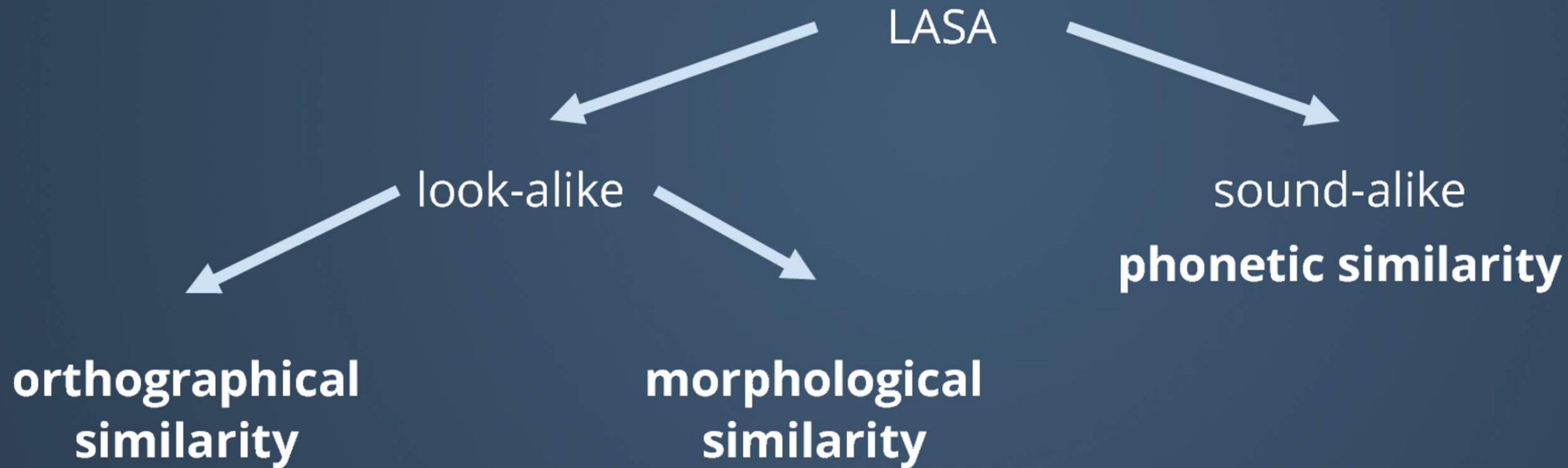


GRAPHICAL MAPPING OF THE DRUG NAME SIMILARITY - THE STRUCTURE OF SOUND - ALIKE AND LOOK - ALIKE SIMILARITY

CURRENT SITUATION

- About 10 % of all errors in the treatment processes in a hospital are medication errors
- About 20% of them are related to the confusion of drug names described as the look-alike or sound-alike errors (LASA).
- As prevention: creating LASA lists

THE SLIGHT BUT IMPORTANT DIFFERENCE



OUR AIM

Development of a prospective analytical strategy to prevent the confusion of LASA drugs

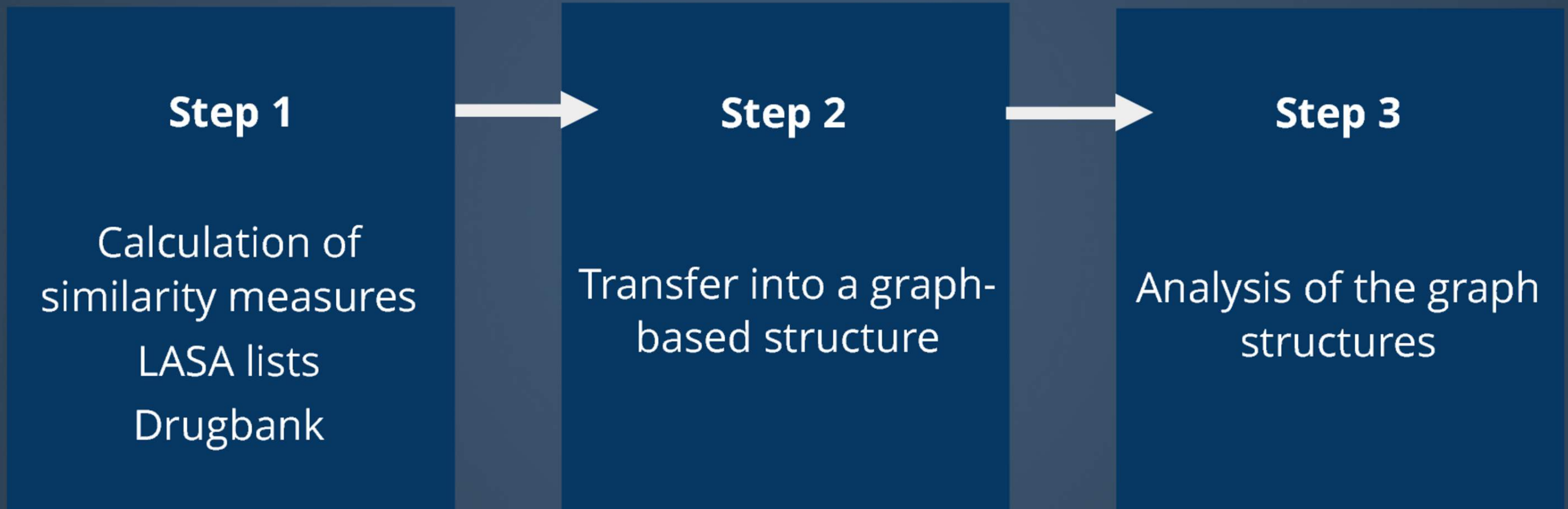
1. Detection of potential candidates
2. Understanding similarity properties



METHODS

Similarity measures and graph analysis

ANALYTICAL STRATEGY



CALCULATION OF SIMILARITY PROPERTIES OF LASA-LISTS

- Institute for Safe Medication Practices (2016)
- Bundesverbandes Deutscher Krankenhausapotheker (2015)

CANADIAN DRUGBANK DATABASE

- <https://www.drugbank.ca/>
- Wishart DS, Feunang YD, Guo AC, Lo EJ, Marcu A, Grant JR, Sajed T, Johnson D, Li C, Sayeeda Z, Assempour N, Iynkkaran I, Liu Y, Maciejewski A, Gale N, Wilson A, Chin L, Cummings R, Le D, Pon A, Knox C, Wilson M. DrugBank 5.0: a major update to the DrugBank database for 2018. *Nucleic Acids Res.* 2017 Nov 8.

ORTHOGRAPHICAL SIMILARITY

Levenshtein-Distance

eighth - weight = 2

ORTHOGRAPHICAL SIMILARITY

Levenshtein-Distance

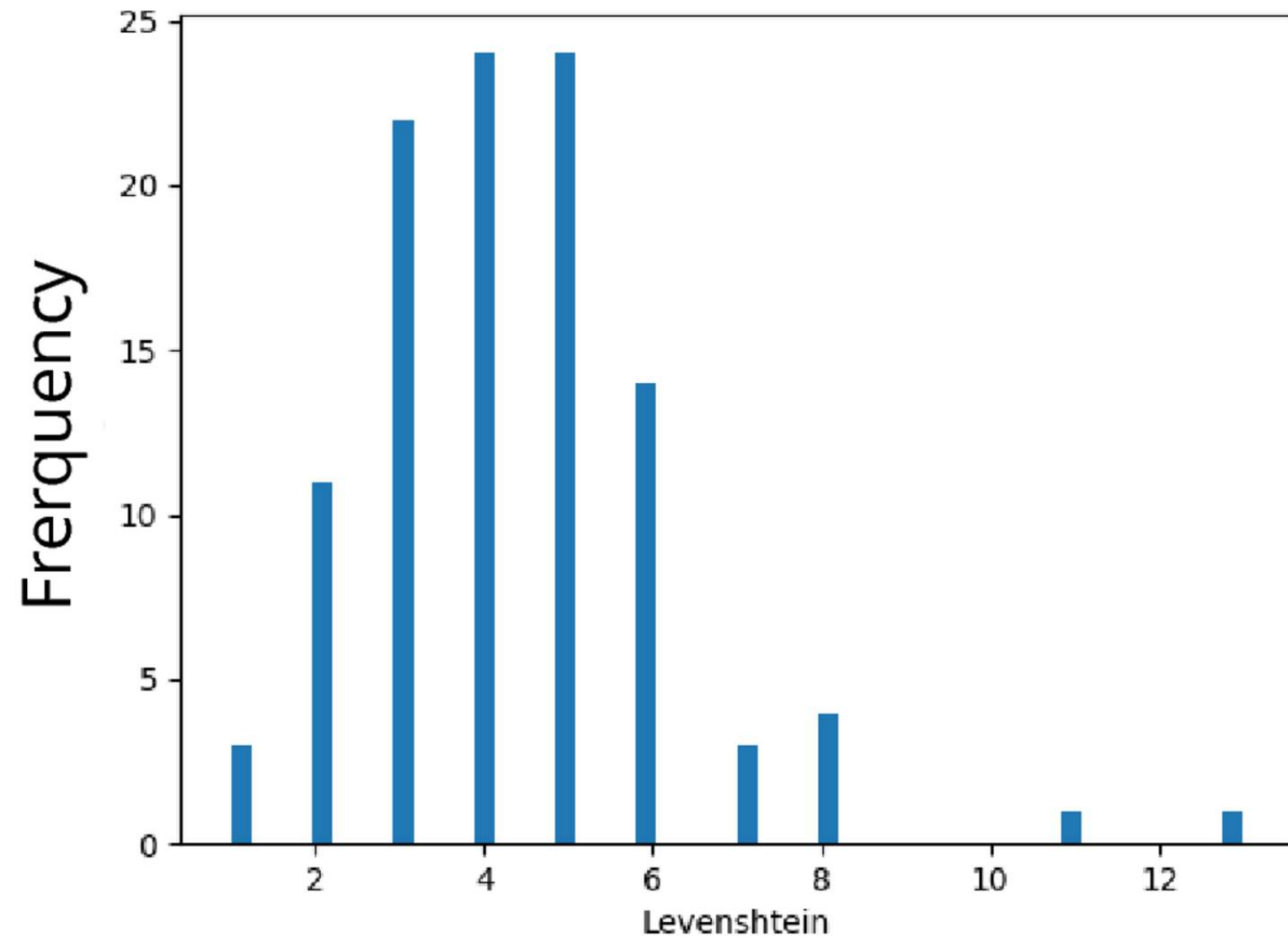
eighth - weight = 2

Levenshtein-Index

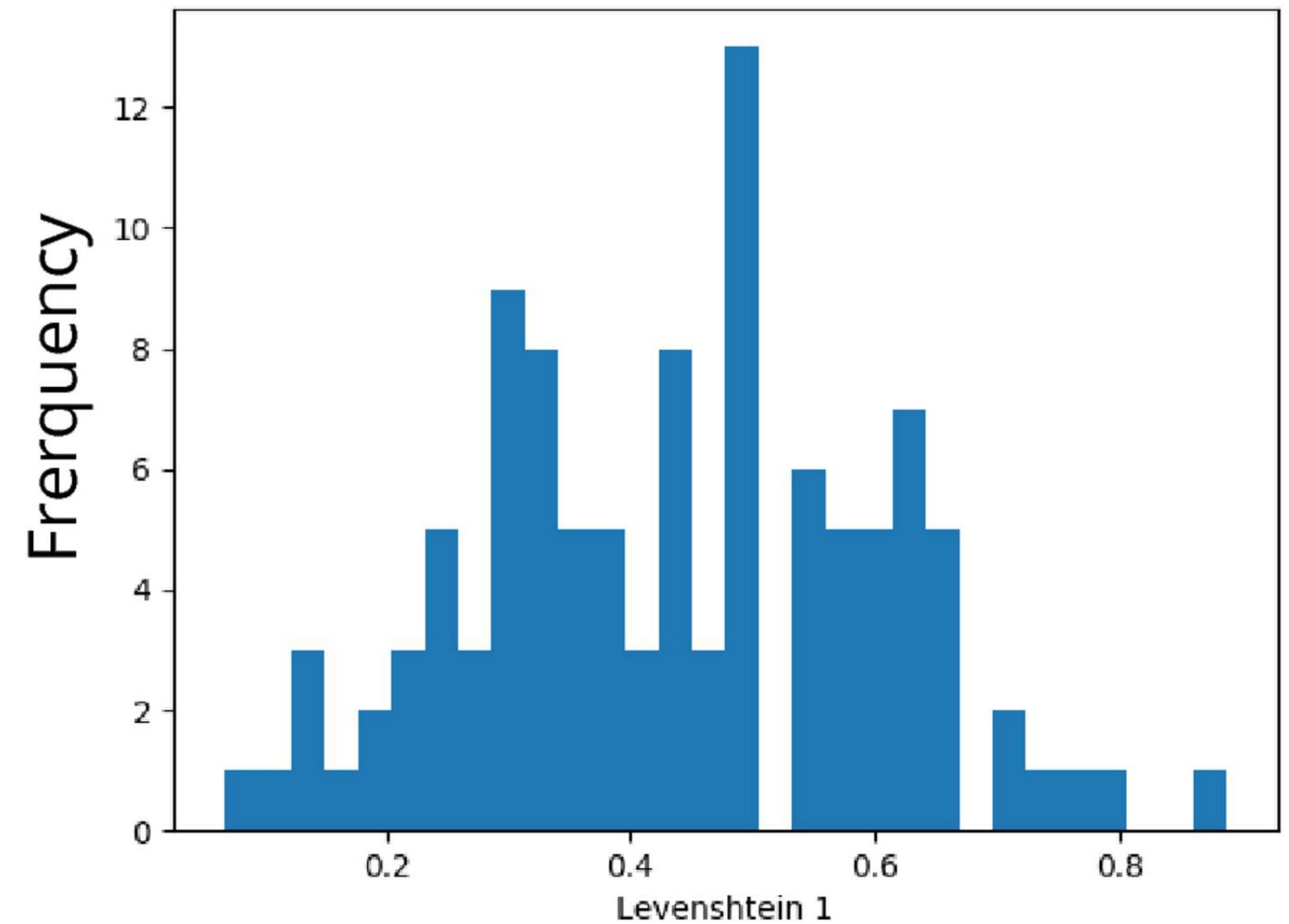
$$\frac{2}{6} = 0,3332$$

DEFINITION OF THRESHOLDS

Levenshtein



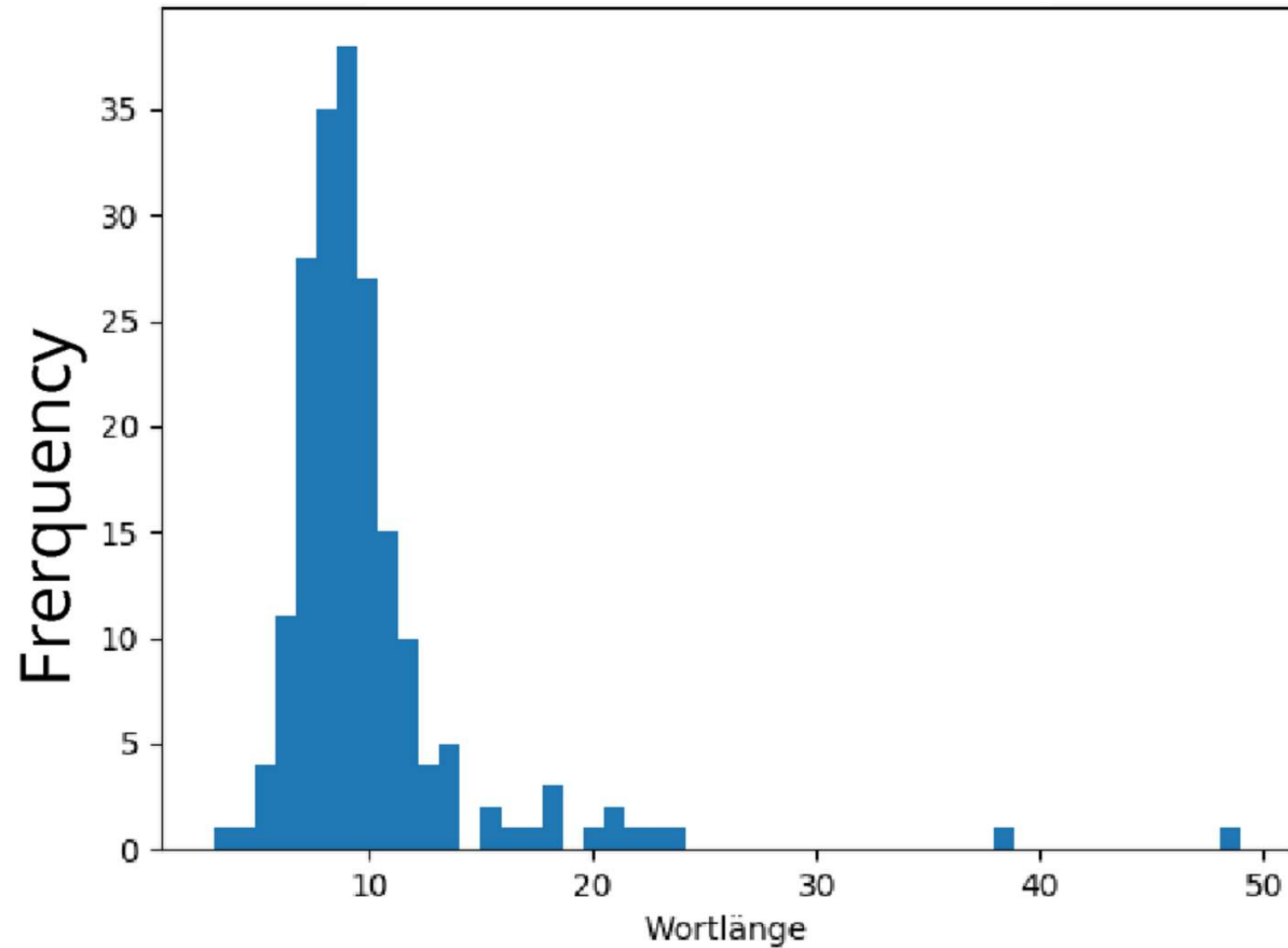
Levenshtein-Index



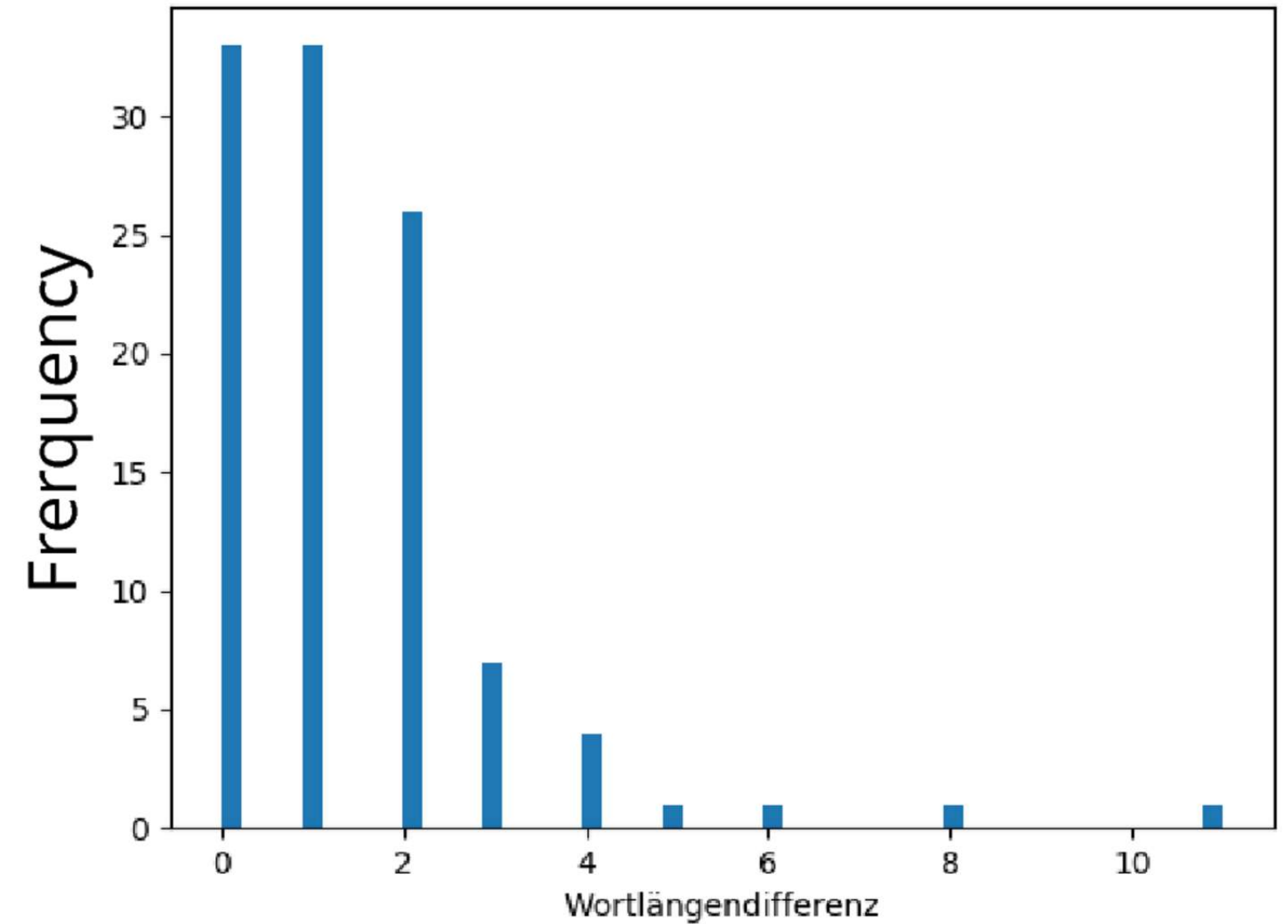
Threshold: Levenshtein-Index < 0,4

DEFINITION OF THRESHOLDS

Word length



Word length difference



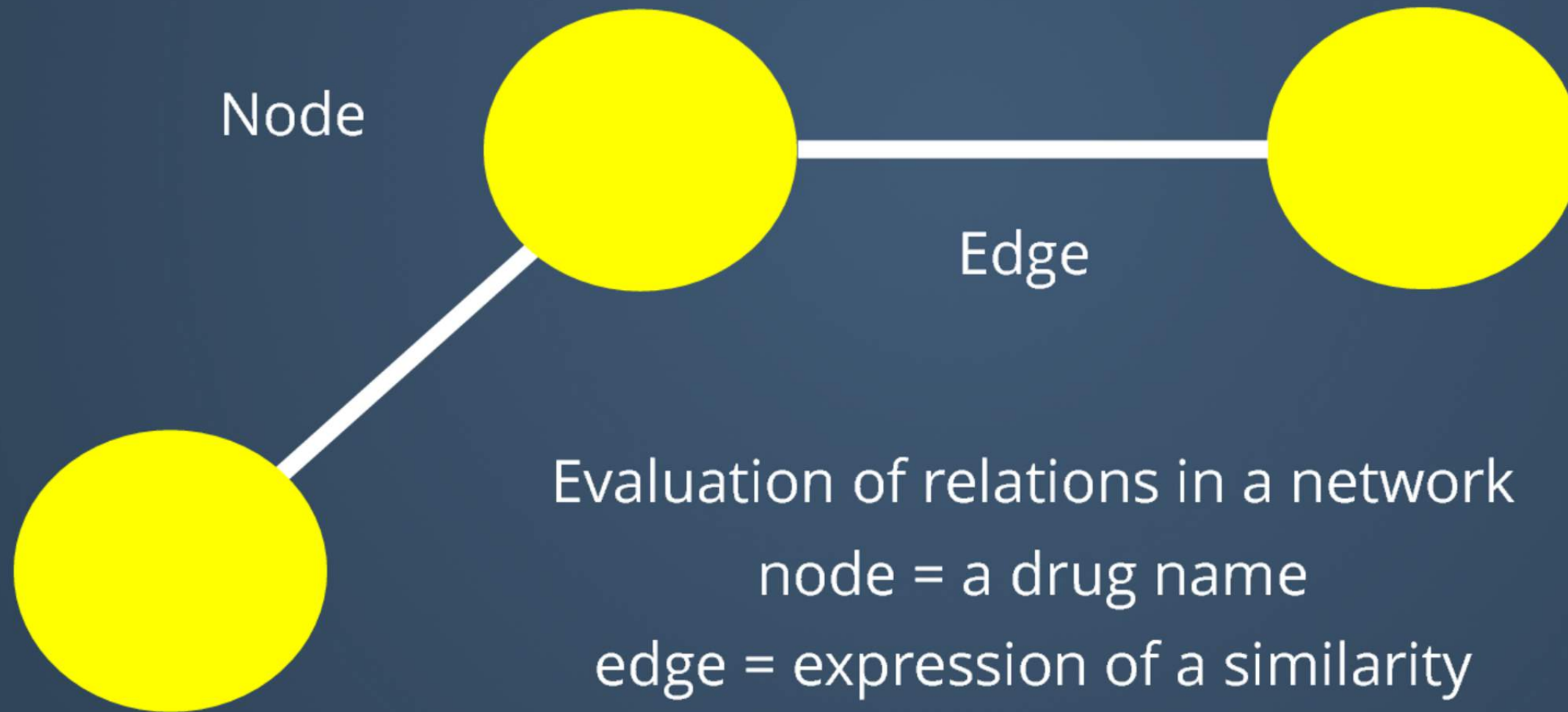
Threshold word length < 20 , word length difference < 5

EVALUATION

80436 different names of drugs and
active substances

over 3,2 milliards pair comparisons

GRAPH-BASED STRUCTURE



Evaluation of relations in a network

node = a drug name

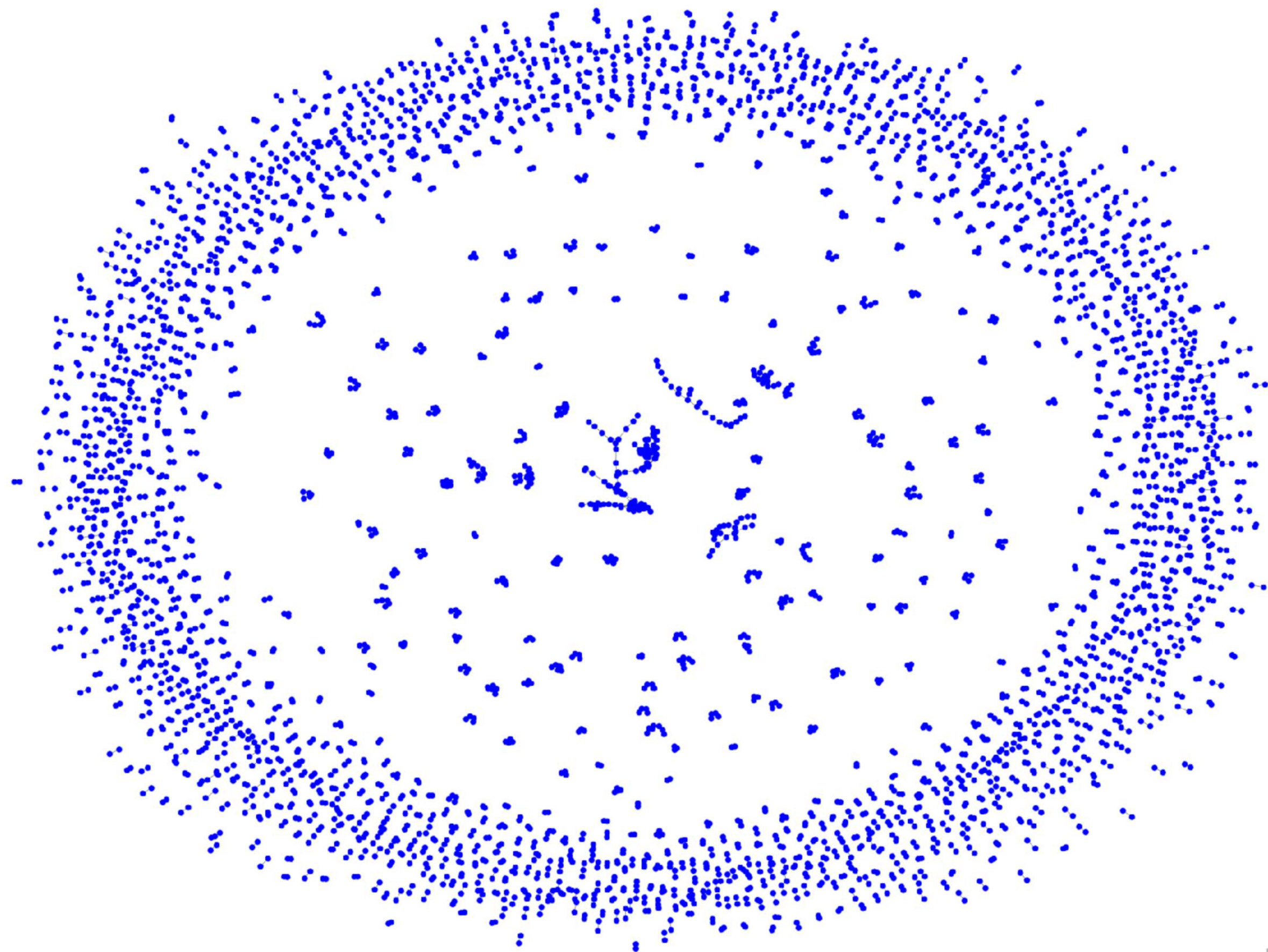
edge = expression of a similarity

RESULTS

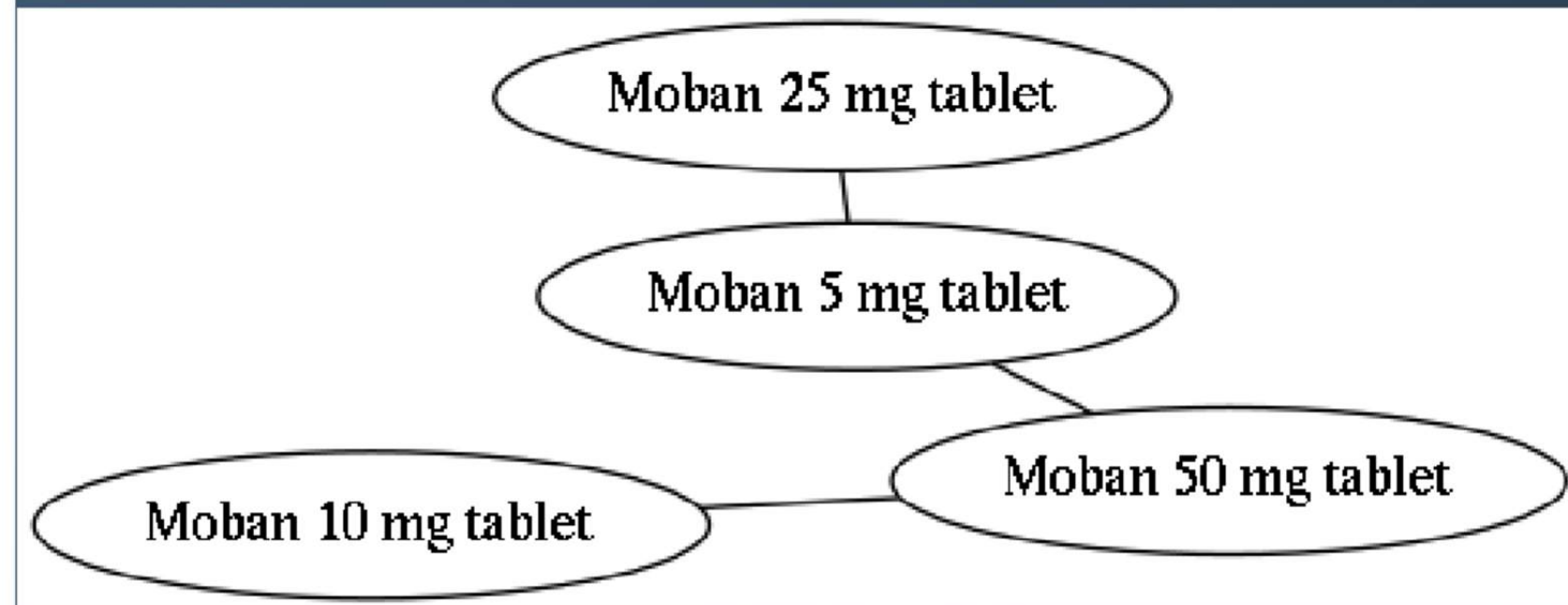
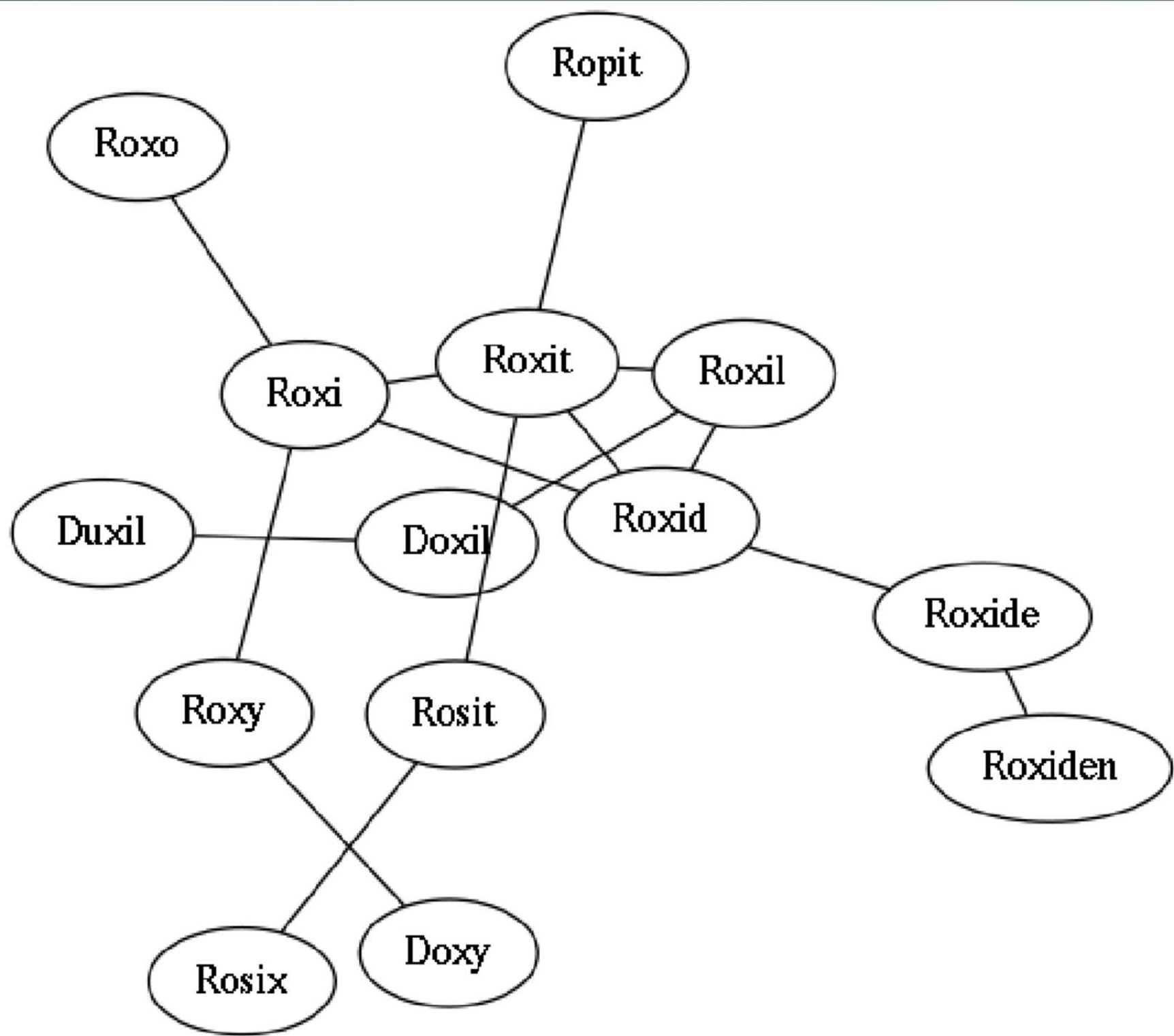


SIMILARITY GRAPH

Levenshtein = 1
Levenshtein-
Index < 0,4

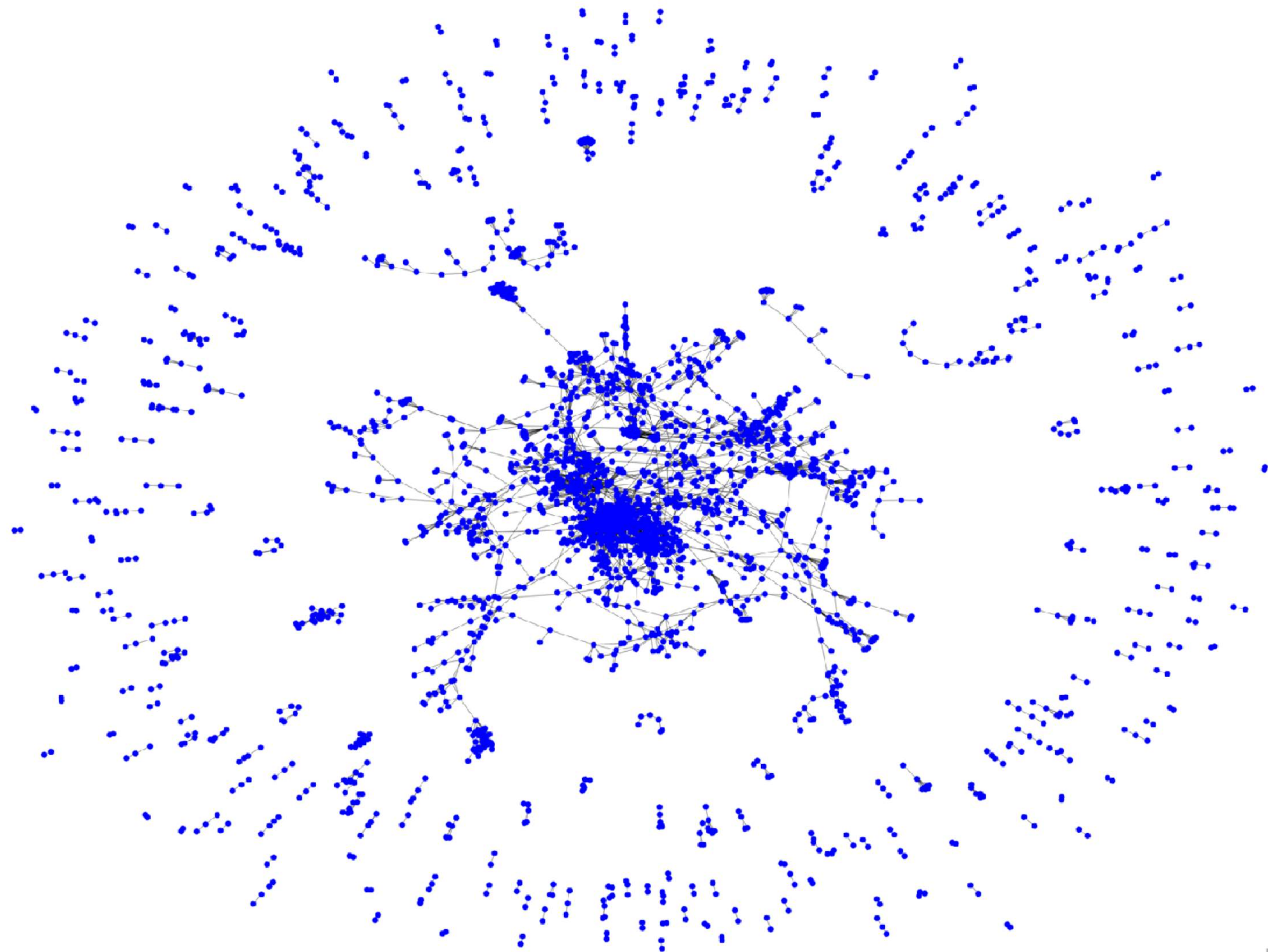


STRUCTURE OF SIMILARITY

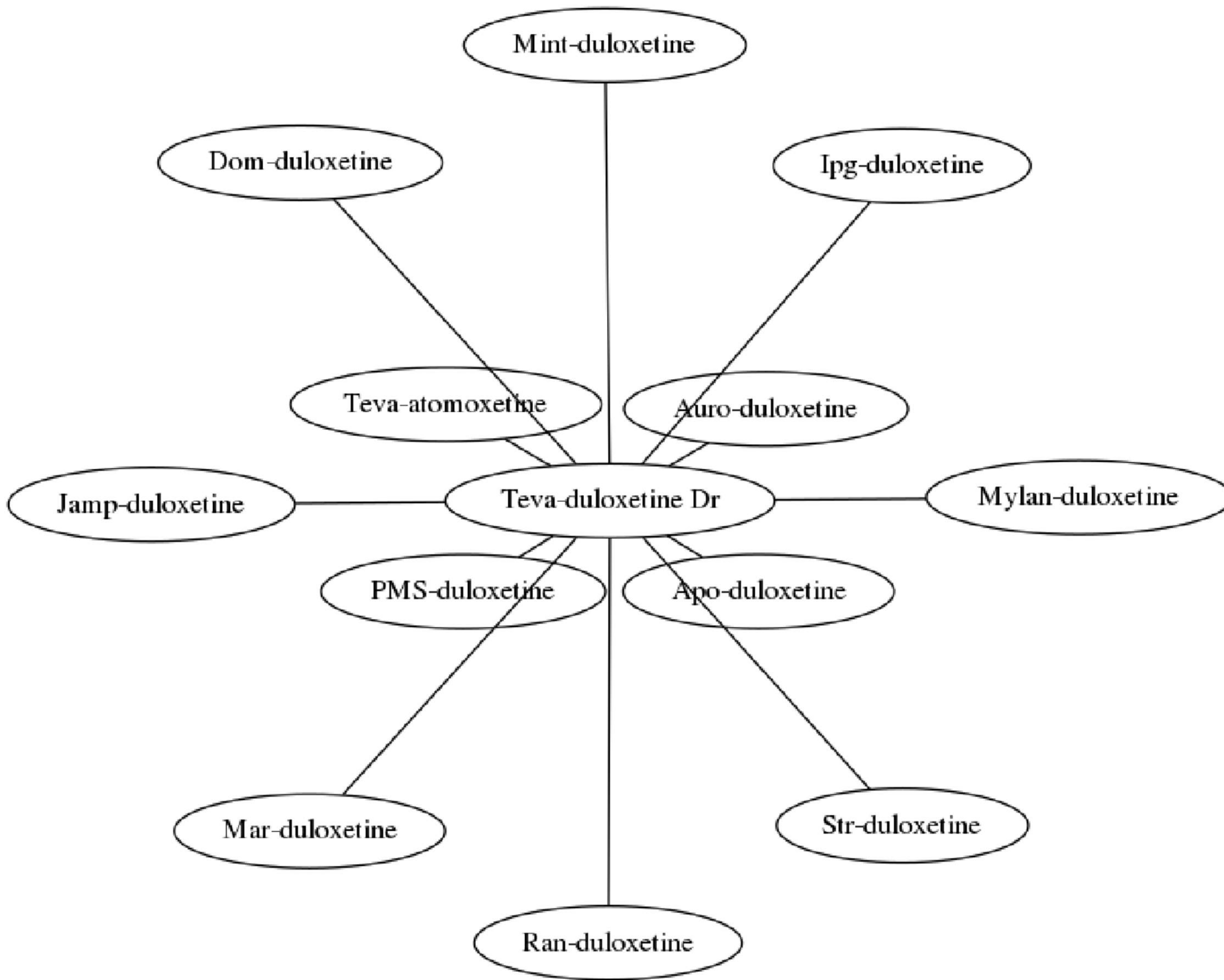


SIMILARITY GRAPH

Levenshtein = 7
Levenshtein-Index
< 0,4



STRUCTURE OF SIMILARITY



The Marketing-Similarity
'Teva'

CONCLUSIONS OF THE ANALYSIS

- The problem of drug name similarity is much larger than expected.
- Two main problems
 - dosis items
 - "Marketing Similarity"
- A change in drug name creation is essential for a general problem solution

FUTURE DEVELOPMENT

- Analysis of real-life drug use
- Development of a better similarity measure
- Algorithms for morphological similarity analysis

THANK YOU VERY MUCH
FOR YOUR ATTENTION

DO YOU HAVE QUESTIONS?



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