

Lecture title

Subject
Week

Me

melbournebioinformatics.org.au

Lecture title

1. Contents slide starts with a single #
2. Example algorithms

Normal slides start with a double ##

🍌 content goes here

Columns

left col

right col

Overprint

Clipped images

Code blocks

```
put anything in the  
class name and you  
get grey
```

```
1 add .numberLines for  
2 numbered lines
```

```
1 work out bash/python
```

👑 it should match the text
indent

Alert blocks

Alerted block

- 👤 alerted content
- 👤 use the three colons to break out of the alertblock

We also have unstyled H3 blocks

- 👤 this matches the layout of alert blocks
- 👤 but has no colour

You need to use latex code to style the headers

- 👤 use the contrast sparingly for highlights

Lecture title

1. Contents slide starts with a single #
2. Example algorithms

Example algorithms

K-means (D, k, ε)

```
1  $t = 0$ 
2 Randomly initialize  $k$  centroids:  $\mu_1^t, \mu_2^t, \dots, \mu_k^t \in \mathbb{R}^d$ 
3 repeat
4    $t \leftarrow t + 1$ 
5    $C_j \leftarrow \emptyset$  for all  $j = 1, \dots, k$ 
6   // Cluster assignment step
7   foreach  $x_j \in D$  do
8      $j^* \leftarrow \arg \min_i \left\{ \|x_j - \mu_i^t\|^2 \right\}$  // Assign  $x_j$ 
9     to closest centroid
10     $C_{j^*} \leftarrow C_{j^*} \cup \{x_j\}$ 
11  // Centroid update step
12  foreach  $i = 1$  to  $k$  do
13     $\mu_i^t \leftarrow \frac{1}{|C_i|} \sum_{x_j \in C_i} x_j$ 
14 until  $\sum_{i=1}^k \|\mu_i^t - \mu_i^{t-1}\|^2 \leq \varepsilon$ 
```

Procedure Dbscan($X, \varepsilon, \text{minpts}$)

```
1 foreach unvisited point  $x \in X$  do
2   mark  $x$  as visited
3    $N \leftarrow \text{GetNeighbours}(x, \varepsilon)$ 
4   if  $|N| < \text{minpts}$  then
5     mark  $x$  as noise
6   else
7      $C \leftarrow \{x\}$ 
8     foreach point  $x' \in N$  do
9        $N \leftarrow N \setminus x'$ 
10      if  $x'$  is not visited then
11        mark  $x'$  as visited
12         $N' \leftarrow \text{GetNeighbours}(x', \varepsilon)$ 
13        if  $|N'| \geq \text{minpts}$  then
14           $N \leftarrow N \cup N'$ 
15      if  $x'$  is not yet member of any cluster
16        then
17           $C \leftarrow C \cup \{x'\}$ 
```