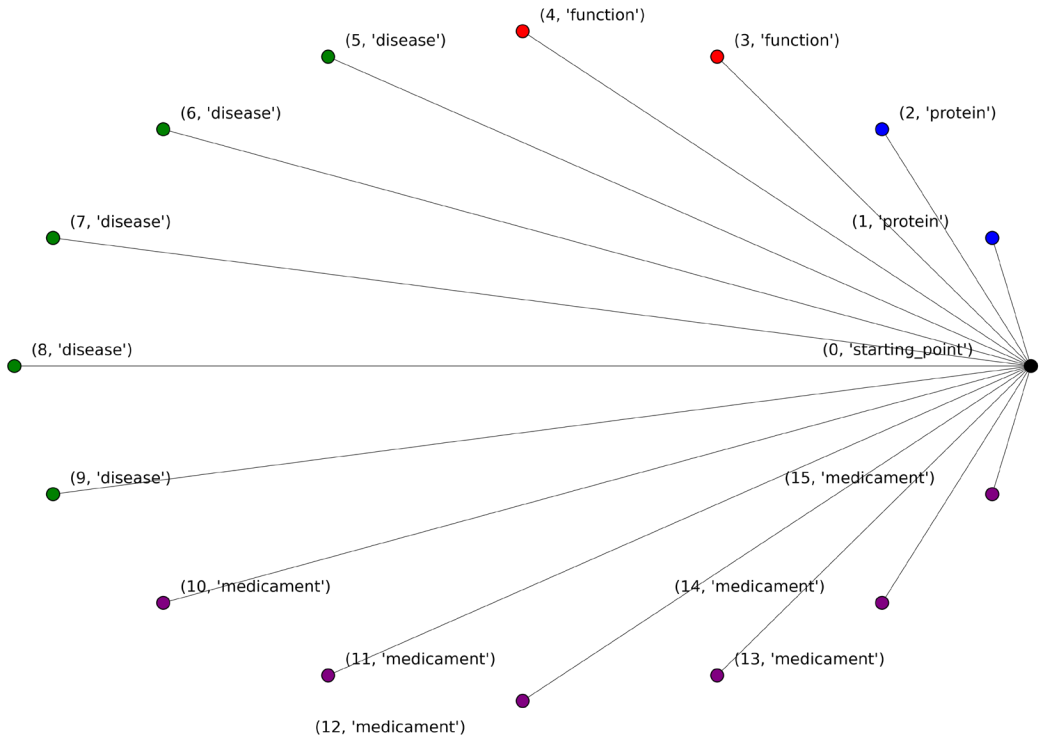
Knowledge Random Walker (KRW)

- Is a RW that can be tailored for the specific knowledge on a certain topic
- It assigns user defined weights to Edges leading to specific node classes

Let’s consider the following example



- Assume that I want to prioritize the path that from the starting point leads to function neighbors.

- I can assign a weight w to the edges in order to prioritize the connections to functions.

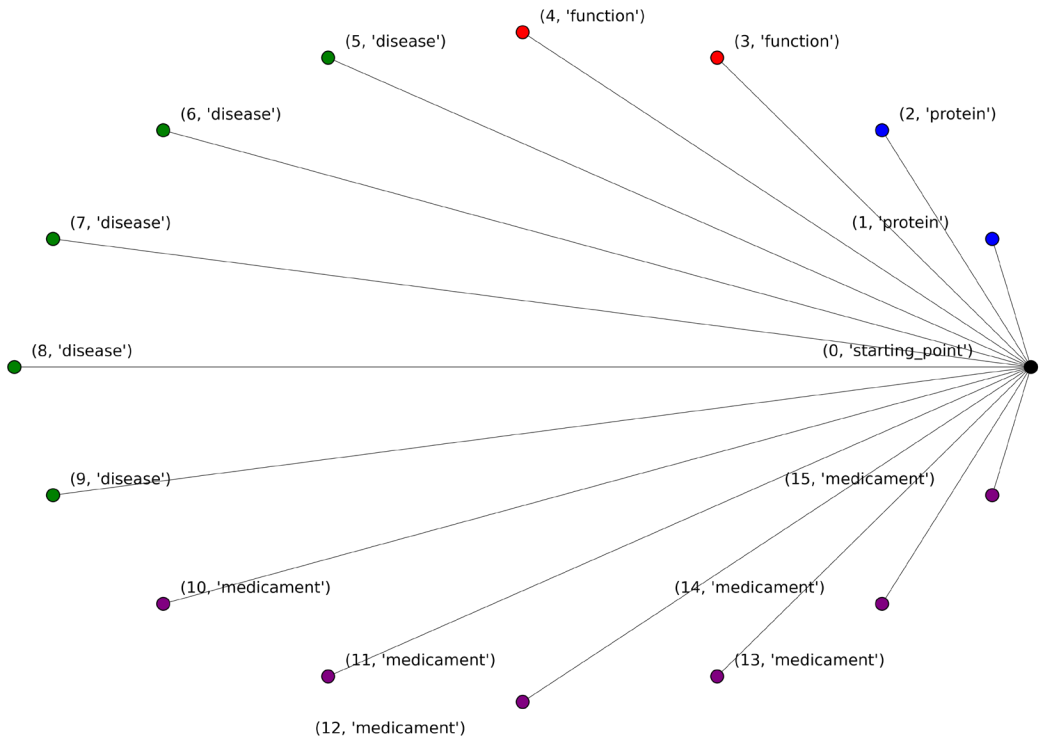
The law that binds the probability of visiting a specific neighbor type to weight is:

$$P(n_i) = \frac{n_i(1 + \frac{w}{n_i})}{W}$$

- n_i is the class of interest of nodes to weight
- $P(n_i)$ is the probability for the RW to jump to the class of interest
- w is the assigned weight
- W is the total number of connections i.e. degree of the node + w

Let’s consider the following example

We want to assign a weight w in order to weight the jump from starting node to “function” node type



- If $w = 0$:

$$P(n_f) = \frac{2\,(1 + \frac{0}{2})}{15 + 0} = \frac{2}{15} = 0{,}13$$

- If w = 5:

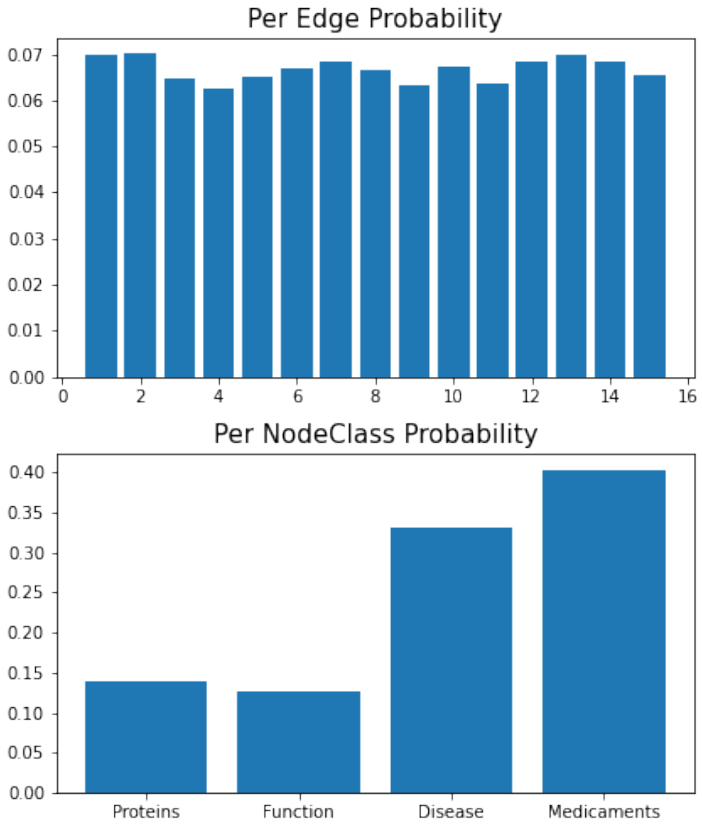
$$P(n_f) = \frac{2\,(1 + \frac{5}{2})}{15 + 5} = \frac{7}{20} = 0{,}35$$

- If w = 1000:

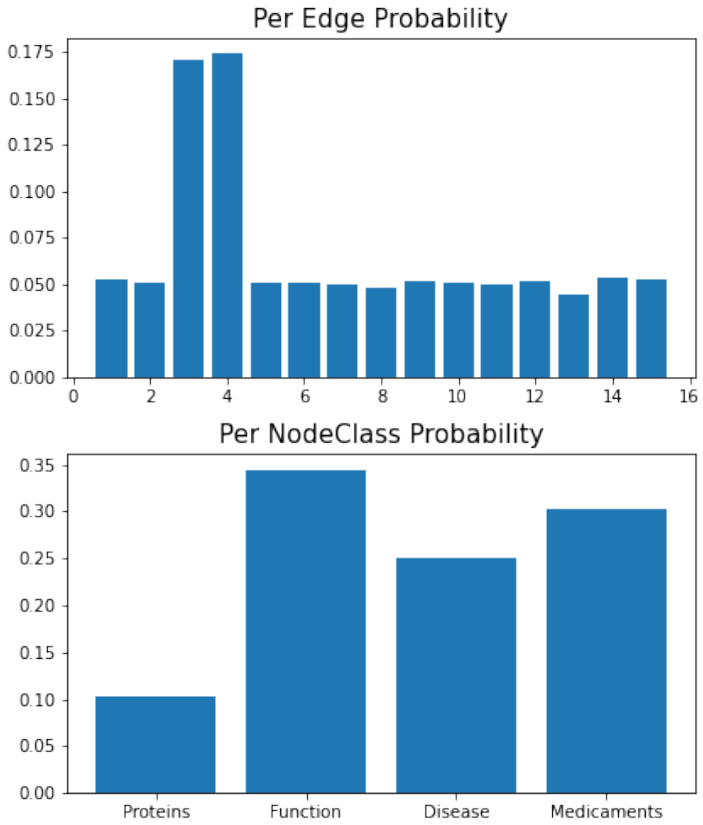
$$P(n_f) = \frac{2\,(1 + \frac{1000}{2})}{15 + 1000} = \frac{1002}{1015} = 0{,}98$$

10000 Simulation with different weights comparison

$w = 0$



$w = 5$:



$w = 1000$: