INFORME PROYECTO ALM

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Abstract

En este documento se recoge el código desarrollado así como los resultados obtenidos durante la realización de las práctias de laboratorio.

Contents

1 Distancias de edición

Implementaión de distancias de edición entre cadenas de forma iterativa y mediante programación dinámica

1.1 Distancia de Levensthtein

Considerando las operaciones de inserción, borrado y sustitución con coste=1.

Listing 1: Algoritmo distancia de levenshtein

```
    mat = matriz(x, y)
    res = np.zeros(shape=(len(x)+1,len(y)+1))
    for i in range(0,len(x)+1):
      for j in range(0,len(y)+1):
            if i==0 or j==0:
               res[i,j] = res[i,j] + i + j
            else:
               res[i,j] =min(
                  mat[i-1,j-1] + res[i-1,j-1],
                  1 + res[i-1,j],
                  1 + res[i,j-1]
               )

    return res[len(x),len(y)]
```

1.2 Distancia de Damerau-Levensthtein restringida

Listing 2: Sample Python code – Damerau-Levensthtein restringido

```
    INF = len(x) + len(y)

    mat = matriz(x, y)
    res = np.zeros(shape=(len(x)+1,len(y)+1))

    for i in range(0,len(x)+1):
      for j in range(0,len(y)+1):
            if i==0 or j==0:
               res[i,j] = res[i,j] + i + j
            elif i == 1 or j == 1:
               res[i,j] =min(
                  mat[i-1,j-1] + res[i-1,j-1],
                  1 + res[i-1,j],
                  1 + res[i,j-1],
               )
            else:
               res[i,j] =min(
                  mat[i-1,j-1] + res[i-1,j-1],
                  1 + res[i-1,j],
                  1 + res[i,j-1],
                  1 + res[i-2,j-2] + (mat[i-2,j-1] + mat[i-1,j-2]) * INF
               )
    return res[len(x),len(y)]
```

1.3 Distancia de Damerau-Levensthtein intermedia

Considerando las operaciones de edición cuando:

$$|u| + |v| \leqslant cte \Leftarrow cte = 1 \tag{1}$$

Listing 3: Damerau-Levensthtein intermedio

```
    M = np.zeros((len(x) + 1, len(y) + 1))
    for i in range(1, len(x) + 1):
      M[i, 0] = i
    for j in range(1, len(y) + 1):
      M[0, j] = j
    for i in range(1, len(x) + 1):
        for j in range(1, len(y) + 1):
            minInit = 0
            if x[i - 1] == y[j - 1]:
                minInit = min(M[i-1, j] + 1, M[i, j-1] + 1, M[i-1][j-1])
            else:
                minInit = min(M[i-1, j] + 1, M[i, j-1] + 1, M[i-1][j-1] + 1)

            if j > 1 and i > 1 and x[i - 2] == y[j - 1] and x[i - 1] == y[j - 2]:
                M[i,j] = min(minInit, M[i-2][j-2] + 1)
            elif j > 2 and i > 1 and x[i-2] == y[j-1] and x[i-1] == y[j-3]:
                M[i,j] = min(minInit, M[i-2][j-3] + 2)
            elif i > 2 and j > 1 and x[i - 3] == y[j-1] and x[i-1] == y[j-2]:
                M[i,j] = min(minInit, M[i-3][j-2] + 2)
            else:
                M[i,j] = minInit
    return M[len(x), len(y)]
```

1.4 Distancia de Damerau-Levensthtein general

Esta por hacer

Listing 4: Damerau-Levensthtein general

```
        M = np.zeros((len(x) + 1, len(y) + 1))
        for i in range(1, len(x) + 1):
          M[i, 0] = i
        for j in range(1, len(y) + 1):
          M[0, j] = j
        for i in range(1, len(x) + 1):
            for j in range(1, len(y) + 1):
                minInit = 0
                if x[i - 1] == y[j - 1]:
                    minInit = min(M[i-1, j] + 1, M[i, j-1] + 1, M[i-1][j-1])
                else:
                    minInit = min(M[i-1, j] + 1, M[i, j-1] + 1, M[i-1][j-1] + 1)

                if j > 1 and i > 1 and x[i - 2] == y[j - 1] and x[i - 1] == y[j - 2]:
                    M[i,j] = min(minInit, M[i-2][j-2] + 1)
                elif j > 2 and i > 1 and x[i-2] == y[j-1] and x[i-1] == y[j-3]:
                    M[i,j] = min(minInit, M[i-2][j-3] + 2)
                elif i > 2 and j > 1 and x[i - 3] == y[j-1] and x[i-1] == y[j-2]:
                    M[i,j] = min(minInit, M[i-3][j-2] + 2)
                else:
                    M[i,j] = minInit
        return M[len(x), len(y)]
```

2 Distancias de edición con thresholds

Listing 5: Sample Bash code.

```
#! /bin/bash
python stage1.py
echo "Stage I done!"
python stage2.py
echo "Stage II done!"
python stage3.py
echo "Stage III done!"
```

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