Let $G = \{V, E\}$ such that
V is a set of vertices $v_i = \{x, i\}, x \in \{A, C, G, T\} \cup \{\{S, 0\}, \{E, -1\}\}$ where S is a special start symbol and E is a special stop symbol and
E is a set of edges $e = \{v_x, v_y\}$ where $v_x, v_y \in V$

Let S be a finite string over the alphabet $\{A, C, G, t\}$ where the individual characters of the string is denoted S_i and substrings from x to y are denoted $S_{x:y}$

The graph mapping problem can be defined as:
For any pair $\{G, S\}$, maximize the recursive formula $f(G, S)$:
$f(G, \epsilon) = 0$,
$f(G, S_{0:x}) = f(G, S_{0:x-1}) + max_{v_j \in V}(\lambda_1 S(S_i, v_j) + \lambda_2 N(S_i, v_j))$
where λ are tuning parameters,
$S(x, y)$ is a scoring function for the two bases contained in x and y (typically defined by a scoring table) and
$N(x, y)$ is a scoring function for the context around x and y, defined as:
$N(x, y) = max_{c \in C_N(x)}(SW(c, C_N(y))$
where $C_N(x)$ is the set of all possible linear contexts of length N around x. A linear context would for a string be the $N/2$ characters in each direction whereas for a graph it would be every possible combination of every possible path going backwards $N/2$ nodes and forwards $N/2$ nodes from x