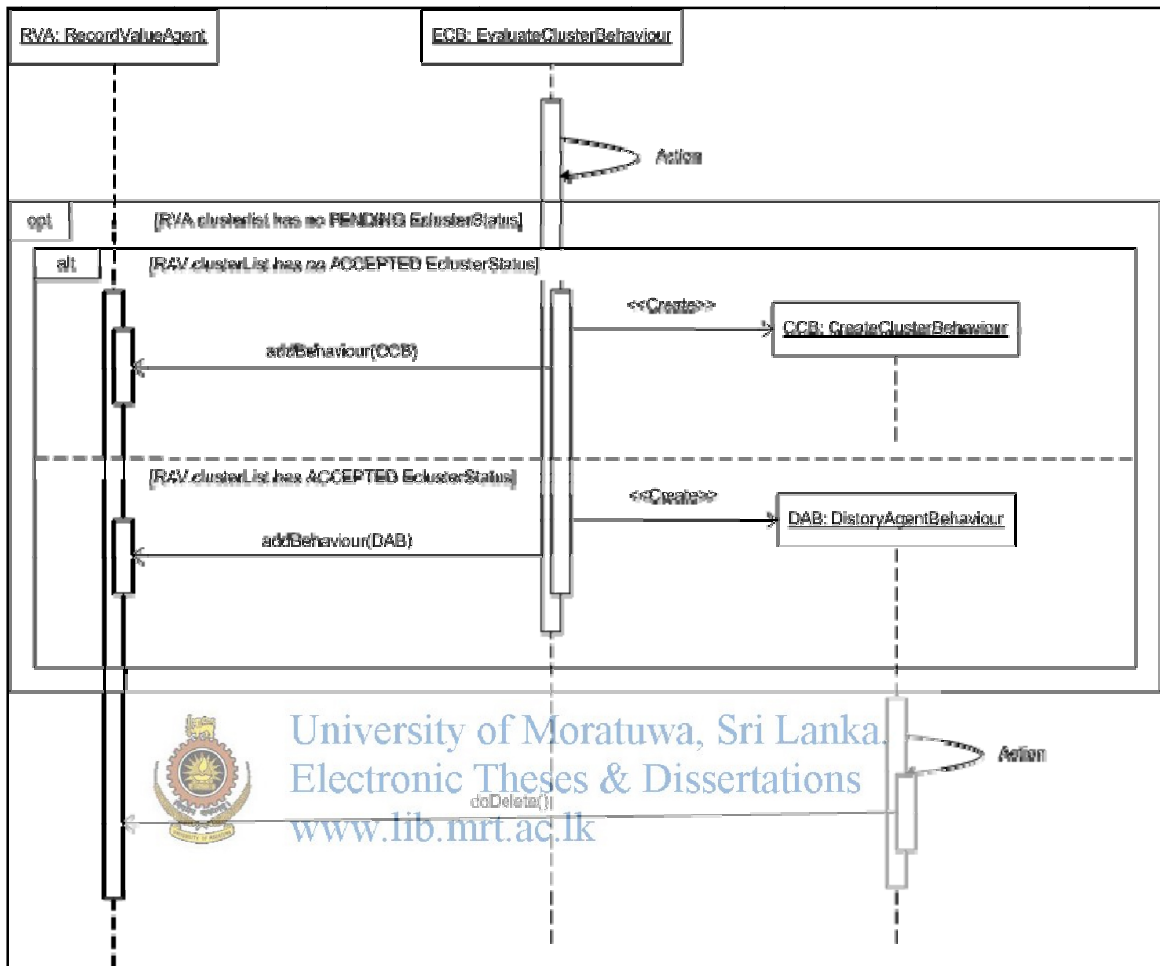


Figure B.3: Evaluate Cluster Behavior Sequence

## B.4. Create Cluster Behavior Sequence

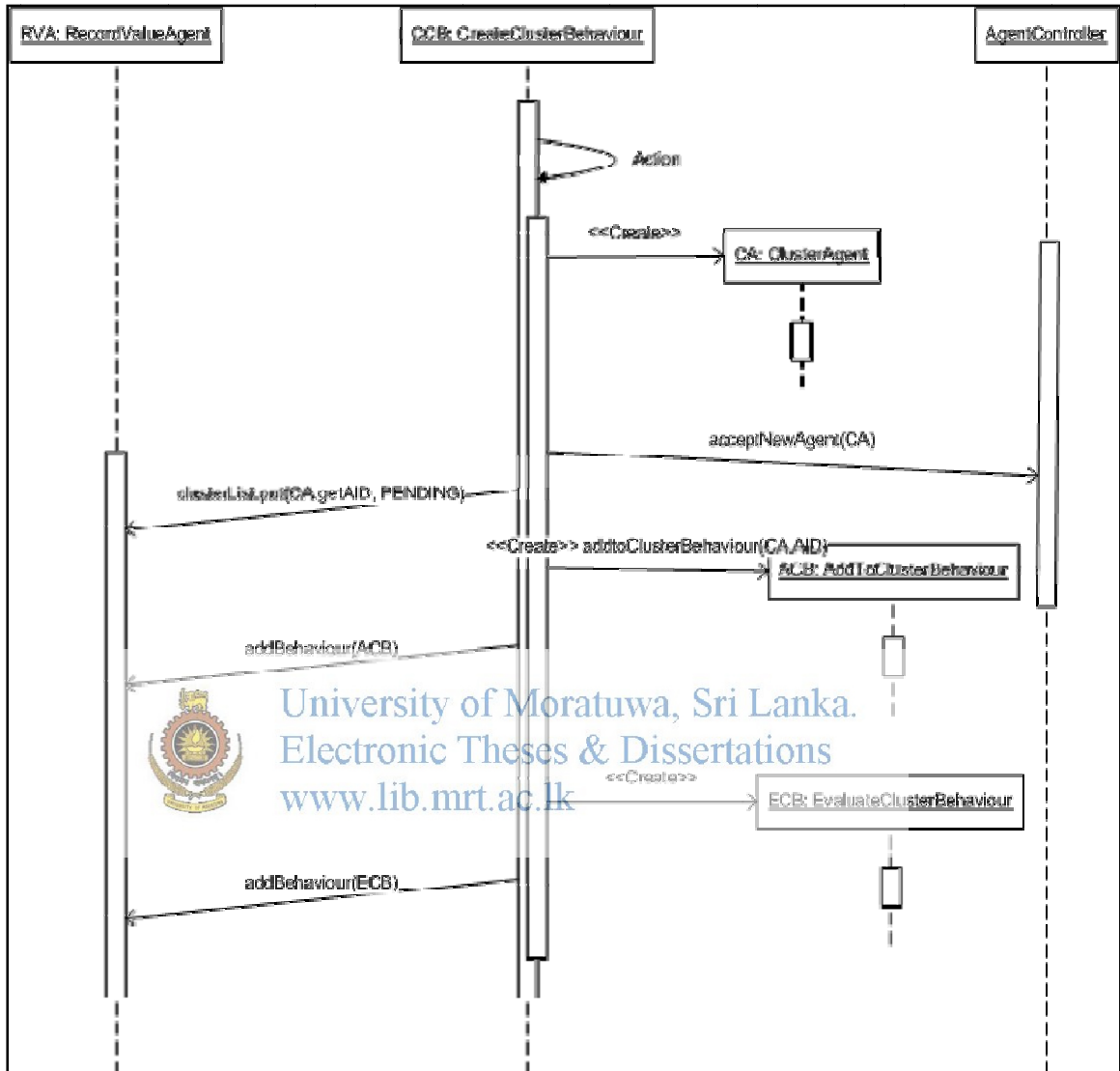


Figure B.4: Create Cluster Behavior Sequence

# Class Diagrams

## C.1. High Level Class Structure

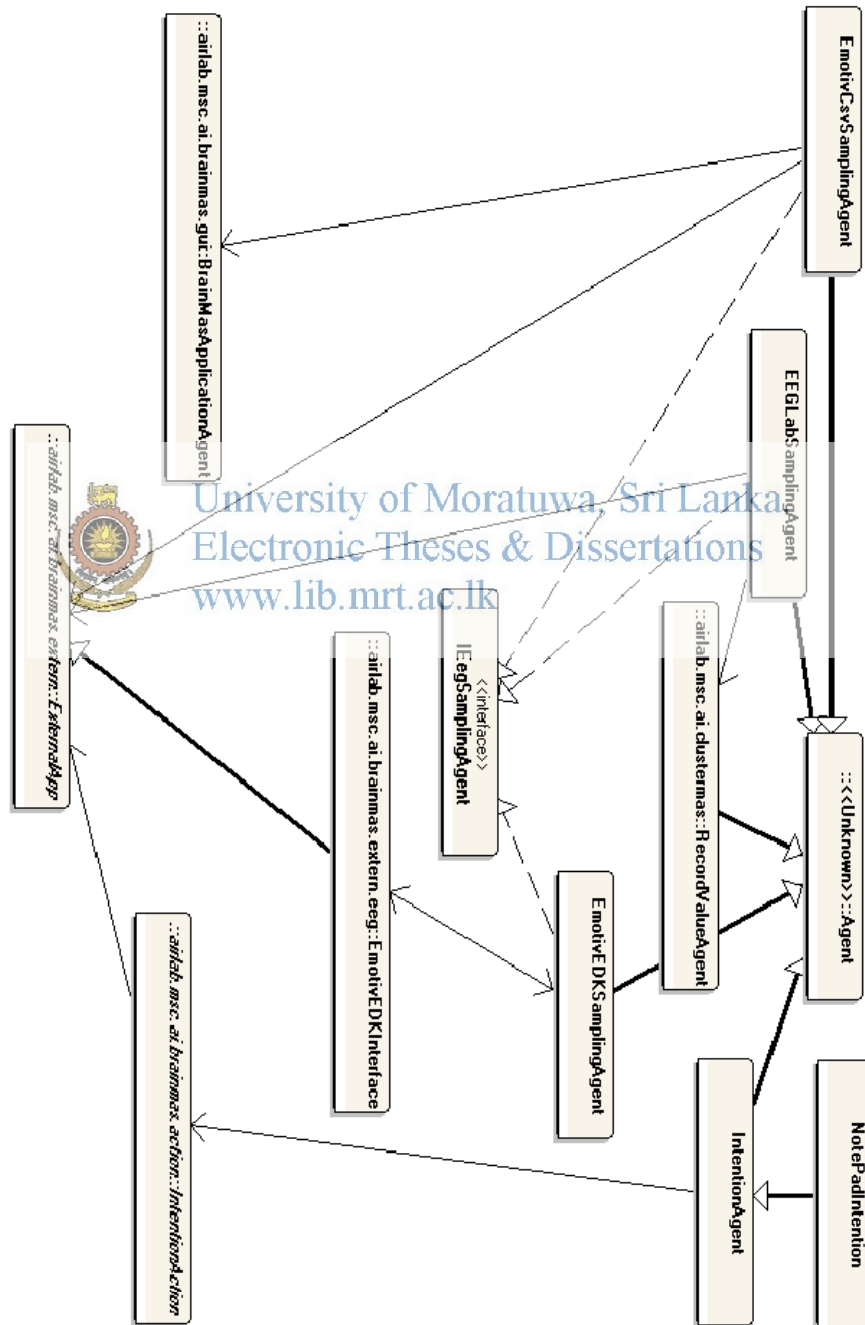


Figure C.1: High Level Package Structure



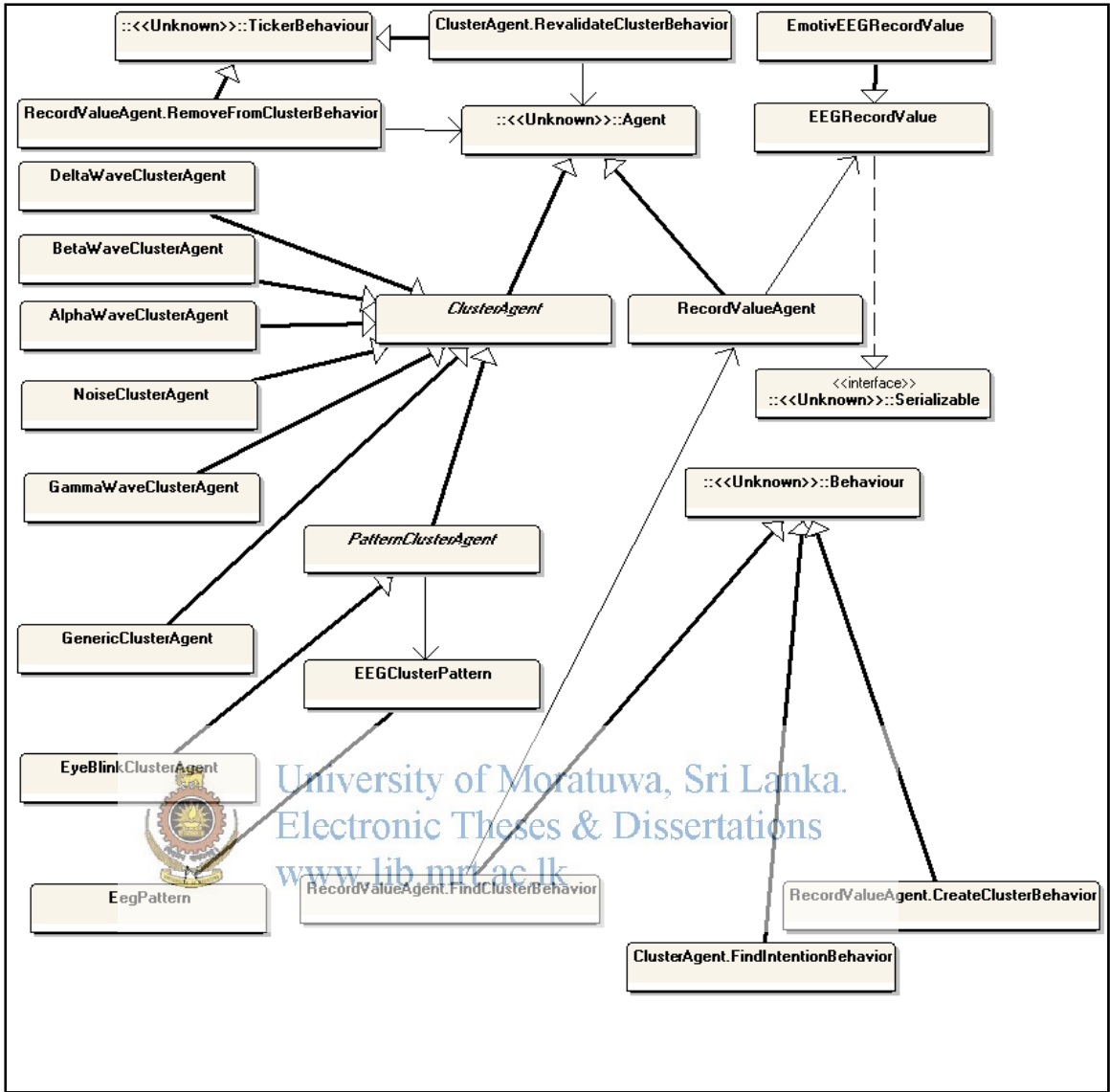


Figure C.2: Overall Class Diagram

## C.2. Detailed Class Diagrams

### C.2.1 EEG Source Data Acquisition

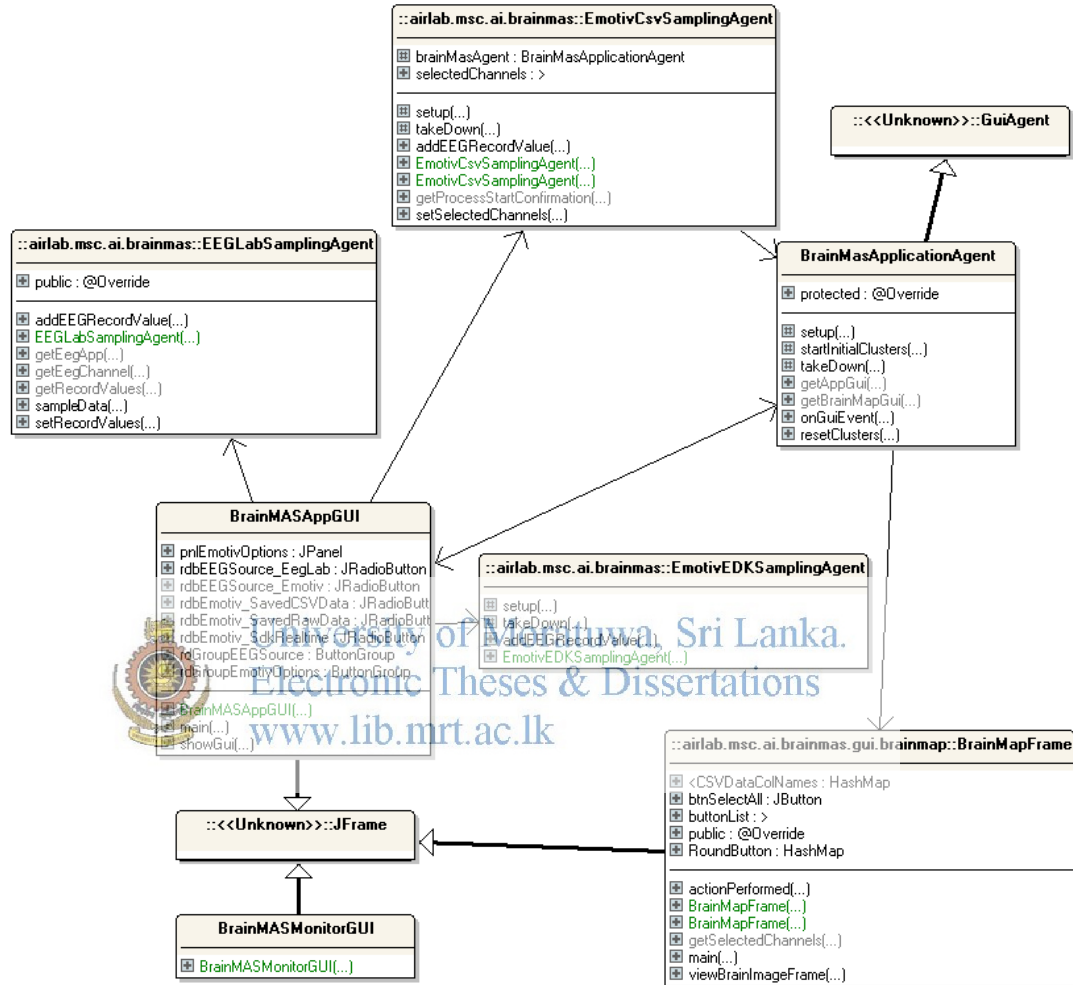


Figure C.3: Brain MAS Application classes

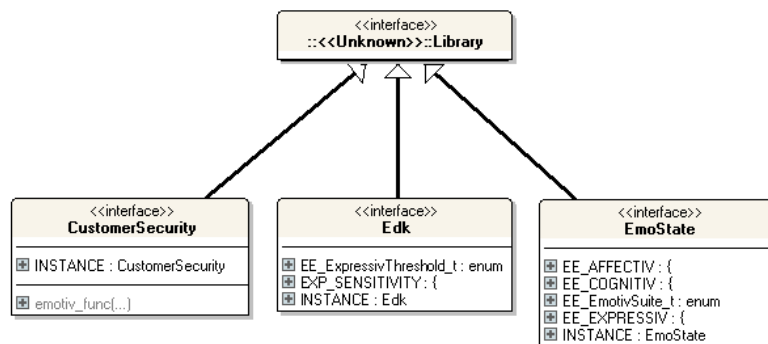


Figure C.4: Emotiv EDK Library Classes



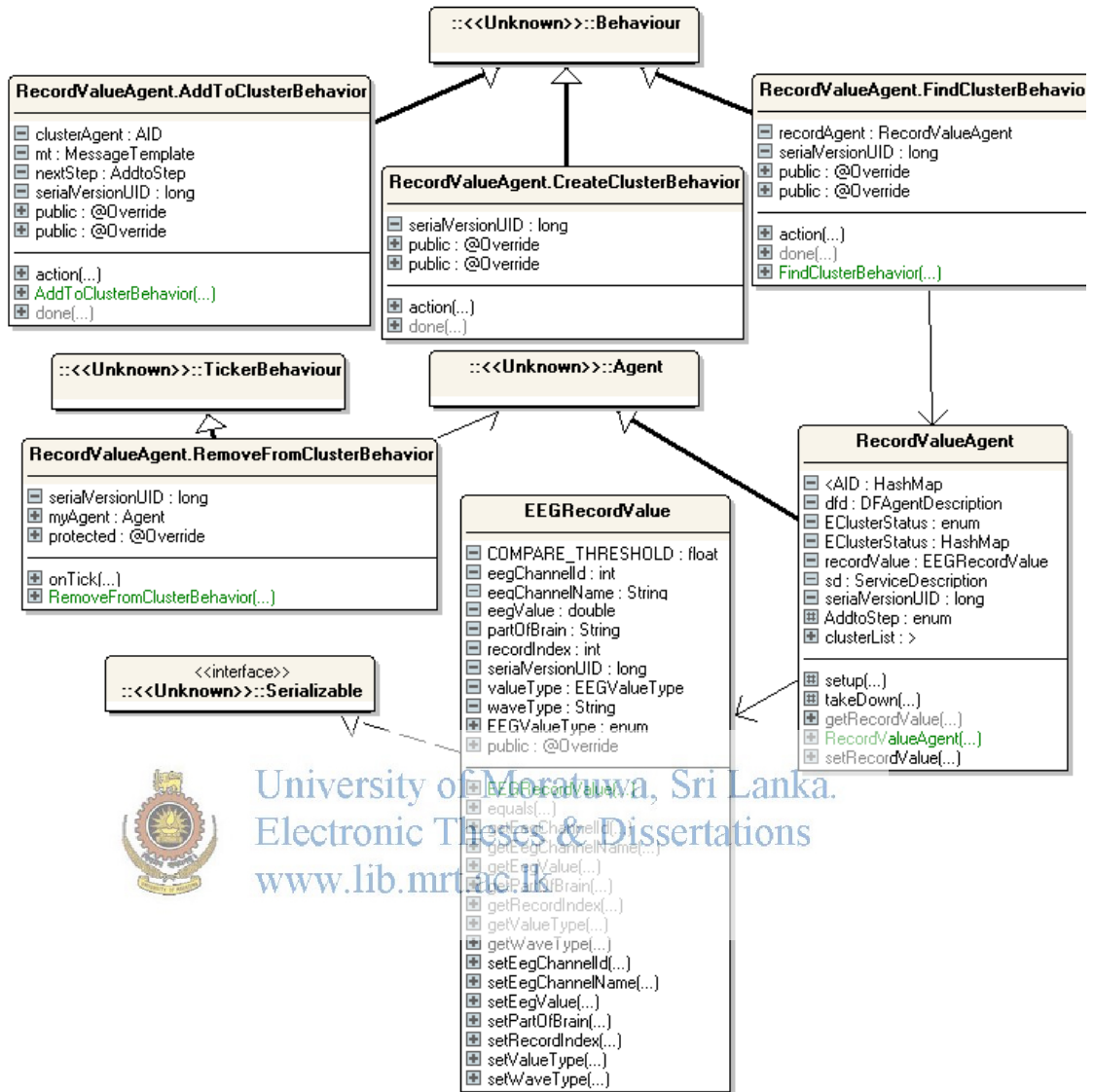


Figure C.7: Clustering Behavior Classes

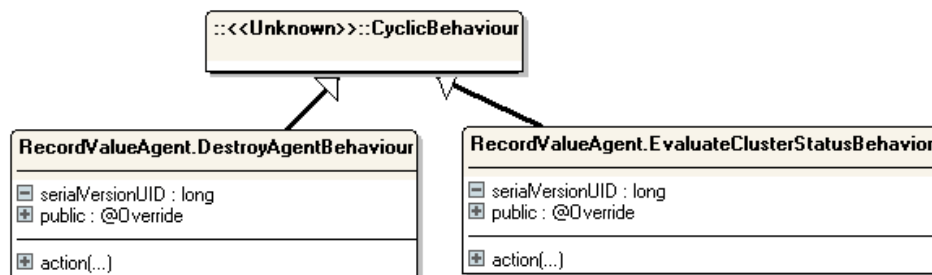


Figure C.8: RecordValueAgent Behaviors



## C.2.4 Exceptions

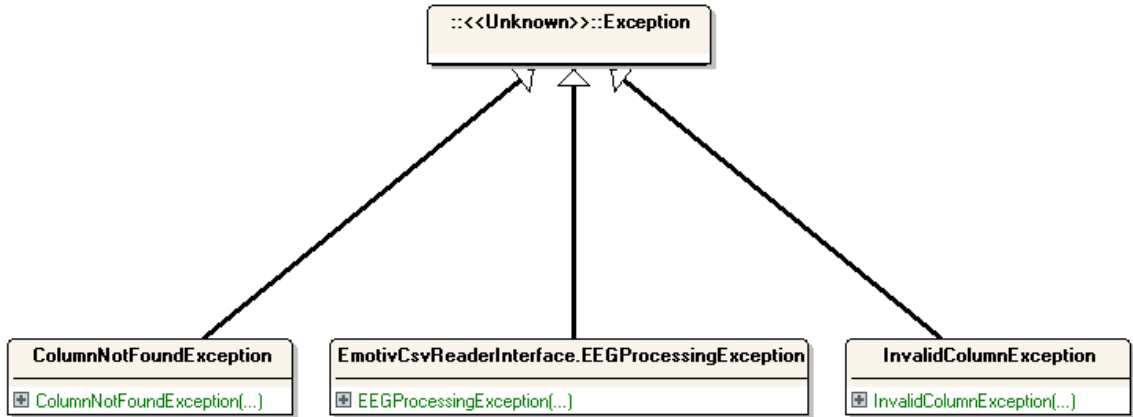


Figure C.10: Emotiv EEG Source Reading Exceptions

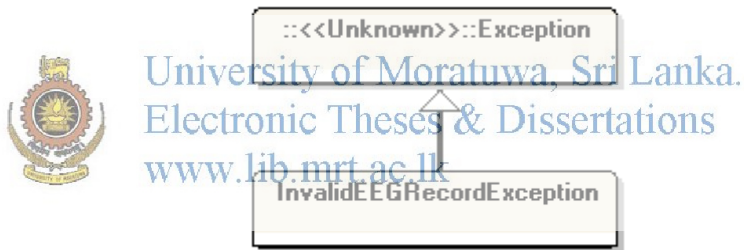


Figure C.11: Exception – Invalid EEG Record Exception

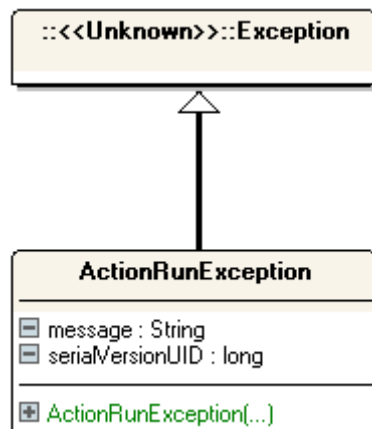


Figure C.12: Exception – Action Run Exception

## C.2.5 Action Execution Classes

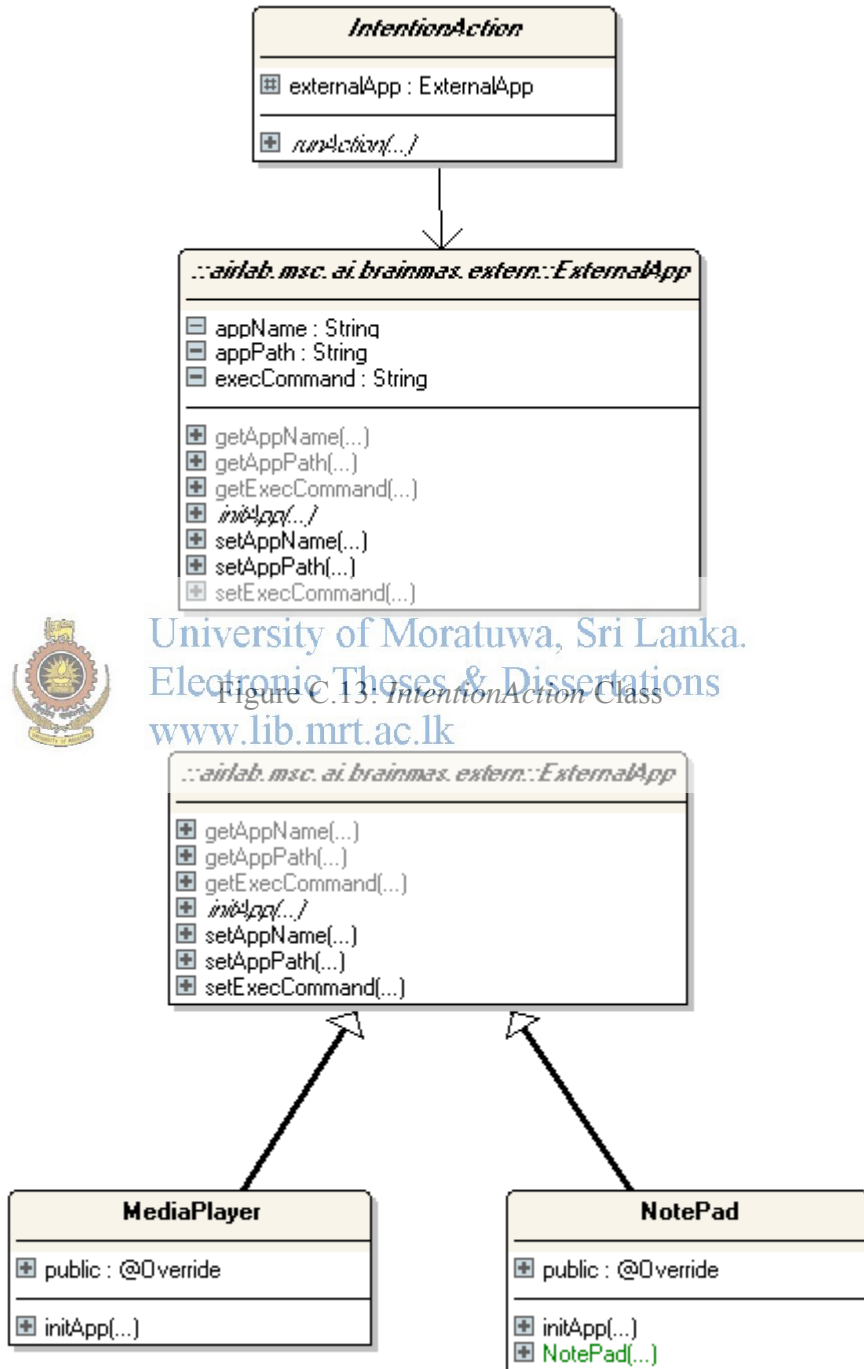


Figure C.14: External App – Media Player & Note Pad

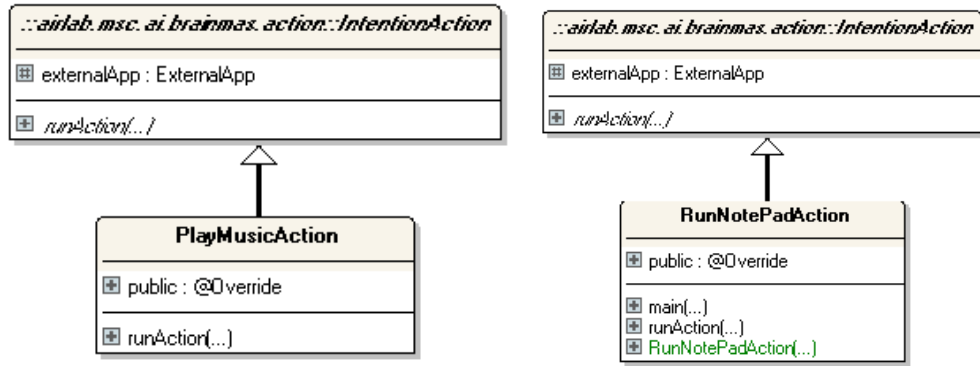


Figure C.15: Intention Action - Play Music & Run Note Pad Actions

### C.3. BrainMAS Main Application Classes

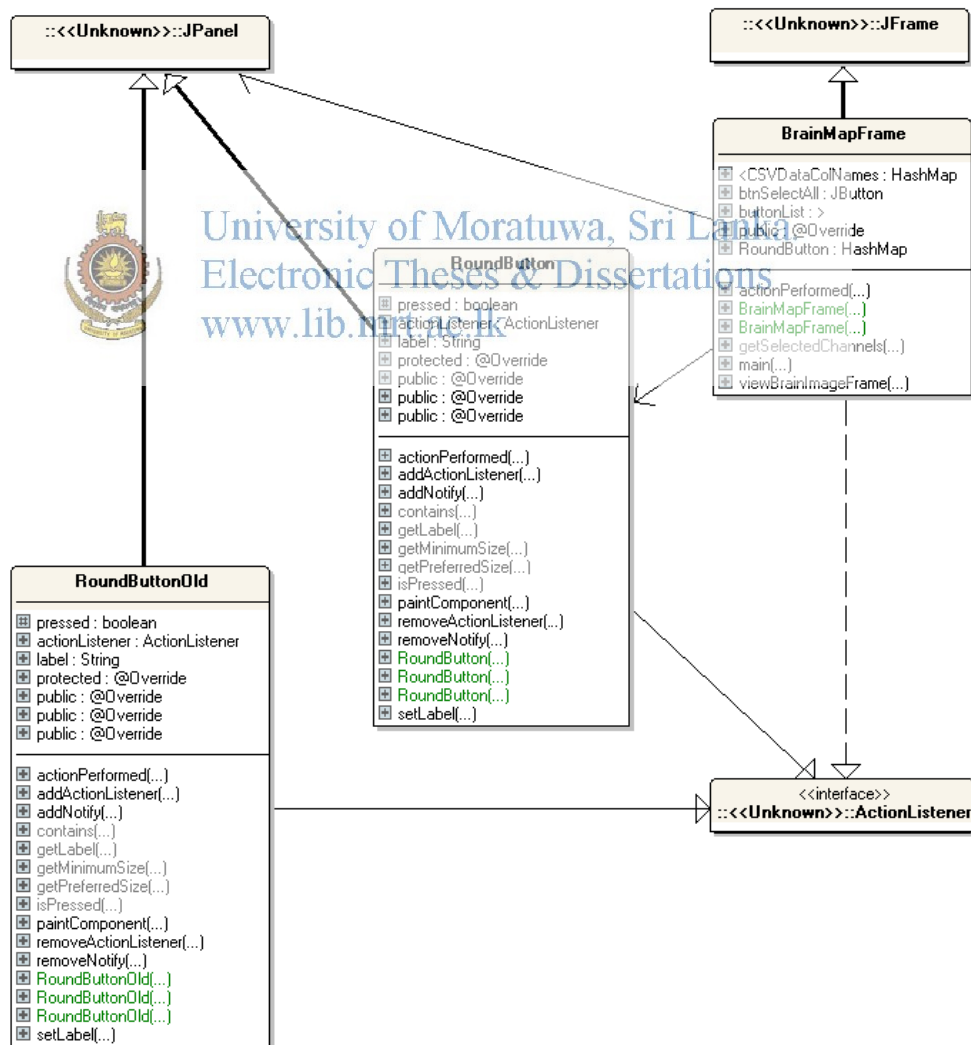


Figure C.16: Components of Channel Select Window



## Sample Screen Shots Of The System

### D.1. Brain MAS Application Screens

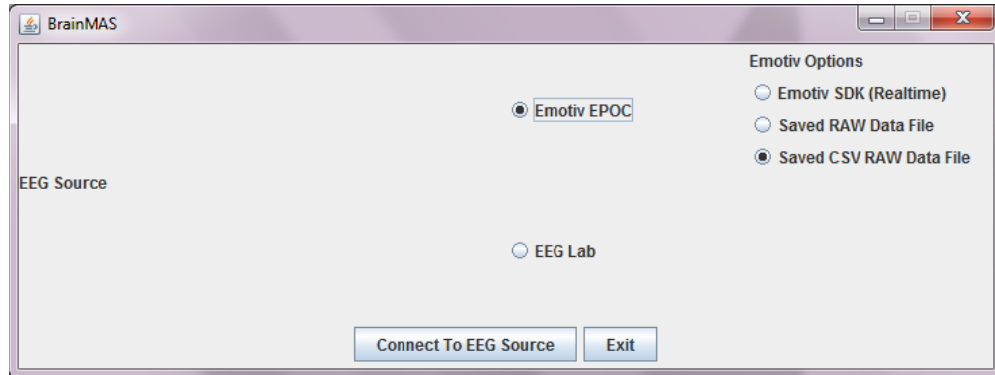


Figure D.1: Brain MAS EEG Source Selection

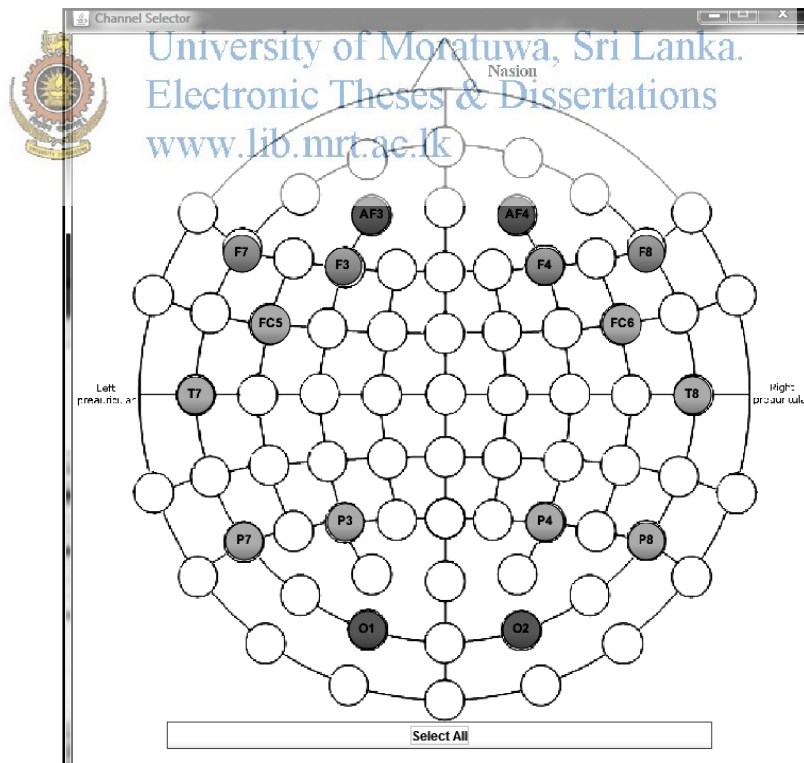


Figure D.2 : EEG Channel Selection Window

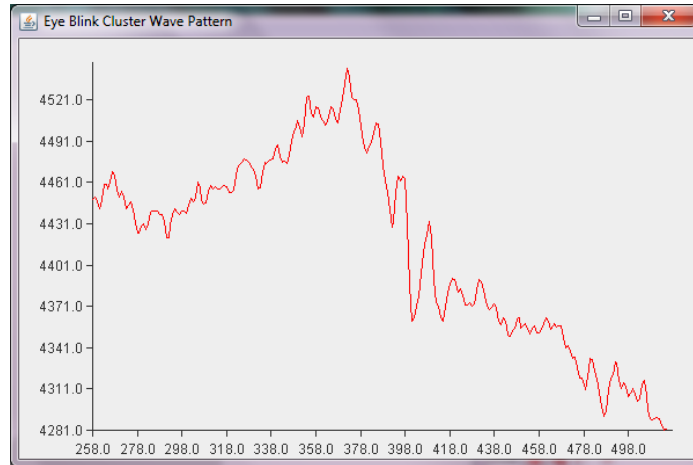


Figure D.3: Sample Cluster Signal Pattern Plot



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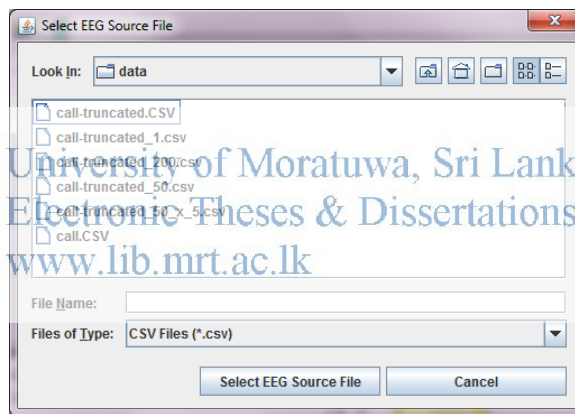


Figure D.4: EEG Signal Source File Selection

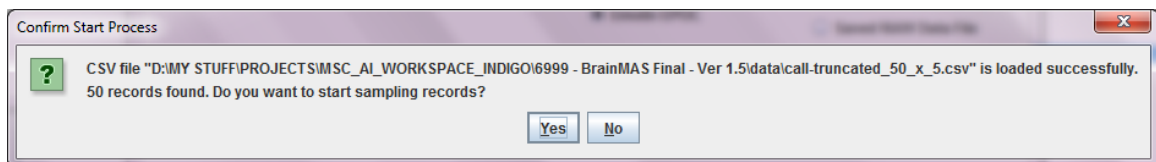


Figure D.5 : EEG Source File Confirmation

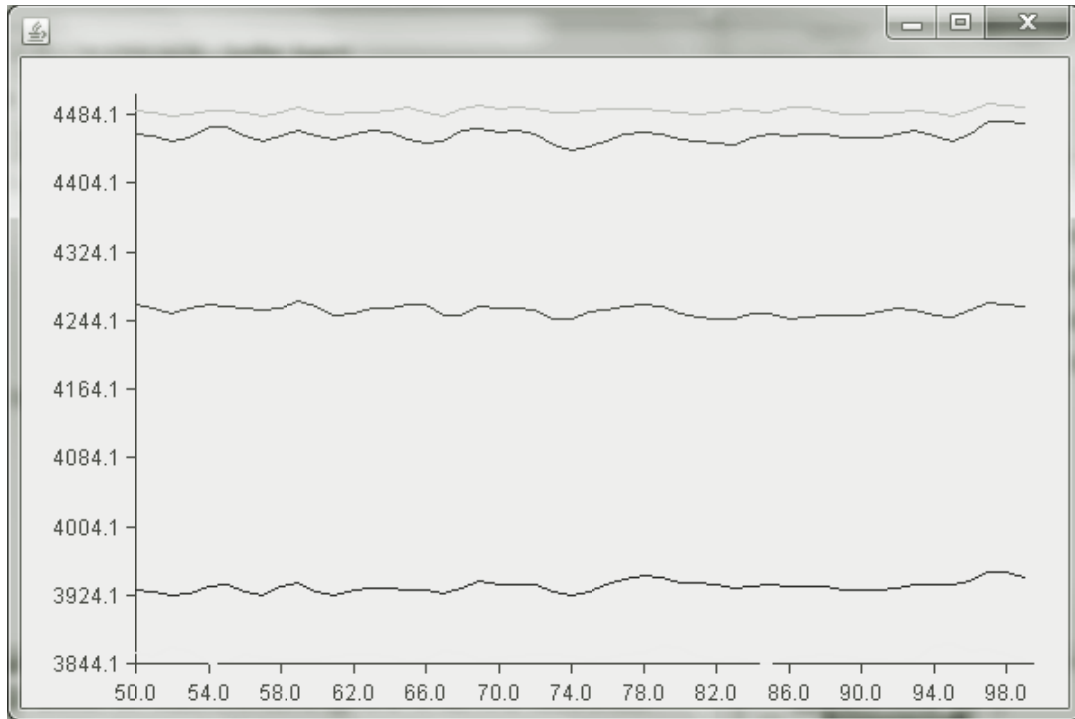


Figure D.6 : EEG Source Signal Plot  
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```

Console
New Cluster Agent Created : Alpha wave Cluster
New Cluster Agent Created : Beta Wave Cluster
New Cluster Agent Created : Gamma Wave Cluster
New Cluster Agent Created : Delta Wave Cluster
New Cluster Agent Created : Noisy Values Cluster
New Cluster Agent Created : Eye Blink Cluster
CSV Column Count : 23 : {0=(COUNTER) COUNTER, 1=(INTERPOLATED) INTERPOLATED, 2=(CHANNEL) AF3, 3=(OTHER) RAW_CQ, 4=(CHAN_CNTACTQLTY) C
Details of CSV File : .\patterns\eye_blink.csv
Title :
Record Time : 02.03.13 22.12.00
Subject : Stored Pattern
Sample Rate : 128
Channels : 1
Units : emotiv
Labels : [COUNTER, INTERPOLATED, AF3, RAW_CQ, CQ_AF3, CQ_F7, CQ_F3, CQ_FCS, CQ_T7, CQ_P7, CQ_01, CQ_02, CQ_P8, CQ_T8, CQ_FC6, CQ_F4
Has Header Record? : YES
Number Of Records : 258

Stored Pattern : 258
alpha-wave-cluster-agent: Cluster Agent initiated...
gamma-wave-cluster-agent: Cluster Agent initiated...
noise-wave-cluster-agent: Cluster Agent initiated...
beta-wave-cluster-agent: Cluster Agent initiated...
delta-wave-cluster-agent: Cluster Agent initiated...
eyeblink-pattern-cluster-agent: Cluster Agent initiated...
emotiv_csv_sampler: CSV Reader Agent Started...
CSV Column Count : 27 : {0=(COUNTER) COUNTER, 1=(INTERPOLATED) INTERPOLATED, 2=(CHANNEL) AF3, 3=(CHANNEL) F7, 4=(CHANNEL) F3, 5=(CHANNEL)
Details of CSV File : MSC_AI_WORKSPACE_INDIGO\6999 - BrainMAS Final - Ver 1.5\data\call-truncated_50_x_5.csv
Title :
Record Time : 02.03.13 22.12.00
Subject :
Sample Rate : 128
Channels : 36
Units : emotiv
  
```

Figure D.7: Application Log - Source File Read

```

eeg_rec_val_48F7 : 6 Cluser agents are present
eeg_rec_val_48F7 Clusters found : 6
alpha-wave-cluster-agent : Rejected application from eeg_rec_val_36AF3
gamma-wave-cluster-agent : Reieved application from eeg_rec_val_49T7
gamma-wave-cluster-agent : Rejected application from eeg_rec_val_49T7
eeg_rec_val_48F7 : Sending cluster application to - delta-wave-cluster-agent
noise-wave-cluster-agent : Reieved application from eeg_rec_val_28T7
noise-wave-cluster-agent : Accepted application from eeg_rec_val_28T7
eeg_rec_val_47F3 : 6 Cluser agents are present
eeg_rec_val_47F3 Clusters found : 6
eeg_rec_val_47T7 : 6 Cluser agents are present
eeg_rec_val_47T7 Clusters found : 6
gamma-wave-cluster-agent : Reieved application from eeg_rec_val_50FC5
gamma-wave-cluster-agent : Rejected application from eeg_rec_val_50FC5
alpha-wave-cluster-agent : Reieved application from eeg_rec_val_36F3
alpha-wave-cluster-agent : Rejected application from eeg_rec_val_36F3
eeg_rec_val_48F7 : Sending cluster application to - alpha-wave-cluster-agent
delta-wave-cluster-agent : Reieved application from eeg_rec_val_48F7
delta-wave-cluster-agent : Rejected application from eeg_rec_val_48F7
eeg_rec_val_47AF3 : 6 Cluser agents are present
eeg_rec_val_47AF3 Clusters found : 6
eeg_rec_val_47F3 : Sending cluster application to - delta-wave-cluster-agent
eeg_rec_val_47T7 : Sending cluster application to - delta-wave-cluster-agent
eeg_rec_val_48F7 : Sending cluster application to - gamma-wave-cluster-agent
noise-wave-cluster-agent : Reieved application from eeg_rec_val_33F7

```

Figure D.8: Application Log - Agent Negotiation

## D.2. JADE Platform Screens

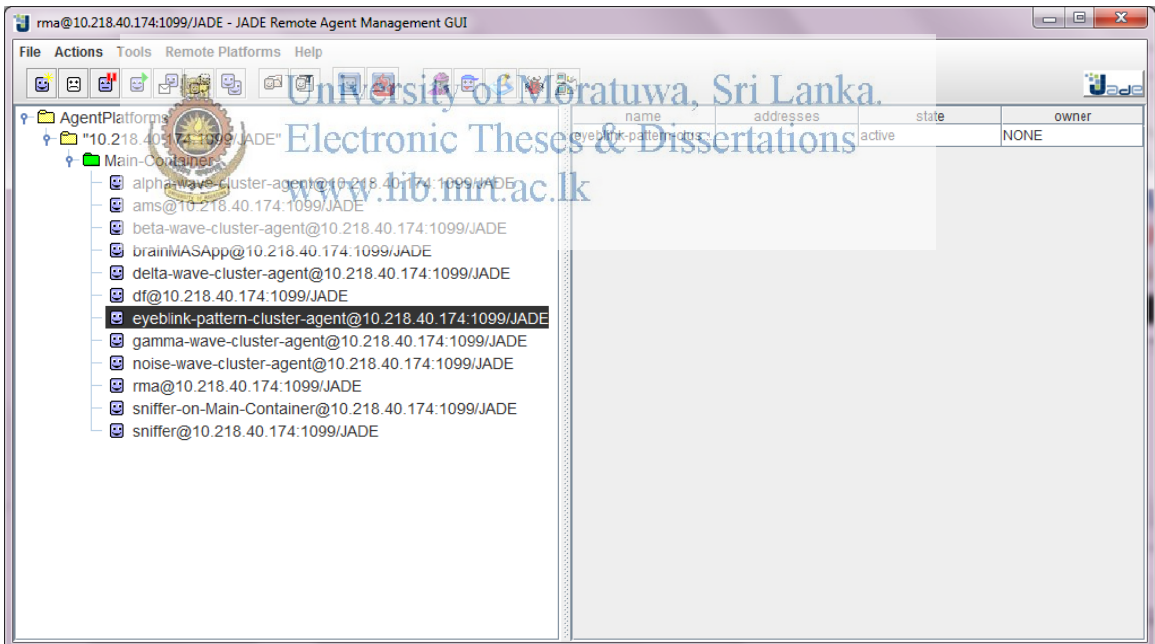


Figure D.9: JADE RMA Agent GUI - Platform

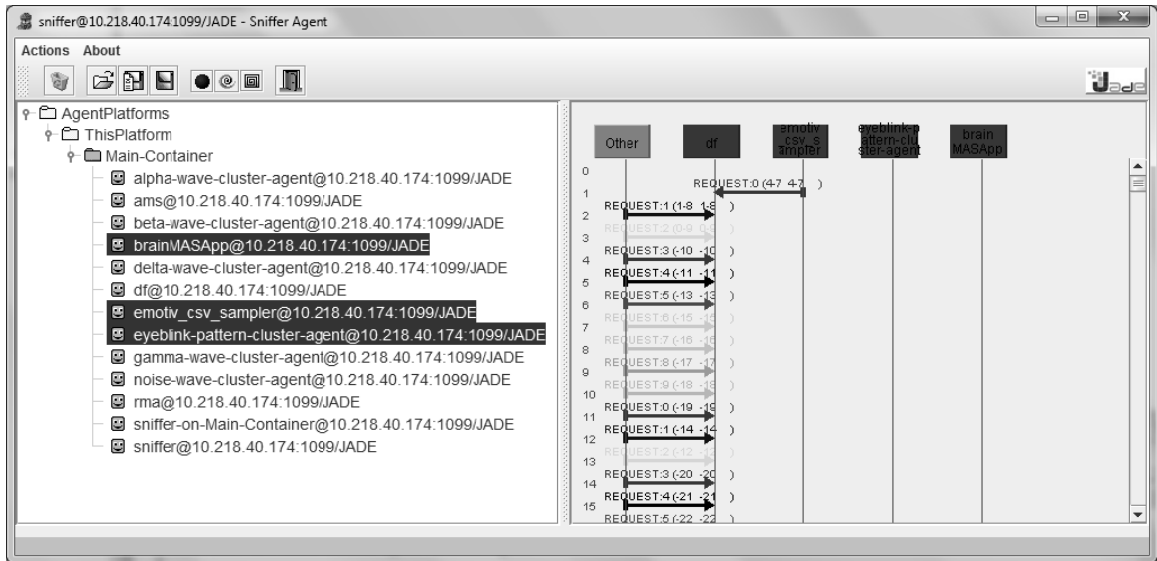


Figure D.10: Sniffer Agent - Initial State

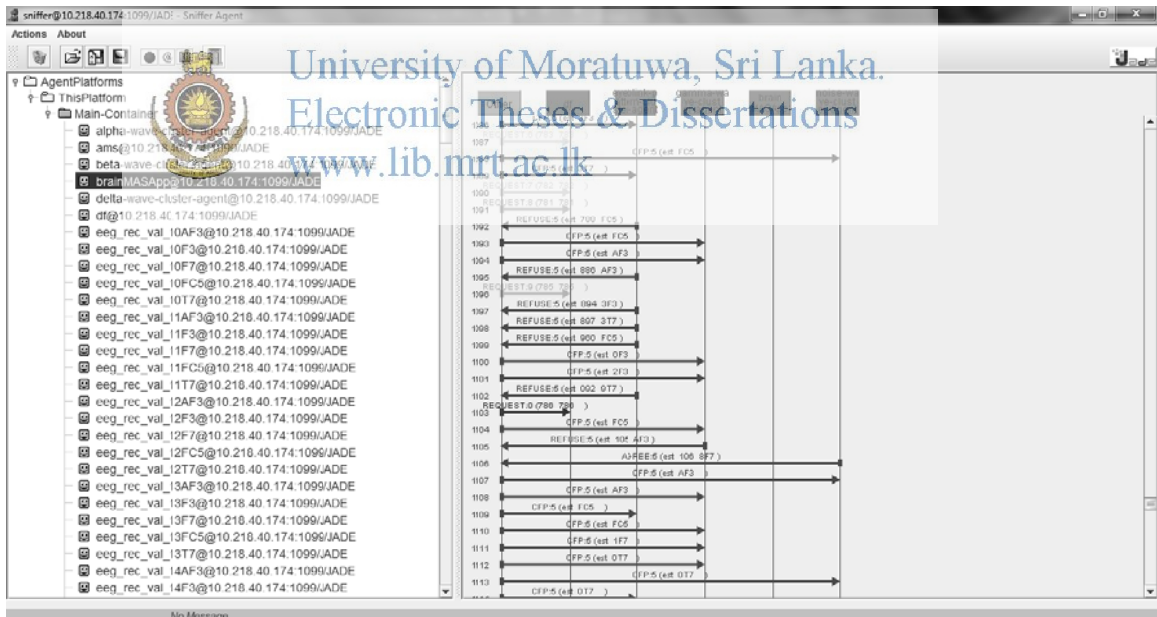


Figure D.11: Sniffer Agent - Record Value Agent Communication