

# Journal

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## **1 Week 1 - 09/11/07 to 09/17/07**

This week we started working on the project called Sets. In this we are approximating the solution  $f$  of an equation in  $d$  dimensions by a separable function. The reason for this is that with functions in higher dimensions  $d$ , the computation complexity increases exponentially in  $d$  as the dimension increases and this problem is called the curse of dimensionality. For our project, we are using the separated representation of a vector to achieve this. Right now we are working on the base case and when done with it, we will extend it further where the final goal is to generate images of low-rank representations of vectors in 3 dimensions.

## **2 Week 2 - 09/17/07 to 09/24/07**

This week we started working on the code for determining the projection of the generated point on a plane which consists of the three basepoint. The generated point is a point which lies on the span of the three basepoints. So we are basically projecting the point  $B$ , onto the span of the plane consisting of the three basepoints  $A_1$ ,  $A_2$  and  $A_3$ , i.e,  $PB = b_1A_1 + b_2A_2 + b_3A_3$ . My part was to determine the values of  $\theta$  which is the angle between B and the plane consisting of  $A_1$ ,  $A_2$  and  $A_3$ , and also the coefficients  $b_1$ ,  $b_2$  and  $b_3$ . I was also assigned the task of writing the main driver.

## **3 Week 3 - 09/24/07 to 09/30/07**

This week we basically went through the code that each of us had written. We had to look for bugs and ensure that the entire code is working and is giving the desired results. I had to do some cleaning of the code and write some additional comments.

## **4 Week 4 - 09/30/07 to 10/7/07**

This week each of us had to work on a piece of code and I had to write a subroutine for the sort procedure. The sort procedure is basically used to discard the points which have an angle greater than the angle cut. This is to ensure that we keep only the useful points and discard any point that is far away. So once we sort the points based on the angle we get a sorted list of points and we can then use this sorted list to discard the points which have an angle greater than the angle cut.

## **5 Week 5 - 10/7/07 to 10/15/07**

This week we had to modify the code from the rank 1 case to the general rank and general resolution case. I had to optimize the code by modifying some portion of the code so that the parameters are passed rather than defining them in the subroutine. This is because each time the subroutine is called these parameters would be reassigned. Apart from this we had to analyze some of the images generated and understand what the images mean and what they indicate and the basic aim is generating some images which would give us the desired information.

## **6 Week 6 - 10/15/07 to 10/22/07**

This week we continued with the previous work and went ahead with writing the code for line points, homotopy and random walk, in order to connect arbitrary points on the lines. The basic purpose of these subroutines is to generate better images which might give more information. I was assigned the task of generating homotopy points. A homotopy between two points is generation of path by a continuous deformation of one point to another point by leaving the endpoint fixed and ensuring that the path remains within its defined region. So, basically we are generating a homotopy to connect two points. The homotopy points form curves and spirals between the two endpoints.

## **7 Week 7 - 10/22/07 to 10/29/07**

This week we had to look for some minimal cover algorithms. This is needed, in order to avoid coloring points which have already been colored by selecting the points which need to be colored. I looked at some minimum spanning tree algorithms and other minimal cover algorithms also but couldn't find them to be of much help. We need to read more and check if they would be of any help to our project.

## **8 Week 8 - 10/29/07 to 11/04/07**

This week we had to start preparing the project report and the project presentation. I have to speak about the line points, nearby points, random walk, homotopy points and trimmed cover. We are going to prepare the slides for presentation in pdf.

## **9 Week 9 - 11/05/07 to 11/12/07**

The "Sets" Group project presentation went on really well. I also attended the presentation of other groups and learned a lot in this process. The final presentation helped each of the groups understand what the other group was working on and how much the groups achieved and what their future plans were. It also helped us learn the different styles of presentation. I really enjoyed working on the project.