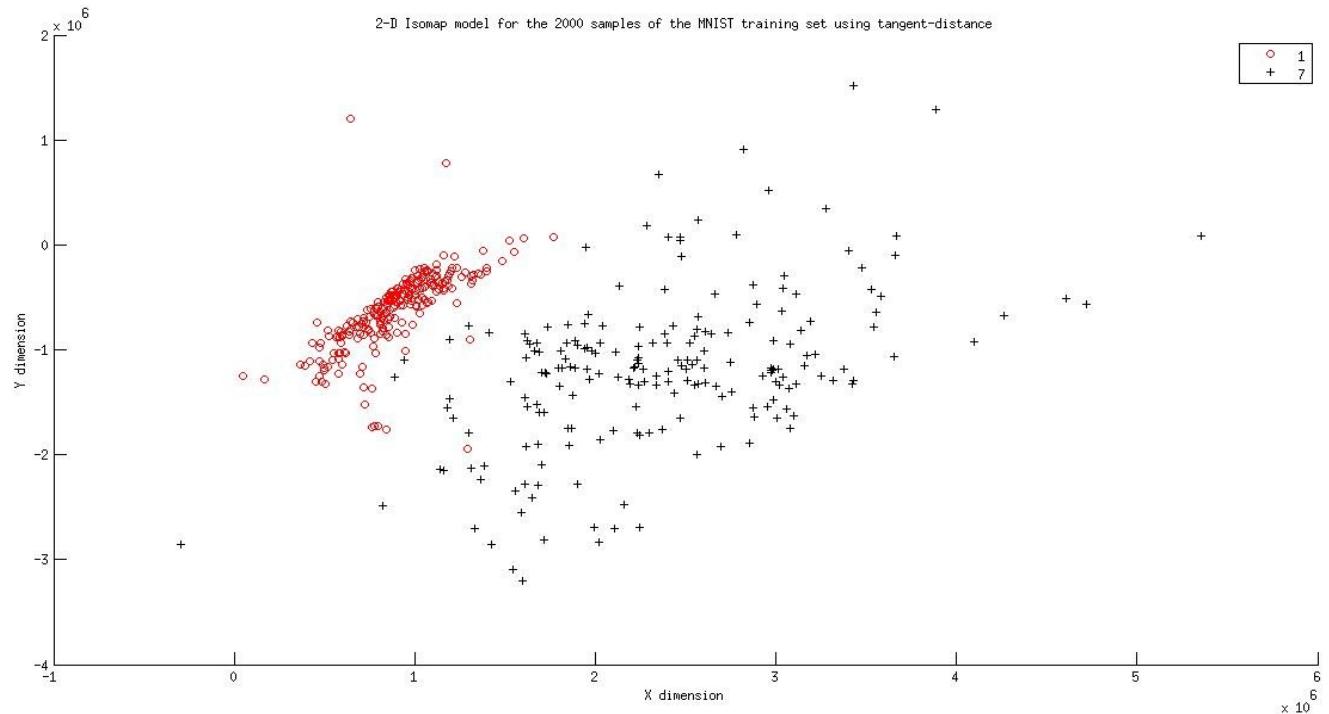


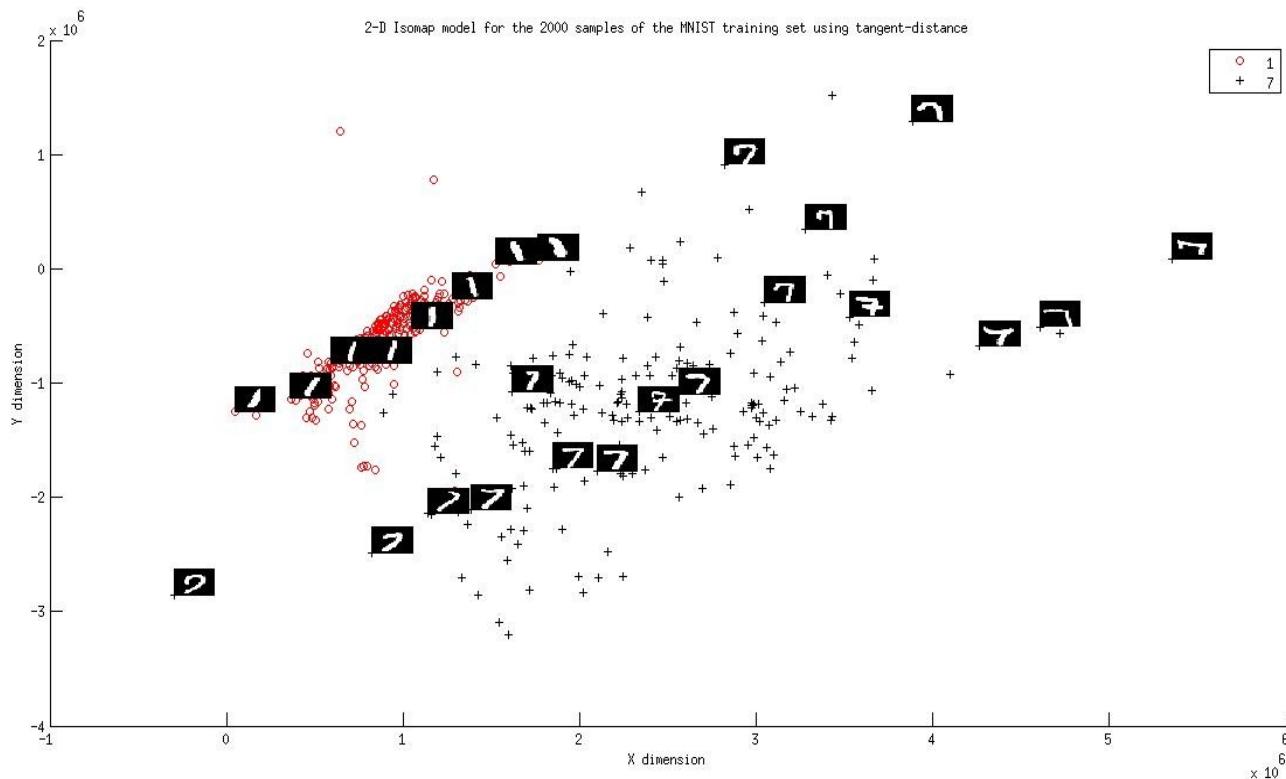
Part-A(2)

To construct the 2-D Isomap model using tangent-distance:

- Digit 1 and 7

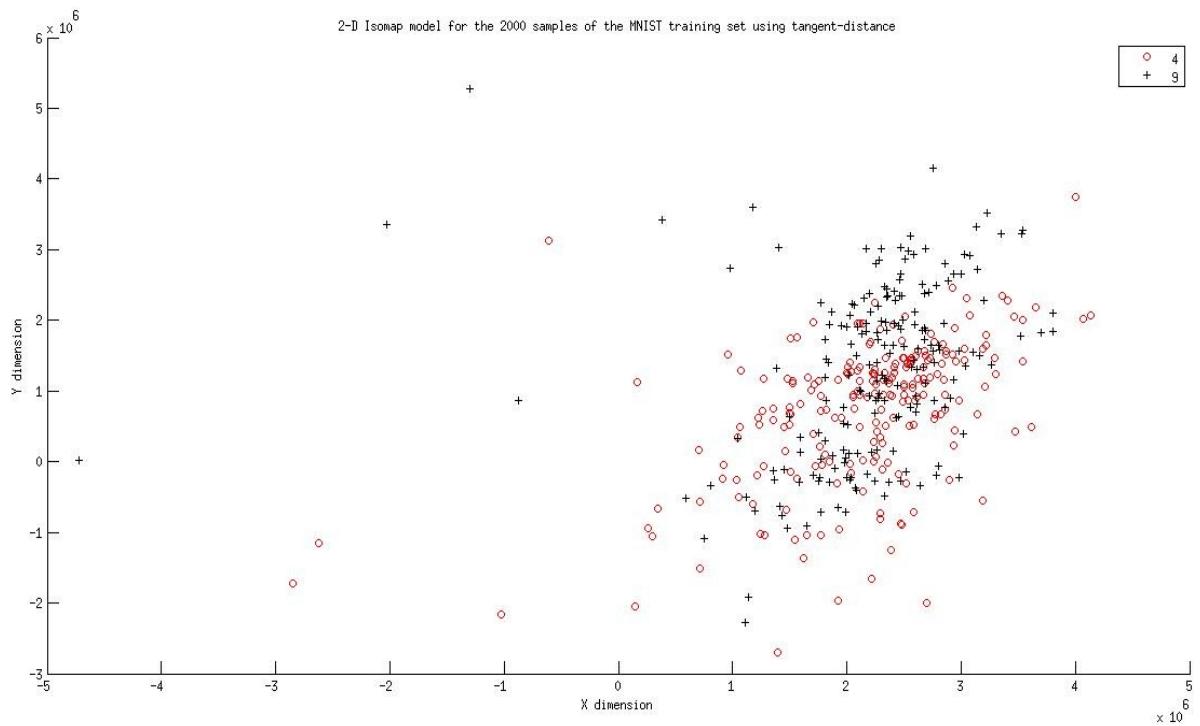


Showing some of the digits on the plot:

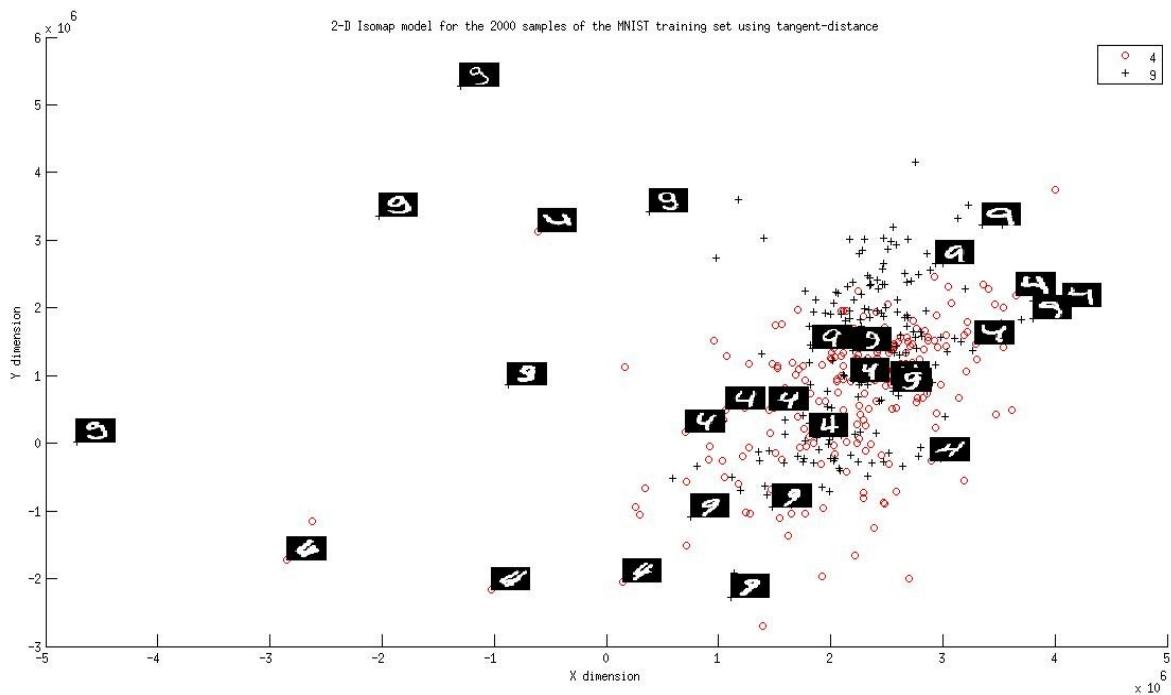


The images of digit 1 clearly forms a group and are distinguished from digit 7. Here the tangent distance can be used efficiently to recognize and separate digit 1 from digit 7.

- Digit 4 and 9:

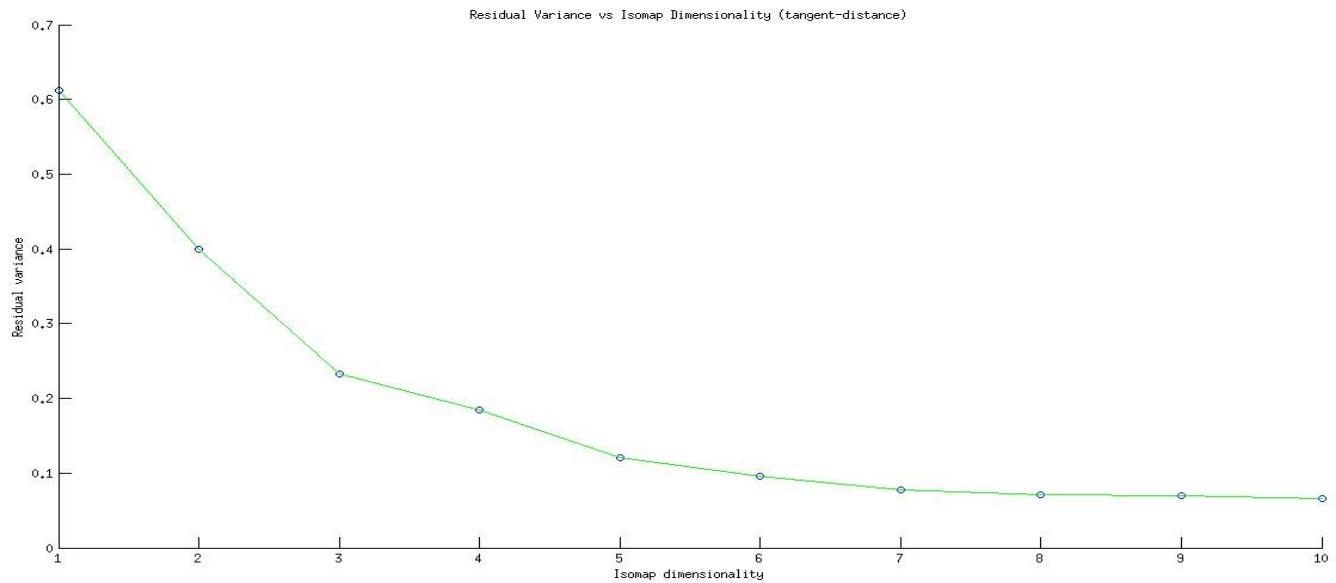
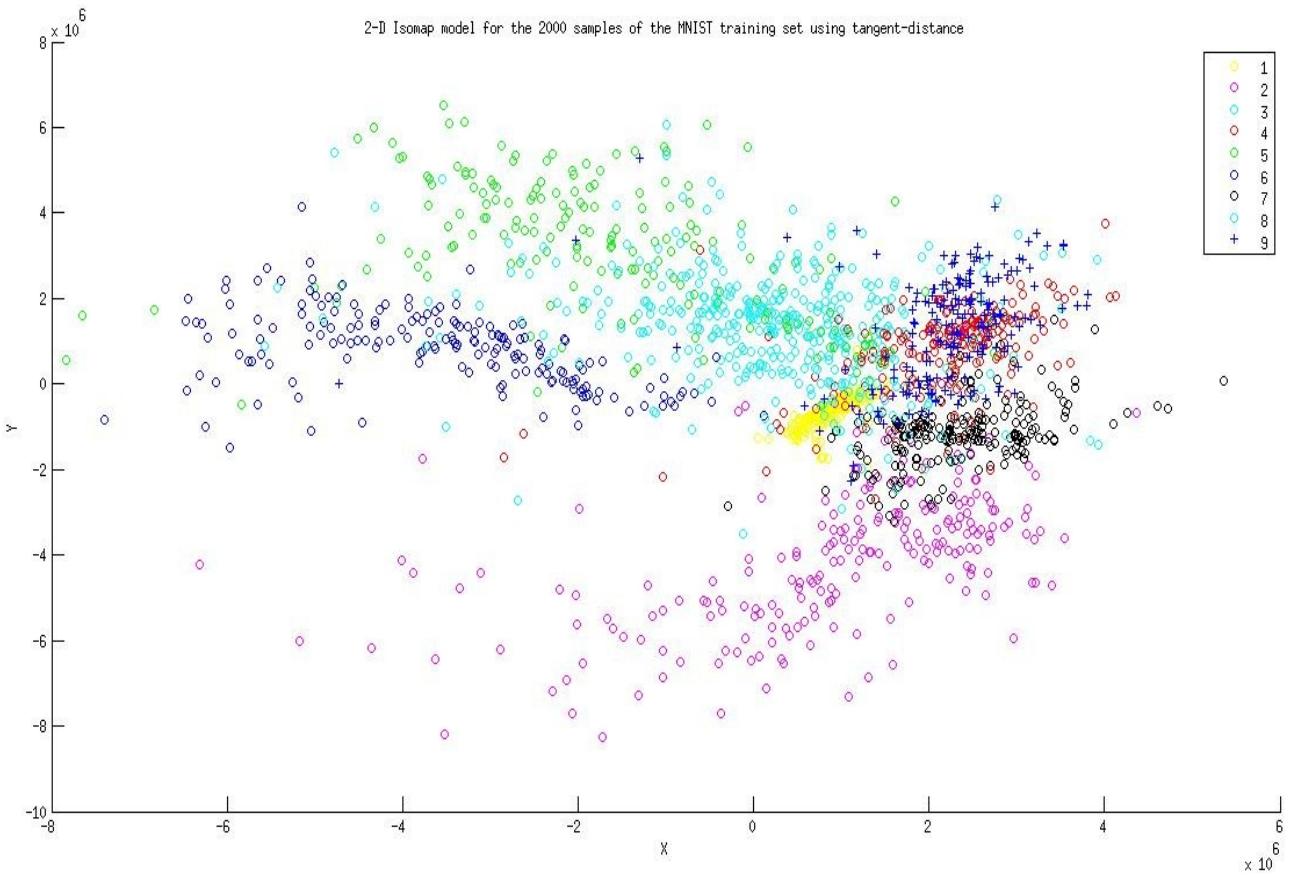


Showing some of the digits on the plot



Digits 4 and 9 are not separated as efficiently as in the case of digits 1 and 7. The reason being both 4 and 9 are written more or less in the same way. So they form a single group in the plot. We need a more efficient method to recognize these digits.

- 2-D Isomap model using tangent-distance for all the digits:



Tangent distance measures how different the two images are. And it can be shown that it is invariant to changes in image like rotation, translation, change of scale, compressing etc. By observing the plots one can argue that the Isomap model constructed using tangent distance separates or groups together the images of the hand written digits more efficiently than using Euclidean distance.