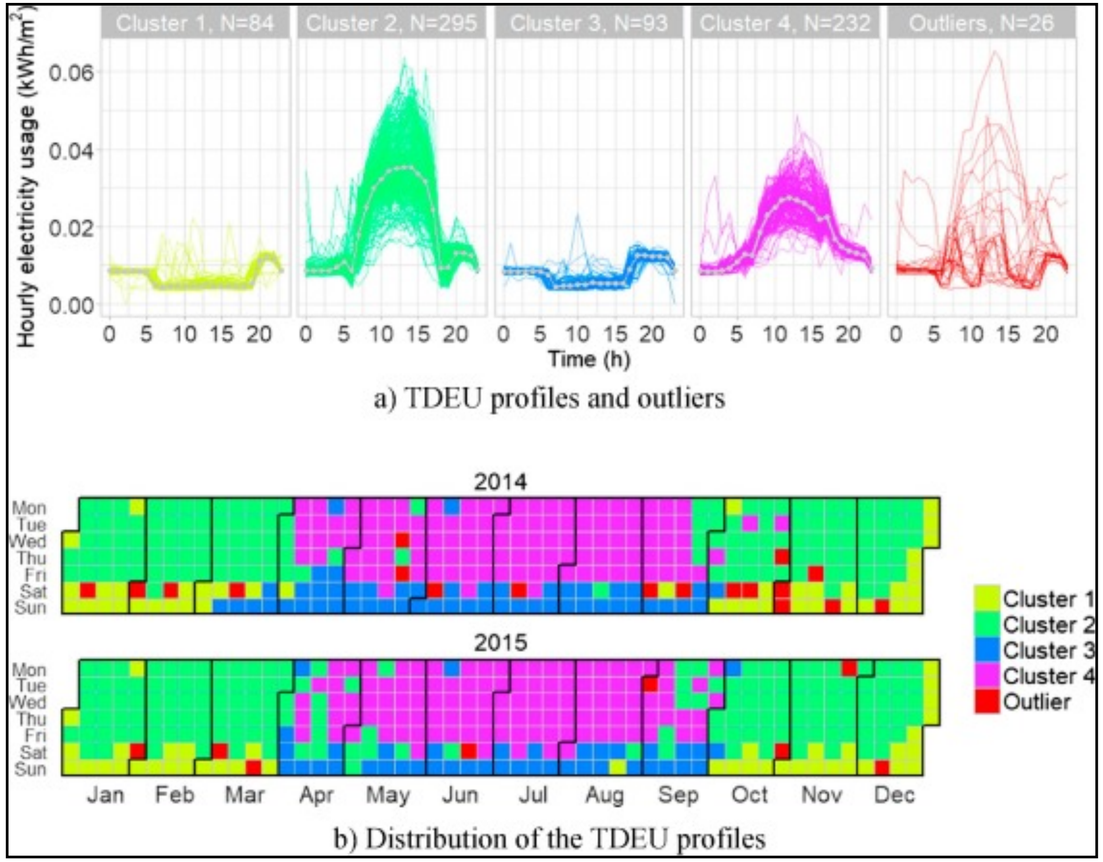
# Take Aways

- GMM does **soft assignment**, every data point belongs to every cluster with some probability
- Data points that are more likely to be in a cluster have **more influence** over its parameters
- GMM uses the EM algorithm to iteratively update the cluster distributions:
  - first assign a responsibility to each data point (**E-step**)
  - then using them to calculate weighted means and variances for each cluster (**M-step**)
- Responsibilities measure **the probability of a data point being in each cluster** (technically the posterior probability).
- Responsibilities contain information about how common a cluster is as well as **the likelihood of a data point belonging to that cluster**

# Applications

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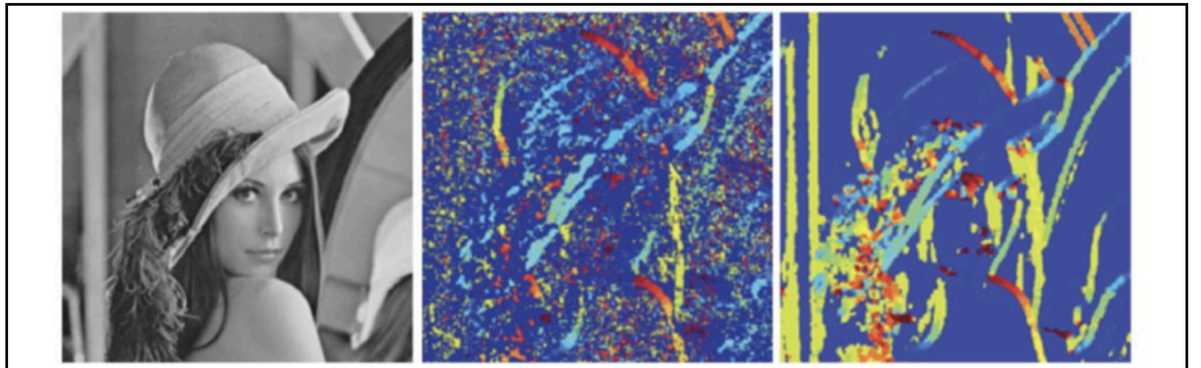
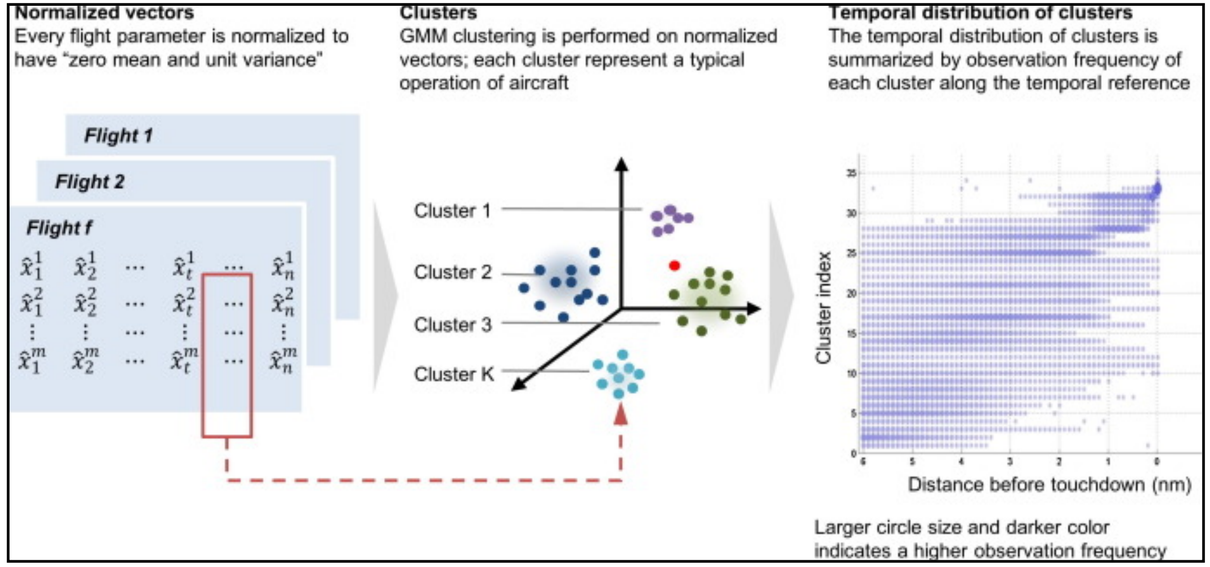


Fig. 1. Illustration of clustering of patches in the PLE method for the Lena image. LEFT: Original image; RIGHT: Clustered image; The pixels in the same color indicate that $8 \times 8$ patches around them are in the same cluster. It can be seen that patches from different parts of image are grouped into one cluster [17].

[source]

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