**Pattern Recognition**

**Assignment 4**

**Verification of the corrected code:**

The verification was done by checking if the output of the function – c and alfaHat matches the given values of c and alfaHat for the example given in section A.3 of the Exercise Project (page 238). The corrected code passed the test case.

**List of problems in the code given:**

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| **Original piece of code :** | T = size(pX) |
| **Corrected one :** | T = size(pX,2) |
| **Type of Flaw :** | Logical and Runtime |
| **Comments :** | T is duration of the observed pattern sequence and hence it is a scalar value and not a vector. |

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| **Original piece of code :** | alfaTemp = zeros(numberOfStates); |
| **Corrected one :** | alfaTemp = zeros(numberOfStates,1); |
| **Type of Flaw :** | Logical |
| **Comments :** | alfaTemp is a temporary value should get reset after calculating alfaHat for every time step ‘t’. Also, since it is reset everytime it will be a row vector with number of states as its size. Without this correction, we get incorrect dimensions of alfaHat and hence alfaHat in general becomes incorrect. |



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| **Original piece of code :** | alfaTemp(j) = alfaTemp(j)/c(2) |
| **Corrected one :** | alfaTemp(j) = alfaTemp(j)/c(t,1); |
| **Type of Flaw :** | Logical |
| **Comments :** | Incorrect c and alfaHat values and dimension. alfaTemp has to be normalised with c at that time instance ‘t’. This is because, alfaHat for a time instance ‘t’ is the normalized state probabilities given the observations at the time instance ‘t’ |

**4.**

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| **Original piece of code :** | alfaHat = [alfaHat alfaTemp'] |
| **Corrected one :** | alfaHat = [alfaHat alfaTemp] |
| **Type of Flaw :** | Runtime |
| **Comments :** | Error : Dimensions of matrices being concatenated are not consistent. |

**5.**

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| **Original piece of code :** | c(max(rows,columns)) = 0.0581 |
| **Corrected one :** | c(max(rows,columns)+1) = 0.0581 |
| **Type of Flaw :** | Logical |
| **Comments :** | For a finite duration HMM, we need to include the special exit condition S(T+1) and hence the exit probability is is for c(T+1). |