|  |  |
| --- | --- |
| **Arousal State** | **Activity Value** |
| Extreme high arousal state | AV > 4.975 |
| High arousal state | 3.808 < AV ≤ 4.975 |
| Low arousal state | 0 < AV ≤ 3.808 |
| No Interaction | AV = 0 |

**Table 3. The proposed ranges for the high and low arousal states, based on the activity values.**

|  |  |
| --- | --- |
| **Emotional State** | **Activity value characteristics** |
| High Positive State | AV > 3.808  δAV (1.405) is not high (i.e., change of AV between consecutive intervals is less) |
| High Negative State | AV is high (AV > 4.049) with possibility of peaks (δAV > 1.614)  δAV = very high (rapid change in AV values in consecutive intervals) |
| Low Positive State | AV < 3.808  δAV (1.663) is not high (i.e., change of AV between consecutive intervals is less) |
| Low Negative State | AV< 4.049  δAV (1.858) is high (i.e., change of AV between consecutive intervals is fast) |

**Table 4. Mapping of the activity value and its rate of change to emotional states.**

**The previous Hypothesis**

**Hypothesis 2:** In the positive state, the rate of change of arousal level will be high. The rate of change will be less in the negative state.

Hypothesis 2 is basically another way of saying that the high positive state (e.g., excited) sustains less long than the high negative state (e.g., frustrated), as our intuition and observations confirm. We can use the hypotheses 1 and 2 together to determine the affective state of a user with the following set of rules.

a)      High positive state: the arousal level is high and the rate of change in arousal level over a period of time is also high.

b)      High negative state: the arousal level is high but the rate of change in arousal level is low.

c)      Low positive state: the arousal level is low but the rate of change in arousal level is high.

d)     Low negative state: both the arousal level as well as its rate of change is low.

**The Result derived from tables are:**  
           
1. The relationship of Average Activity rate in different states:   HP< HN < LP < LN

2. Activity value is high for Negative state than Positive state in both low and high arousal mode.

3. The rules to determine the affective state of a user

a)      High positive state: the arousal level is high and the rate of change in arousal level over a period of time is **low**

b)      High negative state: the arousal level is high but the rate of change in arousal level is **high.**

c)      Low positive state: the arousal level is low and the rate of change in arousal level is **high.**

d)     Low negative state: the arousal level is low but the rate of change is **very high.**