



Fig. 5.9: **Drawing random samples from the generative density model.** Given a trained density forest we can generate random samples by: i) selecting one of the component trees, ii) randomly navigating down to a leaf and, iii) drawing a sample from the associated Gaussian. The precise algorithmic steps are listed in algorithm 5.1.

Given a density forest with T trees:

- (1) Draw uniformly a random tree index $t \in \{1, \dots, T\}$ to select a single tree in the forest.
- (2) Descend the tree
 - (a) Starting at the root node, for each split node randomly generate the child index with probability proportional to the number of training points in edge (proportional to the edge thickness in fig. 5.9);
 - (b) Repeat step 2 until a leaf is reached.
- (3) At the leaf draw a random sample from the *domain bounded* Gaussian stored at that leaf.

Algorithm 5.1: **Sampling from the density forest model.**

a Gaussian.

An equivalent and slightly faster version of the sampling algorithm is obtained by compounding all the probabilities associated with individual edges at different levels together as probabilities associated with