Exercise 5

The dataset below contains measurements of height and weight of six persons. Use a Gaussian mixture model to cluster each person.

Show complete solutions

Height and Weight Dataset

Person	Height (cm)	Weight (kg)	r_{women}	r_{men}
A	158	52	0.98	0.02
B	162	56	0.95	0.05
C	166	60	?	?
D	175	72	0.10	0.90
E	180	78	0.05	0.95
F	185	84	0.02	0.98

Parameter	women	men
$mean\ (\mu)$	$\begin{bmatrix}160\\55\end{bmatrix}$	$\begin{bmatrix}180\\78\end{bmatrix}$
$mixing\ coefficient\ (\pi)$	0.5	0.5
$covariance\ (\Sigma)$	$\begin{bmatrix}9 & 0\\0 & 16\end{bmatrix}$	$\begin{bmatrix}16 & 0\\0 & 25\end{bmatrix}$

1. Compute the responsibility for sample C. **(20 pts)**
2. Compute the data points for each cluster. **(20 pts)**
3. Compute the updated mixing coefficient for each cluster **(20 pts)**
4. Compute the updated means of each cluster. **(20 pts)**
5. Compute the updated covariance of each cluster. **(20 pts)**