Mikaela Dobie

300164161

CSI2110 D

Lucia Moura

Programming Assignment 2 Report

Experiment 1: Verification

Text

Description automatically generated

|  |  |  |  |
| --- | --- | --- | --- |
| **Points** | **Linear** | **KD** | **#pts** |
| **1** | [(-5.415942549526783,0.7715622302147948,-0.3968421613600826), (-5.420458778974271,0.7891803562243134,-0.3973486218703048), (-5.429850154613408,0.8075670478362598,-0.3982168226988382), (-5.43030556398262,0.8246710769927127,-0.3984338736632657), (-5.432677820578597,0.8420909833742529,-0.3987956432309413)] | [(-5.420458778974271,0.7891803562243134,-0.3973486218703048), (-5.429850154613408,0.8075670478362598,-0.3982168226988382), (-5.43030556398262,0.8246710769927127,-0.3984338736632657), (-5.432677820578597,0.8420909833742529,-0.3987956432309413), (-5.415942549526783,0.7715622302147948,-0.3968421613600826)] | 5 |
| **2** | [(-12.992860583393504,5.051138148093654,0.7622934861842156), (-12.976373725118926,5.090611379773172,0.7622388885867976)] | [(-12.992860583393504,5.051138148093654,0.7622934861842156), (-12.976373725118926,5.090611379773172,0.7622388885867976)] | 2 |
| **3** | [(-36.10818686248445,14.241618397722052,4.293473761897471)] | [(-36.10818686248445,14.241618397722052,4.293473761897471)] | 1 |
| **4** | [(3.120500565609992,0.0626817334571532,0.4610553779823442), (3.1325477563686954,0.0533098761028178,0.4628090065256689), (3.135663991597881,0.0437404978846847,0.4632473987090112), (3.124626229458665,0.071407284130788,0.4308557147843563), (3.101060042170619,0.0613504651643957,0.4275782041593502), (3.102224266499409,0.0518528106206318,0.4277147594345744), (3.127132326652067,0.0426729987558792,0.4311288249443483), (3.1074370070938127,0.0328693350571258,0.4283975616247083), (3.110494894440637,0.0233580135464159,0.4288072530996791), (3.1491863135474705,0.0139866281830143,0.4341331975609065), (3.124448583809515,0.0042909825235033,0.4307191323087426), (3.106996584743287,0.0607965822112821,0.3982019007320806), (3.1121272286089696,0.0513459811348819,0.3988373764321324), (3.123179921500925,0.041944387155322,0.4002354917039907), (3.1431306038656457,0.032567946655484,0.4027774803812885), (3.1233786019830654,0.0227801237087123,0.4002354923207727), (3.1274271451816897,0.0036195964459265,0.4007438901352219)] | [(3.106996584743287,0.0607965822112821,0.3982019007320806), (3.1121272286089696,0.0513459811348819,0.3988373764321324), (3.123179921500925,0.041944387155322,0.4002354917039907), (3.1233786019830654,0.0227801237087123,0.4002354923207727), (3.1274271451816897,0.0036195964459265,0.4007438901352219), (3.1431306038656457,0.032567946655484,0.4027774803812885), (3.124626229458665,0.071407284130788,0.4308557147843563), (3.101060042170619,0.0613504651643957,0.4275782041593502), (3.102224266499409,0.0518528106206318,0.4277147594345744), (3.1074370070938127,0.0328693350571258,0.4283975616247083), (3.110494894440637,0.0233580135464159,0.4288072530996791), (3.124448583809515,0.0042909825235033,0.4307191323087426), (3.127132326652067,0.0426729987558792,0.4311288249443483), (3.1491863135474705,0.0139866281830143,0.4341331975609065), (3.120500565609992,0.0626817334571532,0.4610553779823442), (3.1325477563686954,0.0533098761028178,0.4628090065256689), (3.135663991597881,0.0437404978846847,0.4632473987090112)] | 17 |
| **5** | [(11.597053489523276,3.032865894391464,1.8696242228185609), (11.580473933555549,2.9906018684790574,1.8654633424019456)] | [(11.597053489523276,3.032865894391464,1.8696242228185609), (11.580473933555549,2.9906018684790574,1.8654633424019456)] | 2 |
| **6** | [(14.159820885717384,4.680702456874969,-0.1337915844837233), (14.180766680737111,4.639415392714257,-0.1338543779659772)] | [(14.159820885717384,4.680702456874969,-0.1337915844837233), (14.180766680737111,4.639415392714257,-0.1338543779659772)] | 2 |

Experiment 2: Computational Time

Text

Description automatically generated

|  |  |  |
| --- | --- | --- |
| File | Linear | KD |
| Point\_Cloud\_1.csv | 575ms | 105ms |
| Point\_Cloud\_2.csv | 1336ms | 304ms |
| Point\_Cloud\_3.csv | 1063ms | 183ms |

KD is approximately 75-80% faster than linear.

Experiment 3: Integration to DBScan

Text

Description automatically generated

File: Points\_Cloud\_1.csv

Text

Description automatically generated

File: Points\_Cloud\_2.csv

Text

Description automatically generated

File: Points\_Cloud\_3.csv

Due to the time it takes to create the tree itself on my system, KD ends up having a longer runtime than Linear.

The solution to P1 was used for experiment 3 to ensure no error on my part messed up the results.