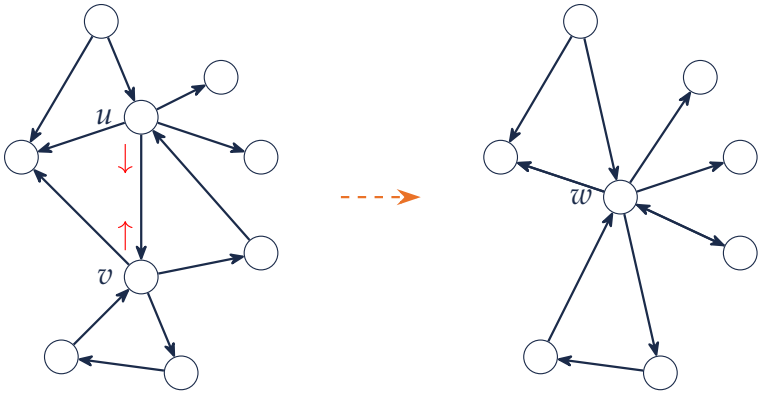
Progettazione di una Struttura Dati per Rappresentare e Analizzare Collezioni di Sogni

Marco Caputo
marco.caputo@studenti.unicam.it

22 Luglio 2024

CONTRAZIONE DI GRAFI

Contrazione di archi



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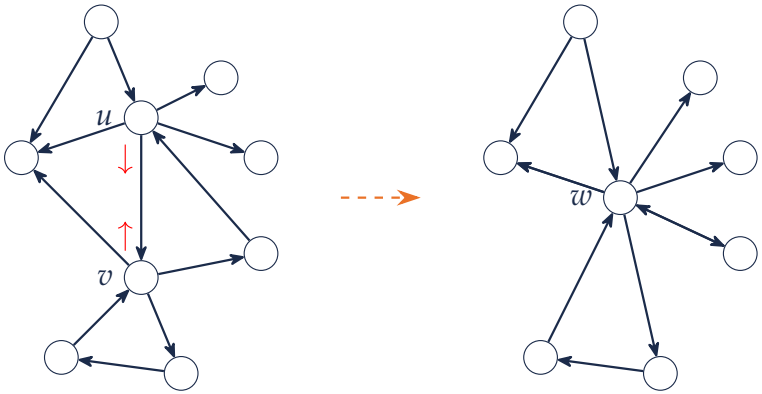

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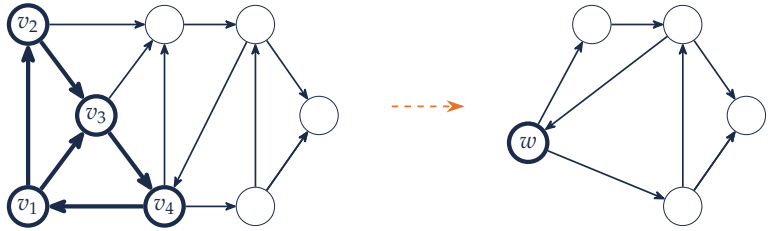

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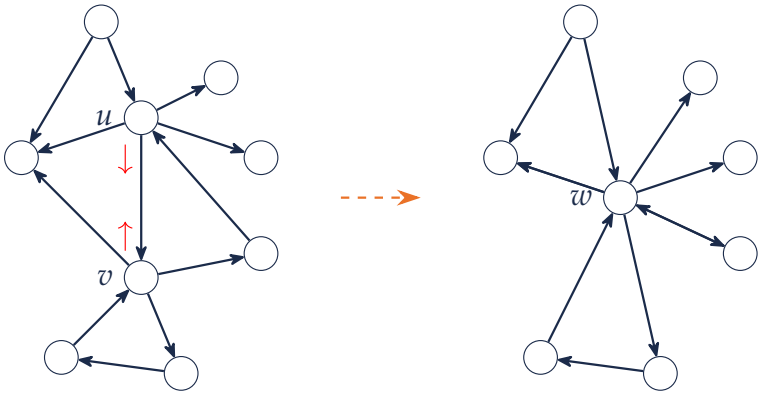

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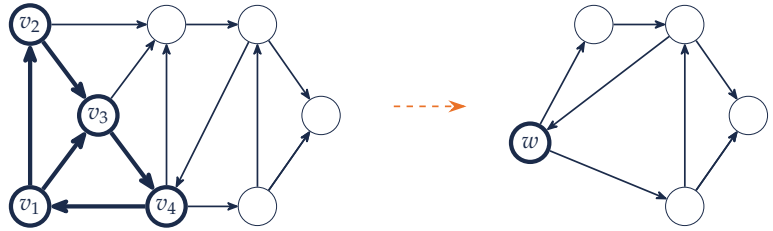
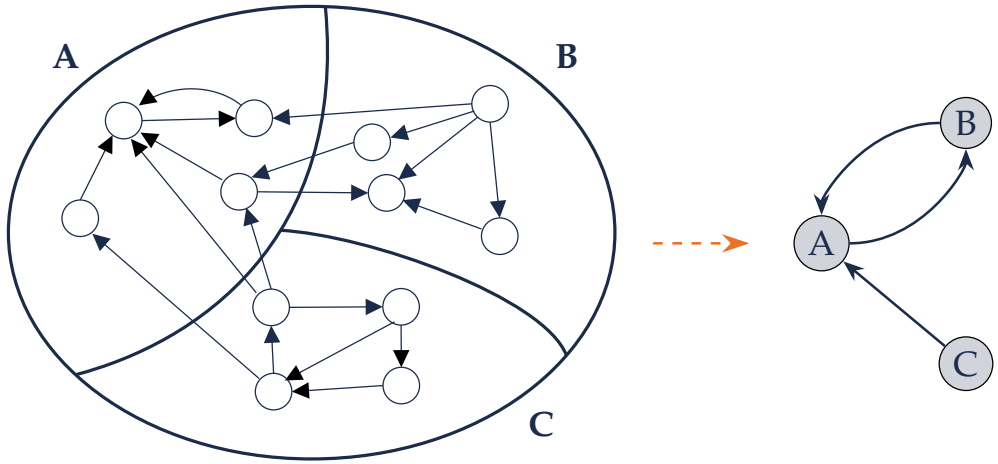


Grafo quoziente



GRAFO MULTI-LIVELLO

Definizione (Grafo multi-livello)

Un **grafo multi-livello** M è una coppia (G, Γ) dove:

- $G = (V, E)$ è un grafo;
- $\Gamma = \langle f_{C_1}, f_{C_2}, .., f_{C_k} \rangle$ è una sequenza di funzioni di contrazione.

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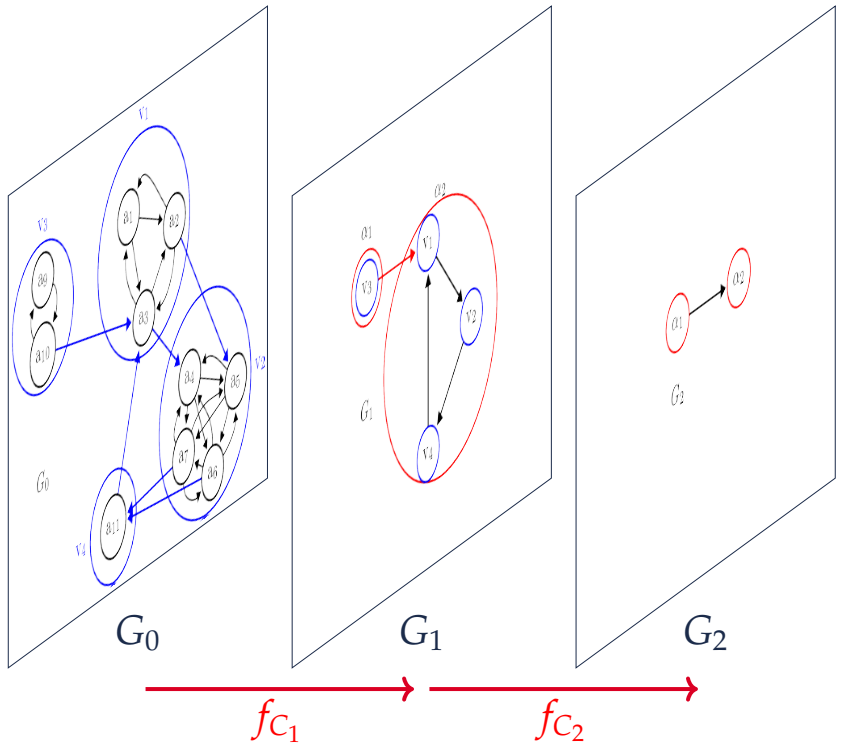

GRAFO DECONTRAIBILE

Definizione (Grafo decontraibile)

Un **grafo decontraibile** è una quadrupla $G = (V, E, dec_V, dec_E)$ dove:

- V è un insieme di elementi detti **supernodi**;
- $E \subseteq V \times V$ è un insieme di coppie ordinate di supernodi, dette **superarchi**;
- $dec_V : V \to \mathcal{G}_D$ è una funzione tale per cui $dec_V(v) = (\mathcal{V}_v, \mathcal{E}_v, dec_{\mathcal{V}_v}, dec_{\mathcal{E}_v})$ è un grafo decontraibile rappresentato dal supernodo v;
- $dec_E : E \to (\mathcal{V} \times \mathcal{V})$ con $\mathcal{V} = \bigcup_{v \in V} \mathcal{V}_v$, è una funzione tale per cui $\forall\, e = (u, v), dec_E(e) = \mathcal{E}_e \subseteq \{(a, b) \mid a \in \mathcal{V}_u \wedge b \in \mathcal{V}_v\}$ è un insieme di archi rappresentati dal superarco e.

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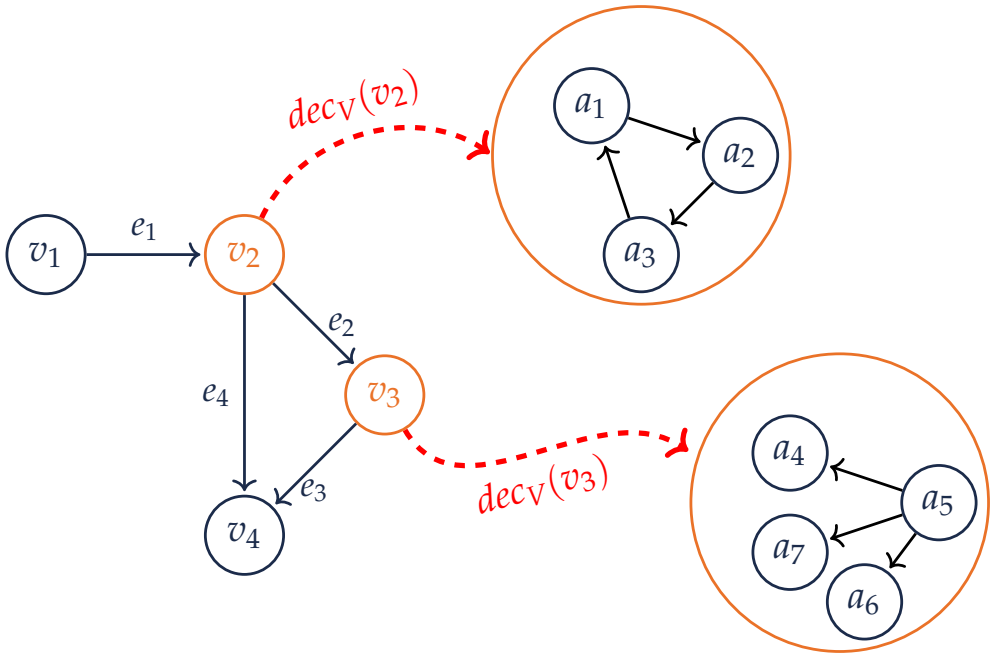

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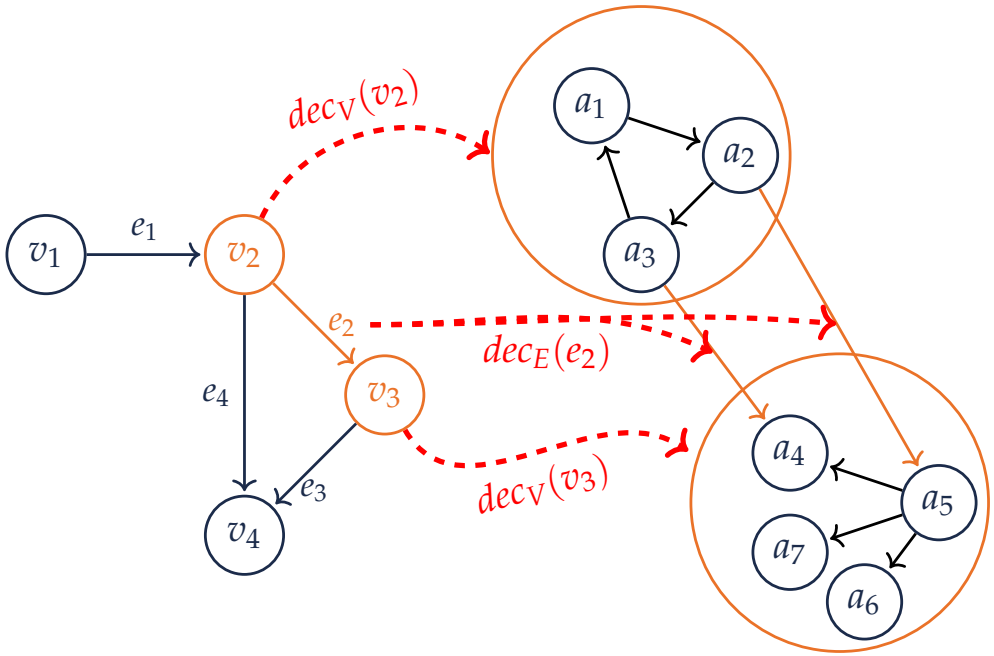
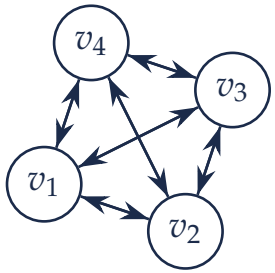


SCHEMI DI CONTRAZIONE

SCHEMA ALGORITMO COMPLESSITÀ

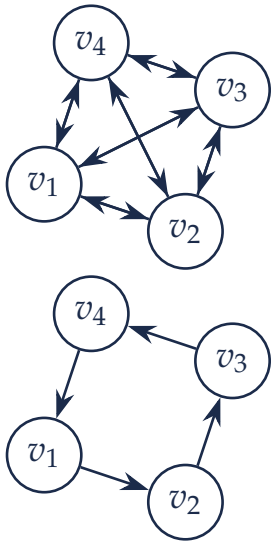
Schemi di contrazione

Schema	Algoritmo	Complessità
Cricche	Algoritmo di Bron-Kerbosch	$O(3^{\frac{n}{3}})$



Schemi di contrazione

Schema	Algoritmo	Complessità
Cricche	Algoritmo di Bron-Kerbosch	$O(3^{\frac{n}{3}})$
Circuiti semplici	Algoritmo dei circuiti semplici di Johnson	$O((n+m)\,c)$



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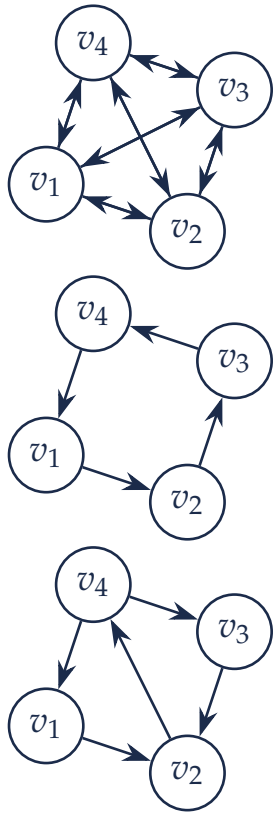
Circuiti semplici	Algoritmo dei circuiti semplici di Johnson	$O((n+m)\,c)$
Componenti fortemente connesse	Algoritmo di Kosaraju-Sharir	$O(n+m)$



Schemi di contrazione

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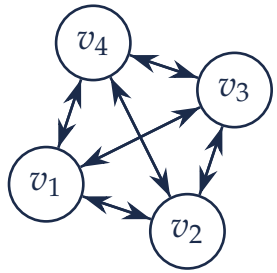
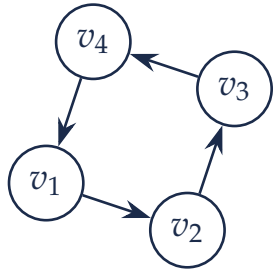
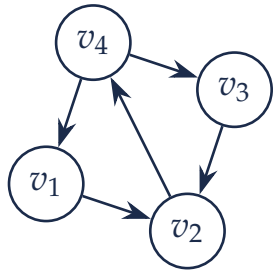
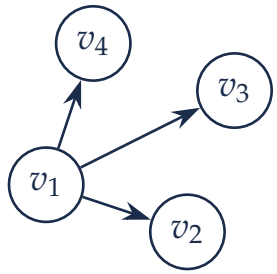
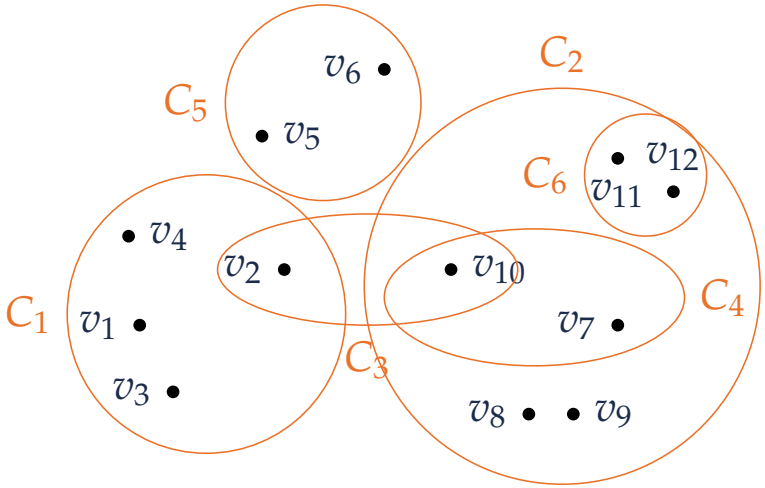
Cricche	Algoritmo di Bron-Kerbosch	$O(3^{\frac{n}{3}})$	
Circuiti semplici	Algoritmo dei circuiti semplici di Johnson	$O((n+m)\,c)$	
Componenti fortemente connesse	Algoritmo di Kosaraju-Sharir	$O(n+m)$	
Stelle	Algoritmo custom	$O(n+m)$	

CONTRAZIONE DI SOTTOINSIEMI



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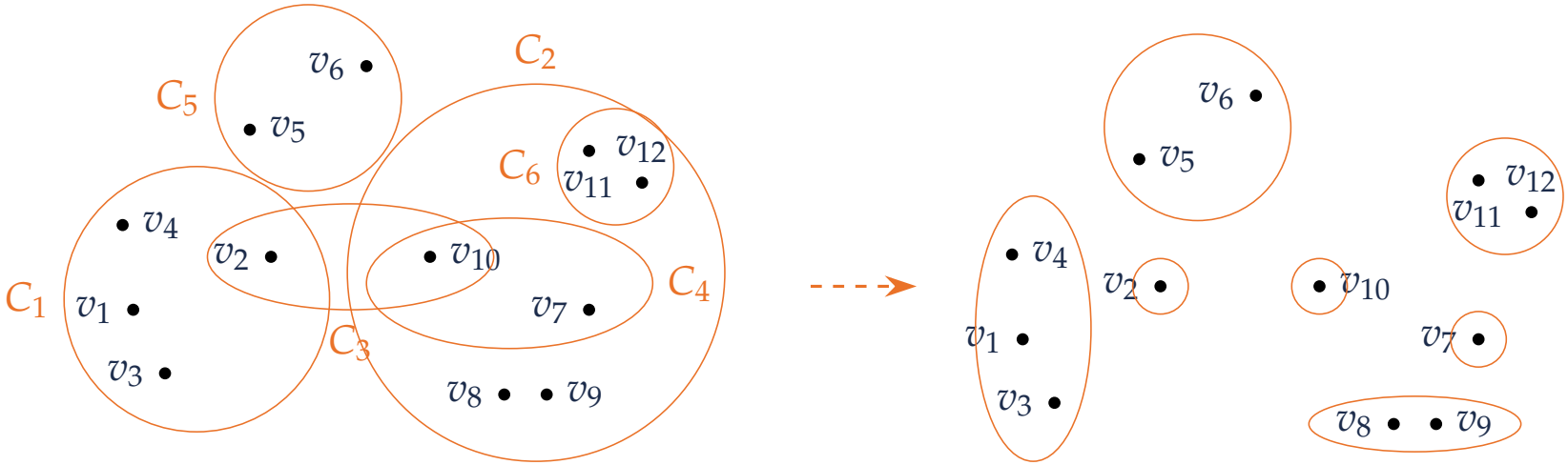

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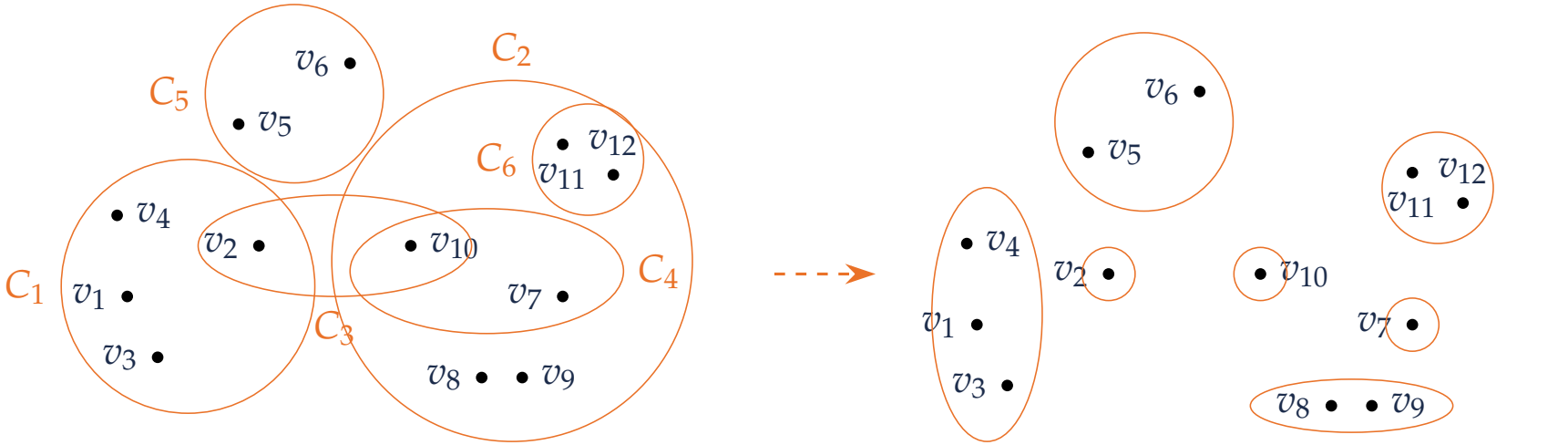
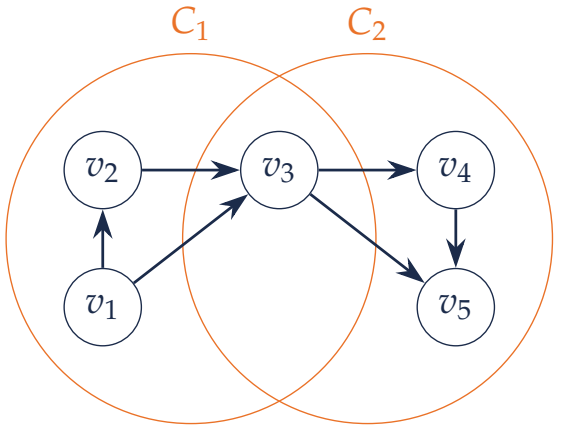


T

v_1	$\{C_1\}$
v_2	$\{C_1\}$
v_3	$\{C_1, C_2\}$
v_4	$\{C_2\}$
v_5	$\{C_2\}$



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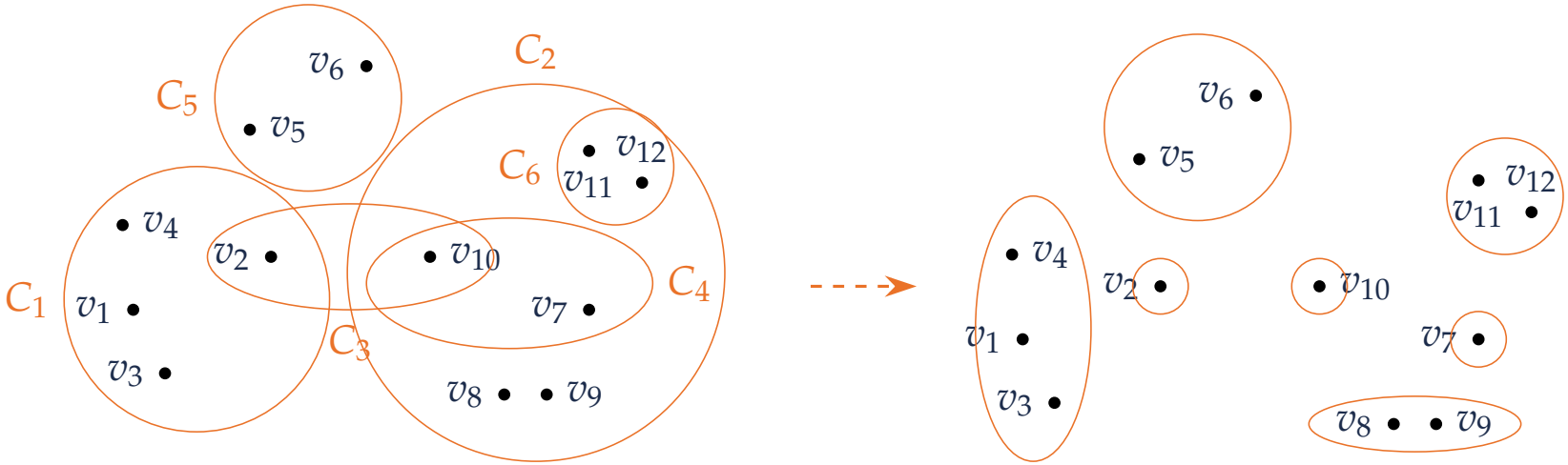

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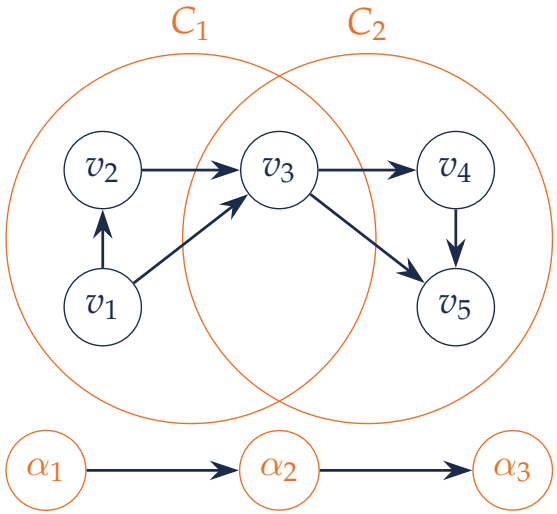
T'

$\{C_1\}$	α_1
$\{C_1, C_2\}$	α_2
$\{C_2\}$	α_3



ANALISI SINTATTICA DEI SOGNI

"I am at a lake in my hometown. Something is going on there and we are in a hurry to get away. We get in a station wagon and have a hard time getting two pet deer, with the same names as my son and daughter, corralled. Finally we get them into the vehicle and we are almost all the way out when the wheel goes off one side of the road and the vehicle is stuck and the deer is about halfway out. At this point I notice my mother-in-law is cutting off a Christmas tree which is growing in the water at the end of the dock."

ANALISI SINTATTICA DEI SOGNI

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RIMOZIONE STOPWORDS

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LEMMATIZ-ZAZIONE

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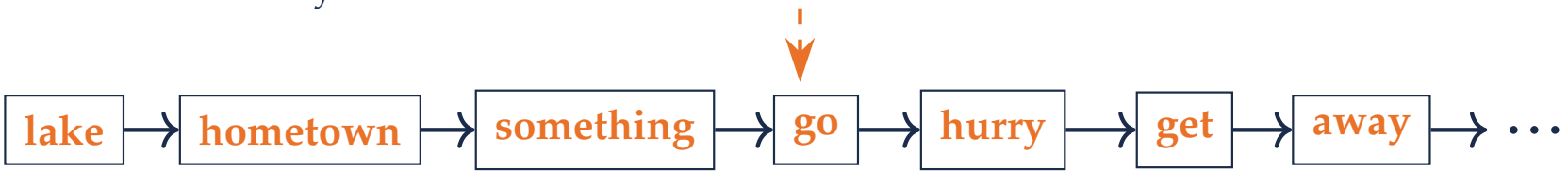

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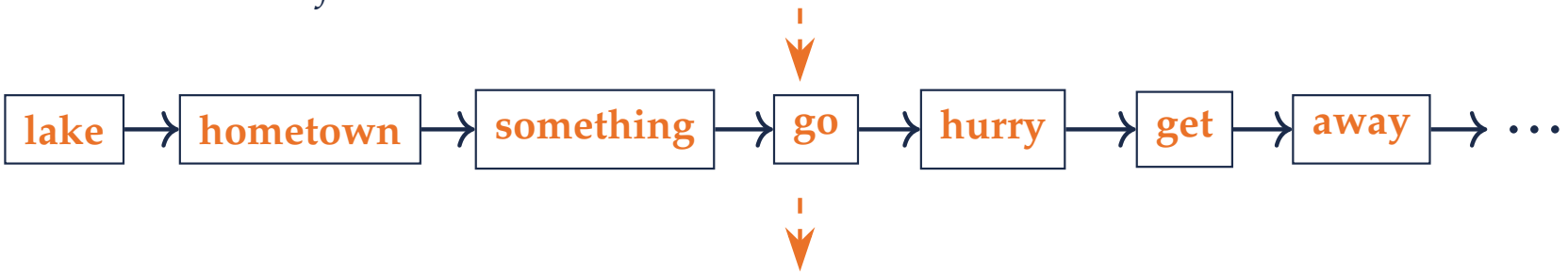

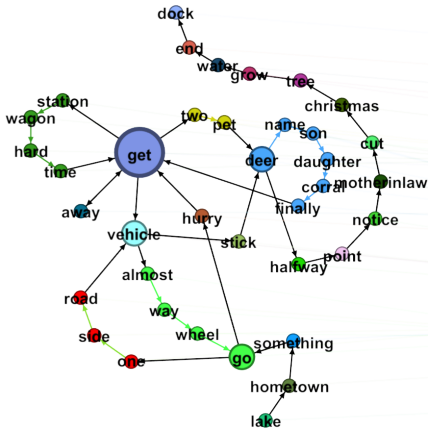

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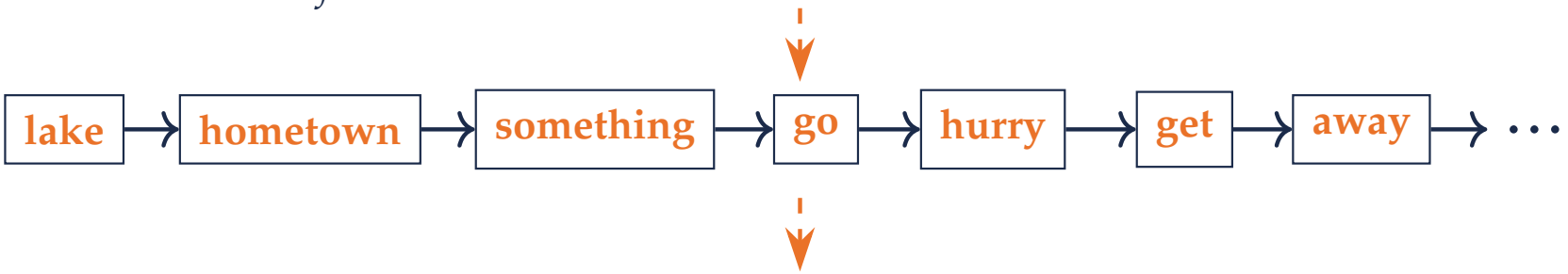

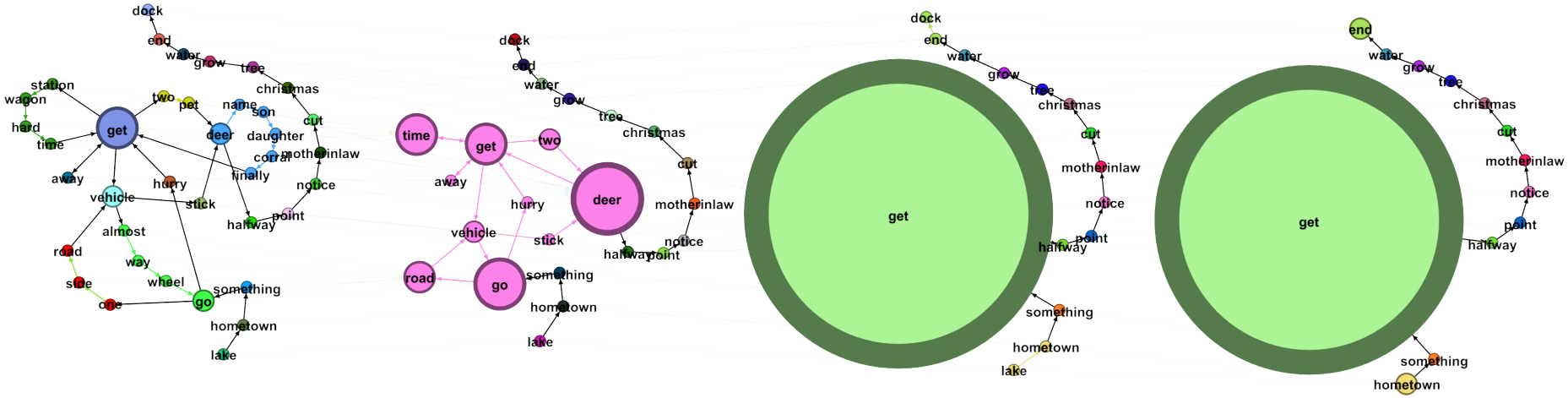

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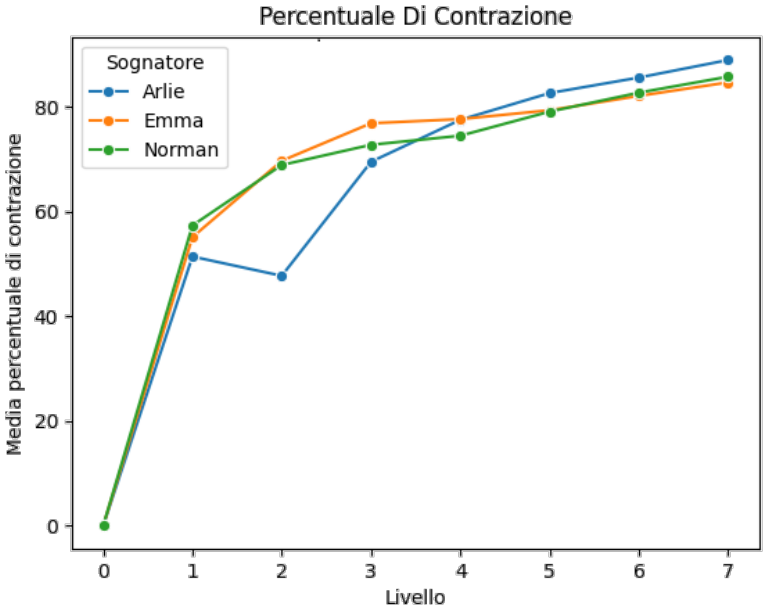
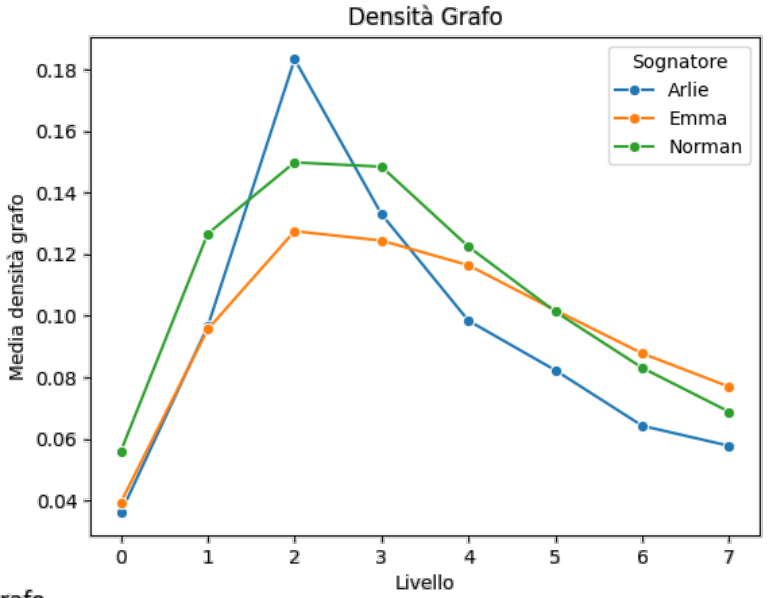
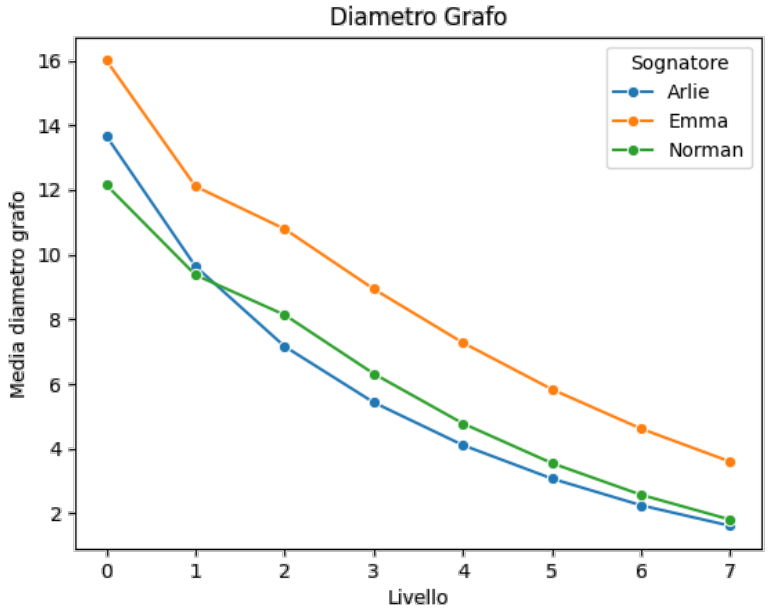
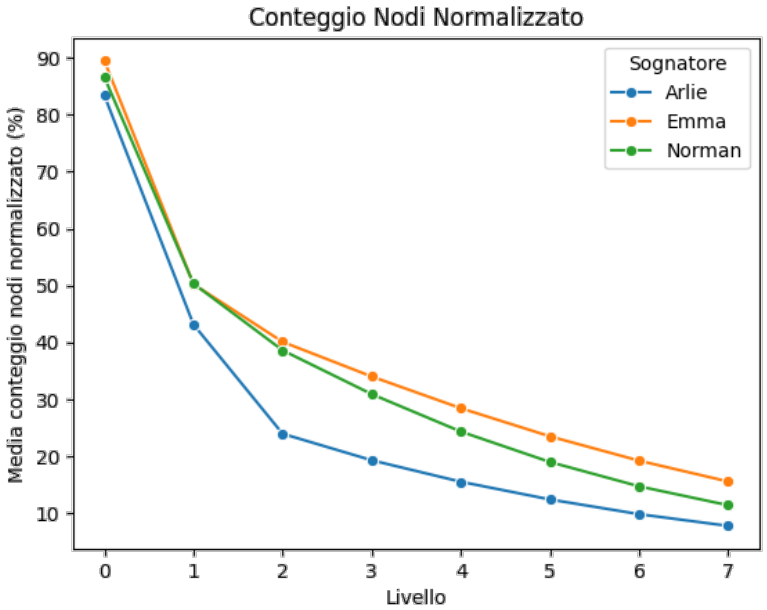
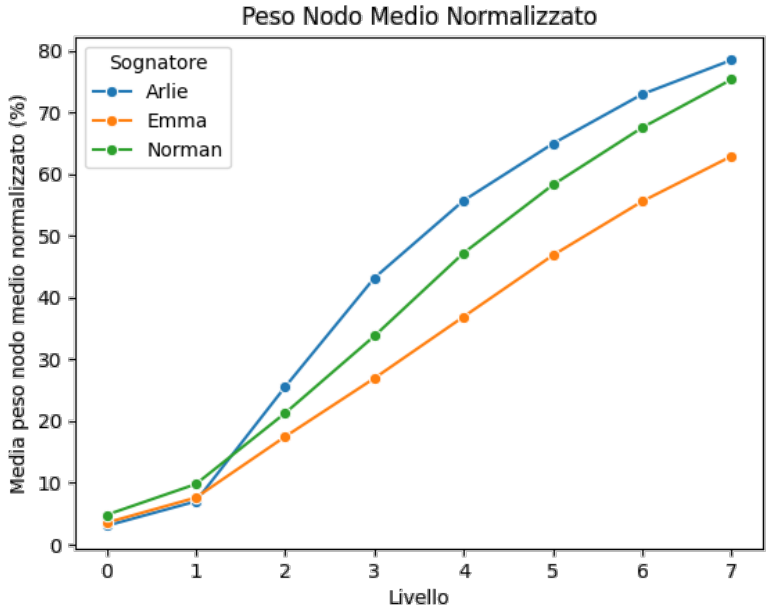


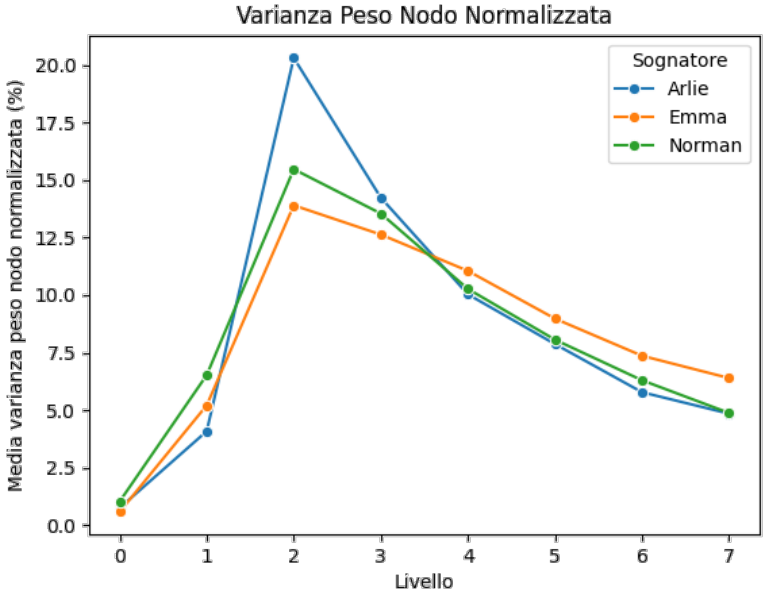


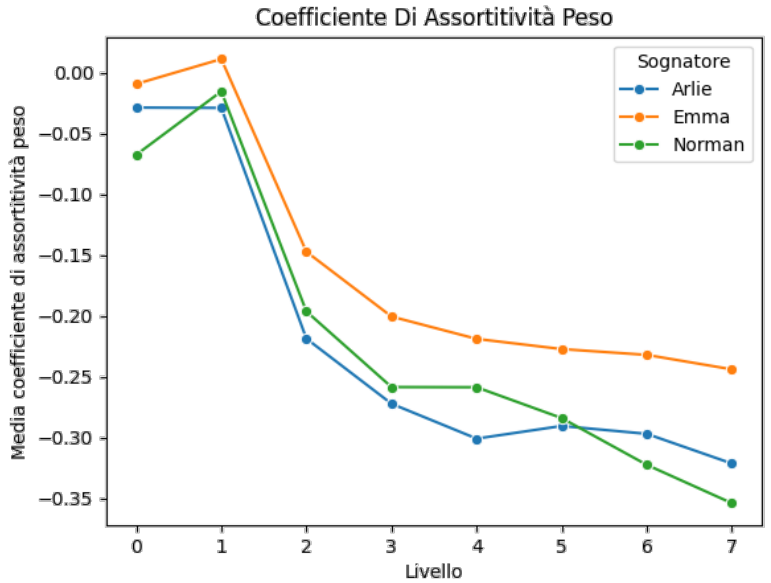


Analisi sintattica dei sogni

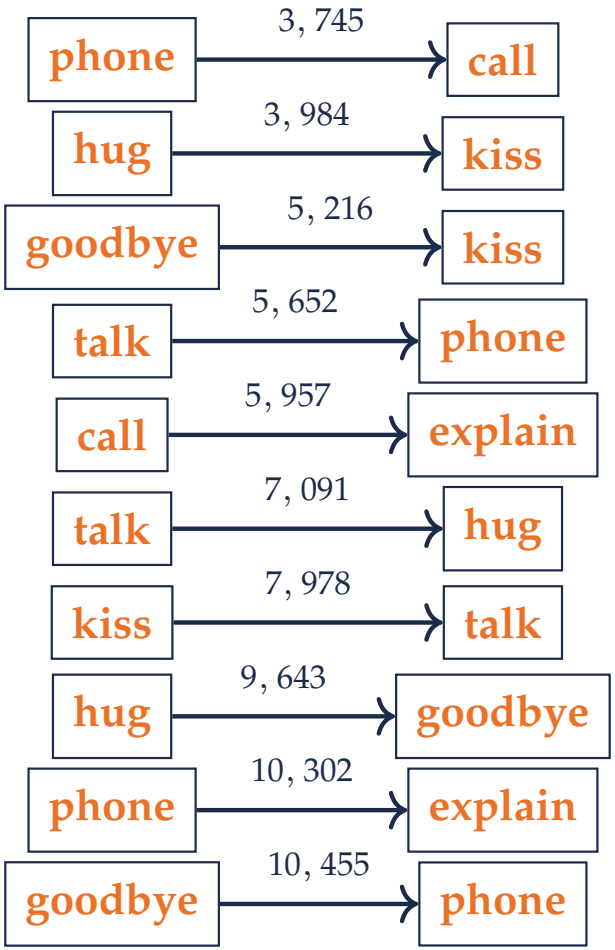








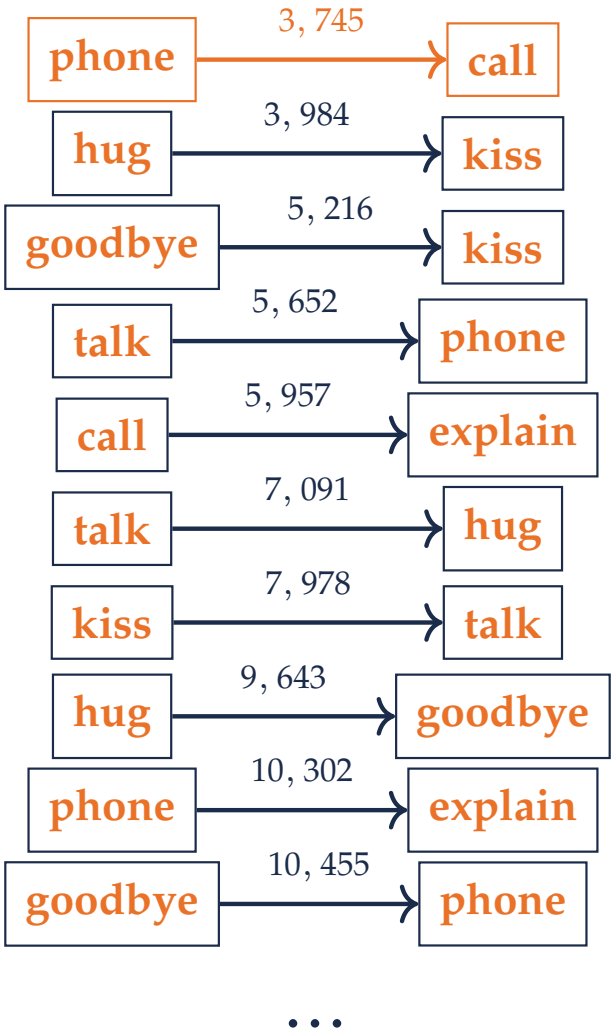
Riduzione della connettività



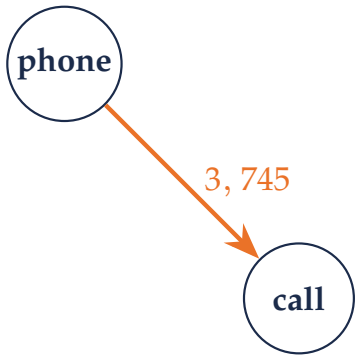
...

$threshold = 12.5$

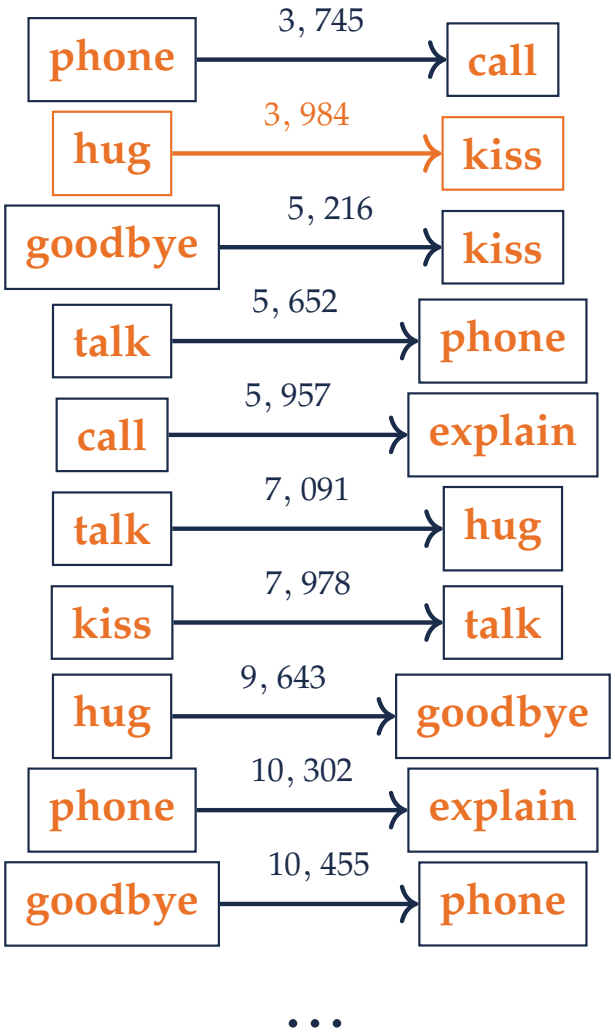
Riduzione della connettività



$threshold = 12.5$



Riduzione della connettività



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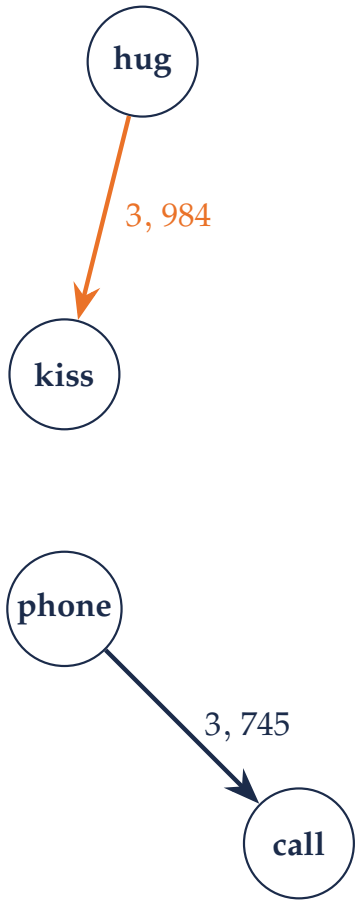

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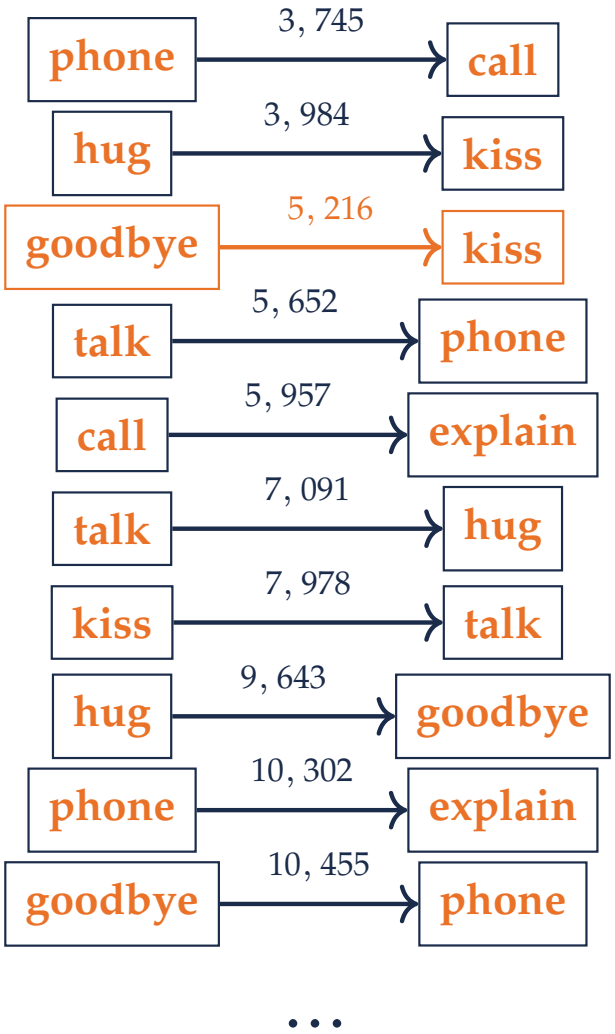

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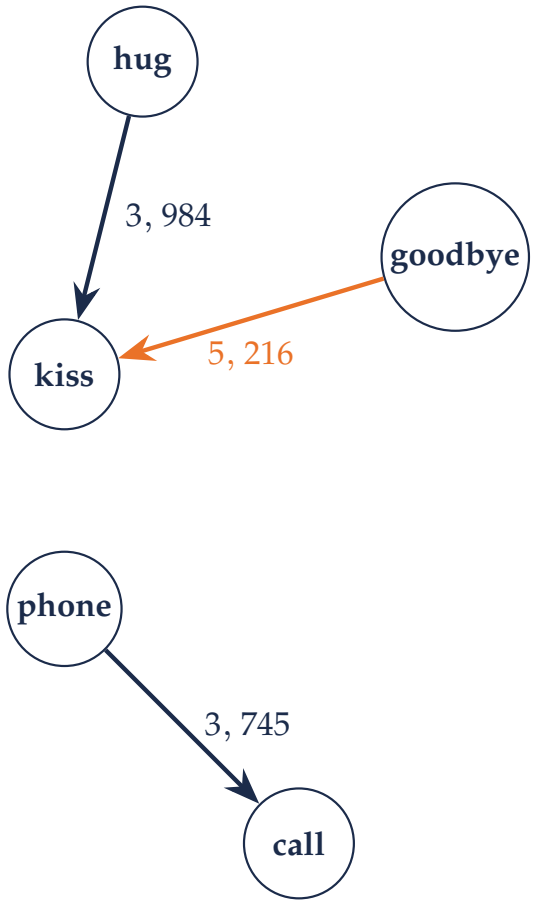

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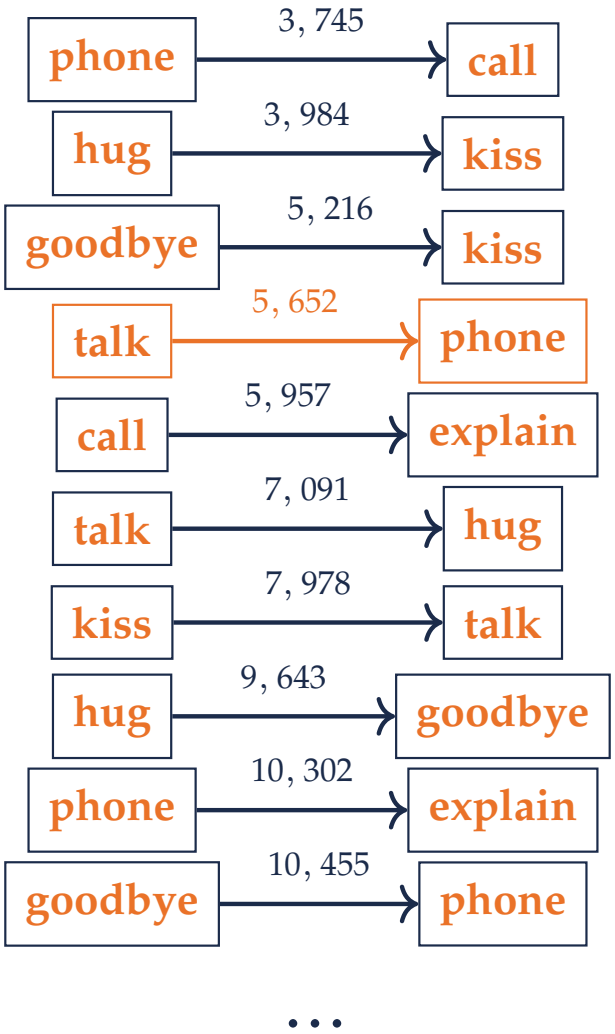

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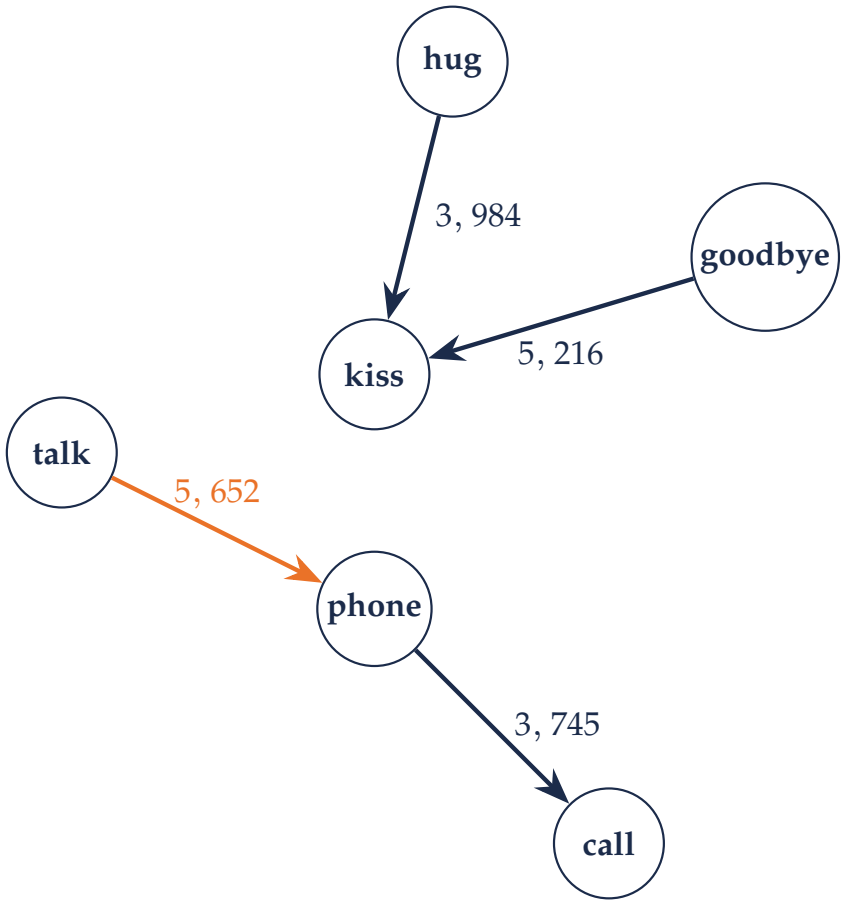

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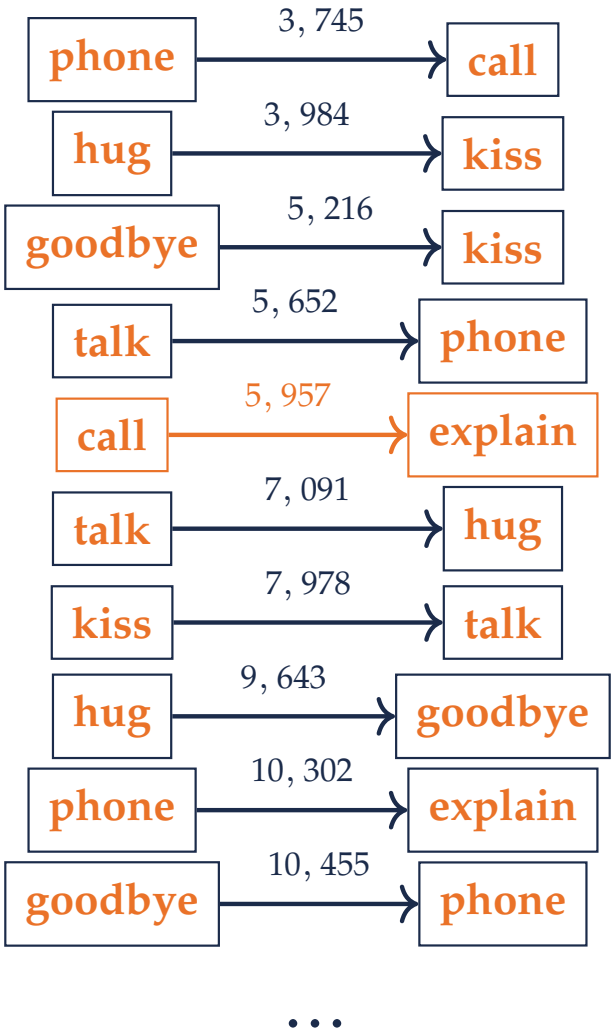

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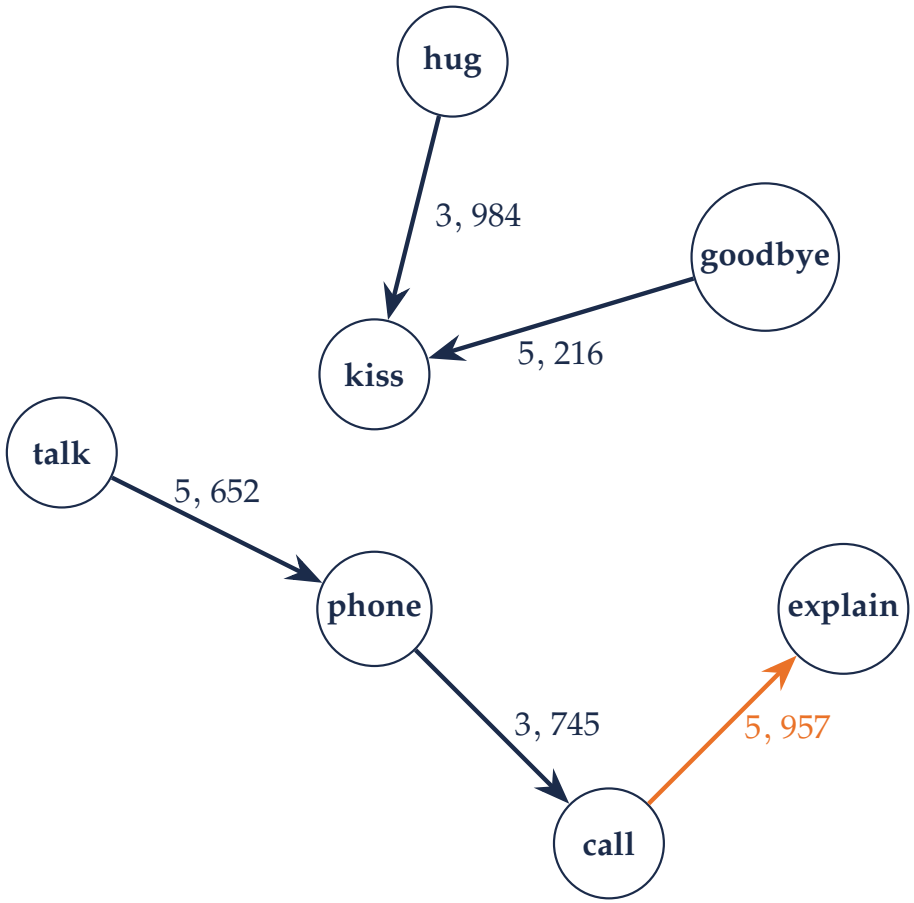

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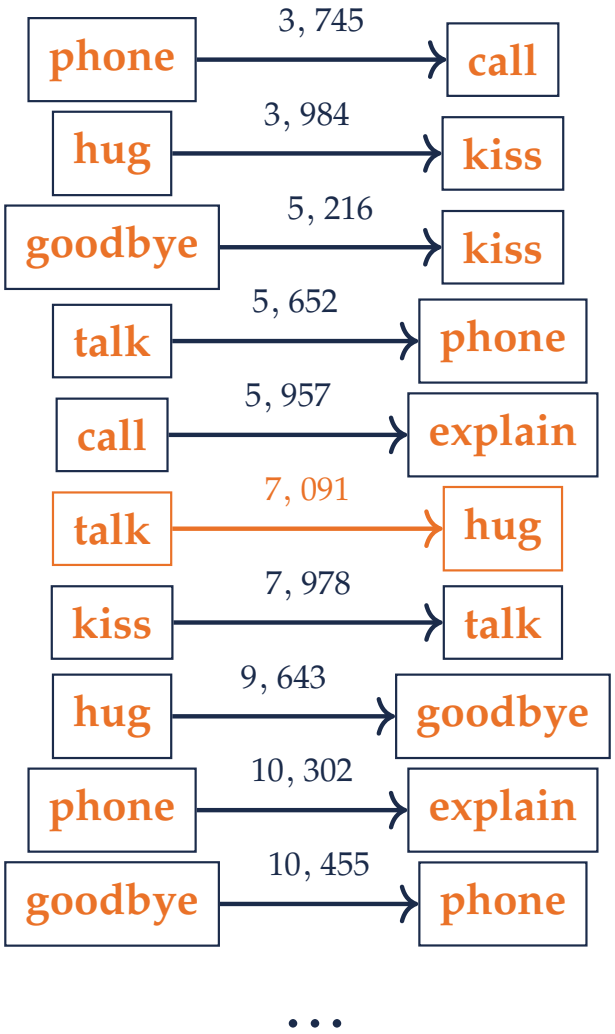

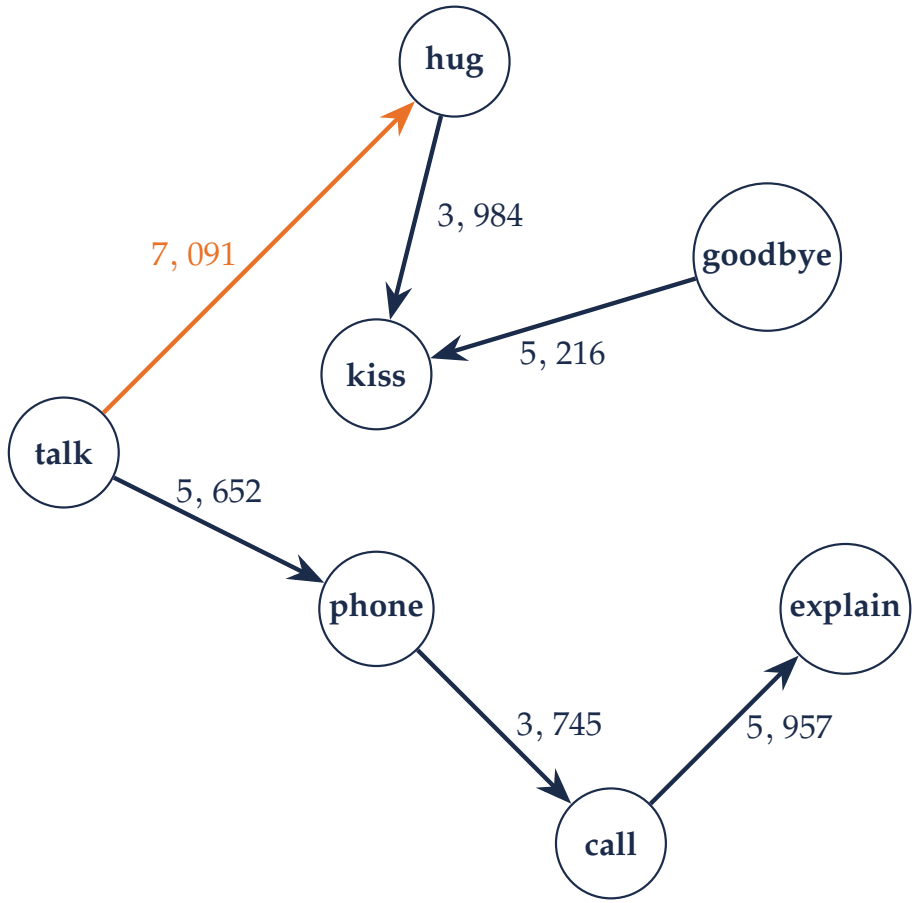

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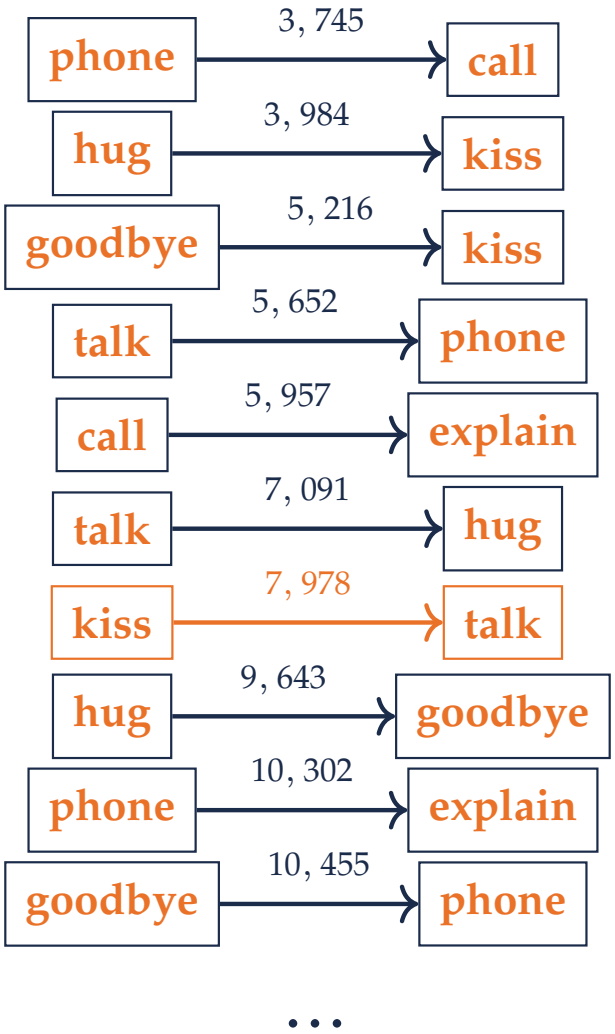

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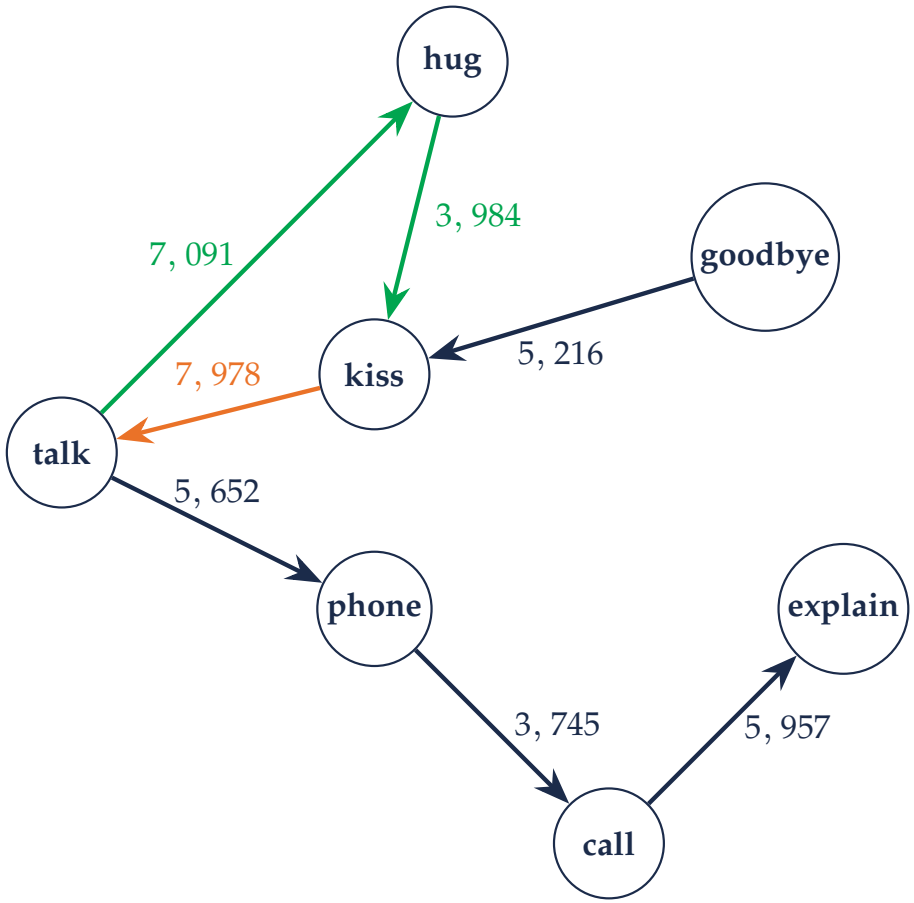

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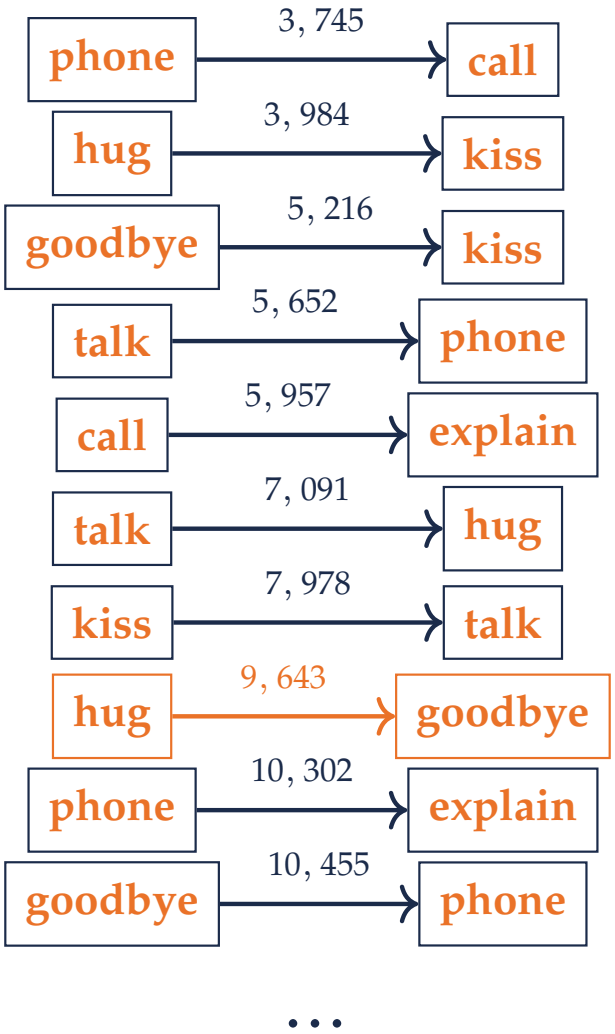

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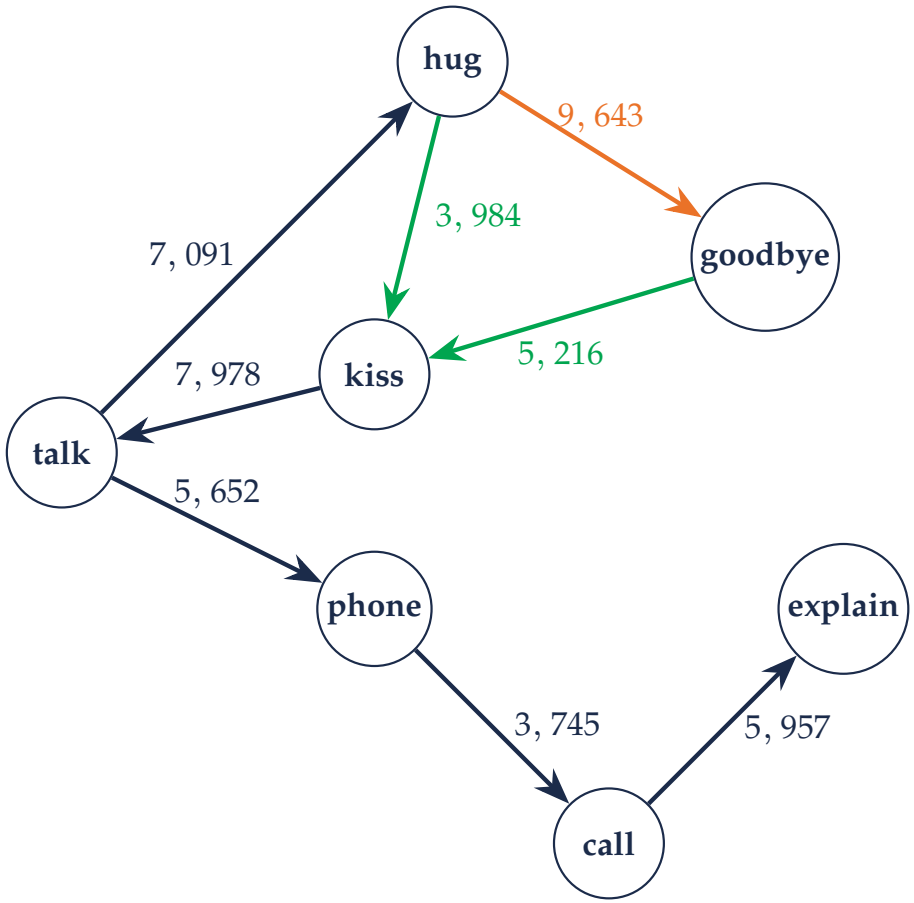

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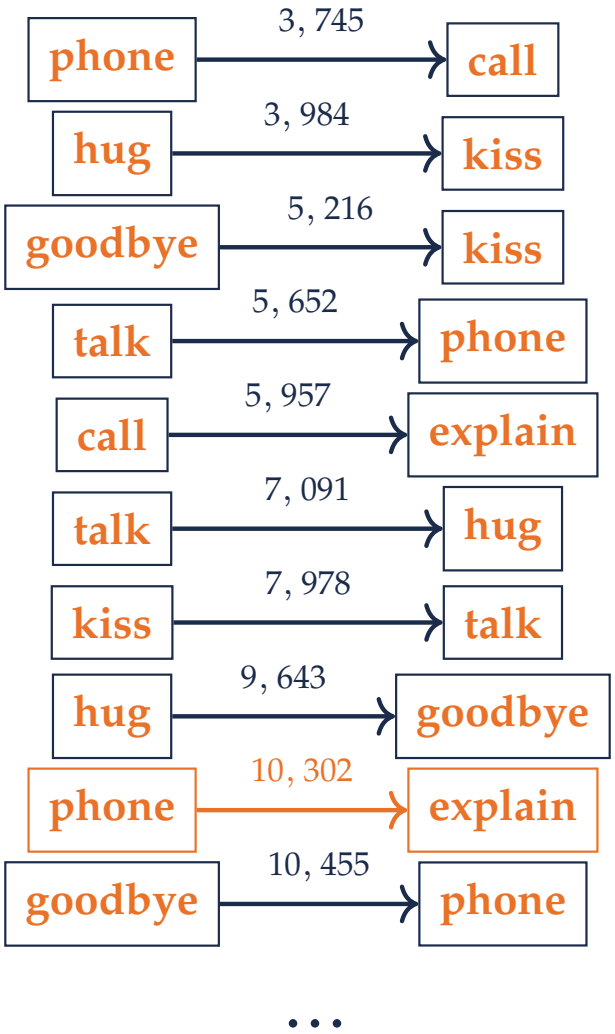

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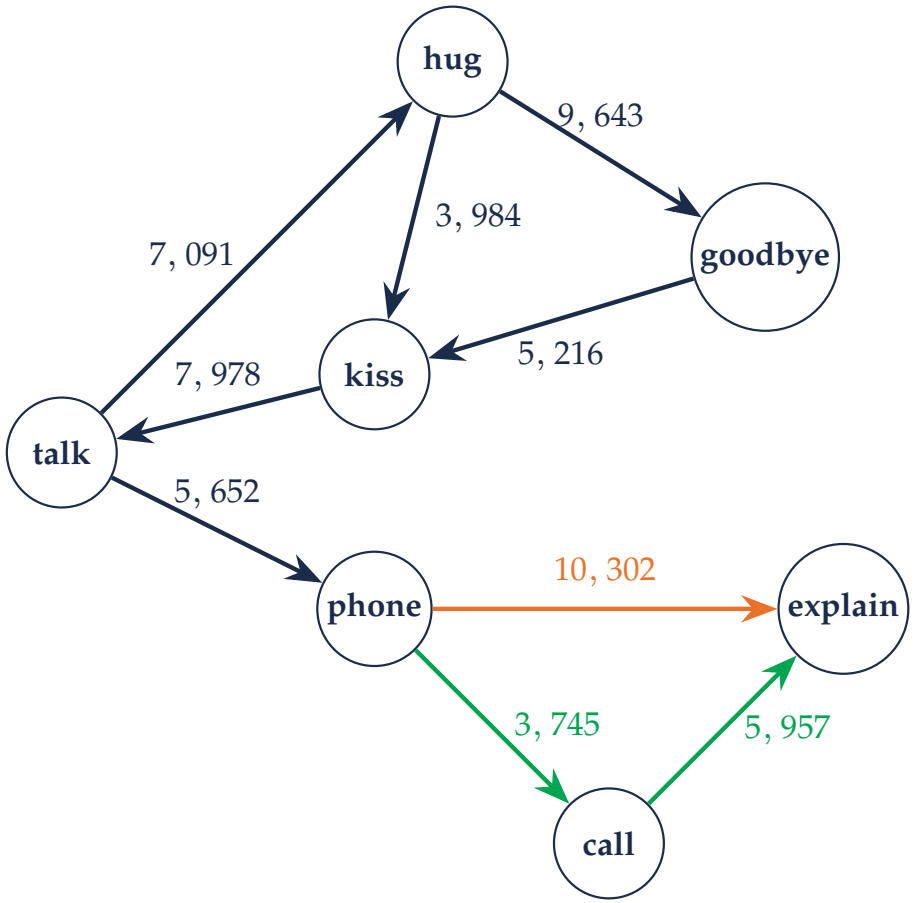

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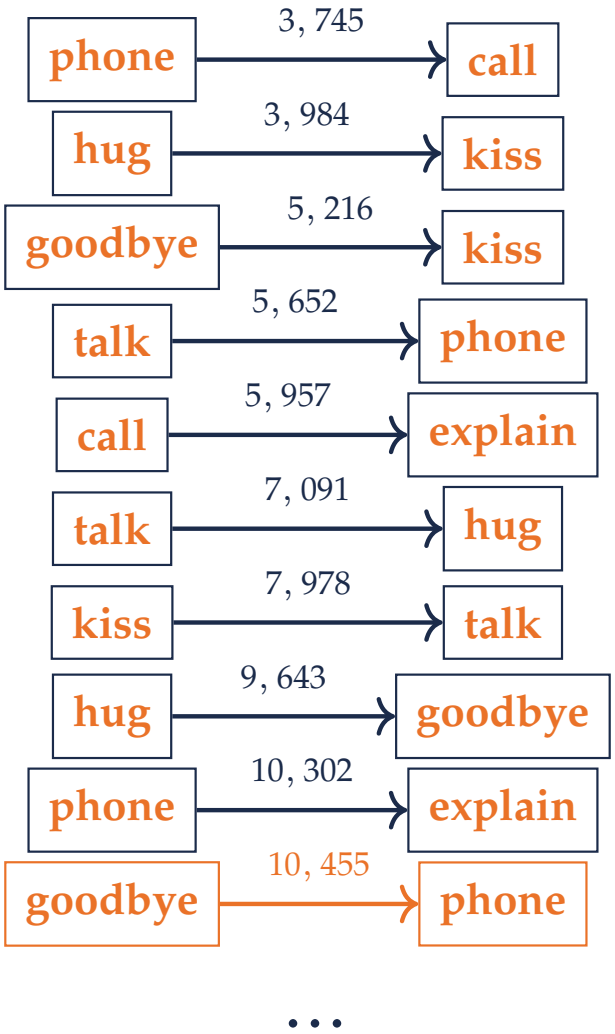

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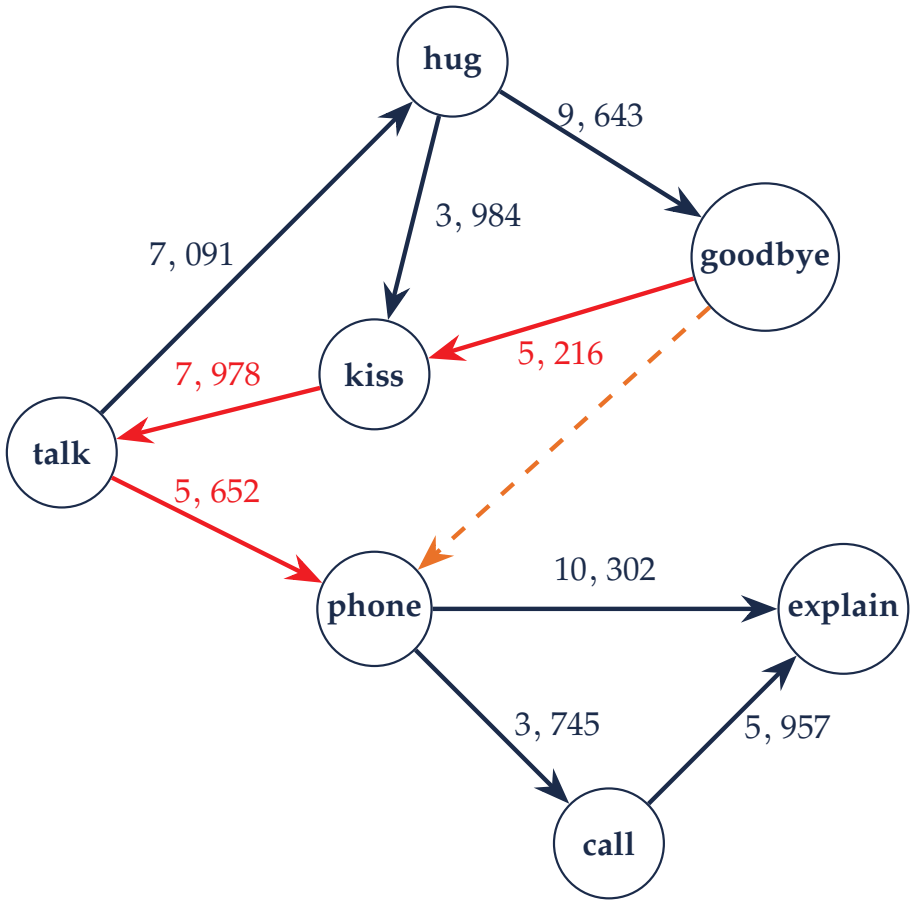

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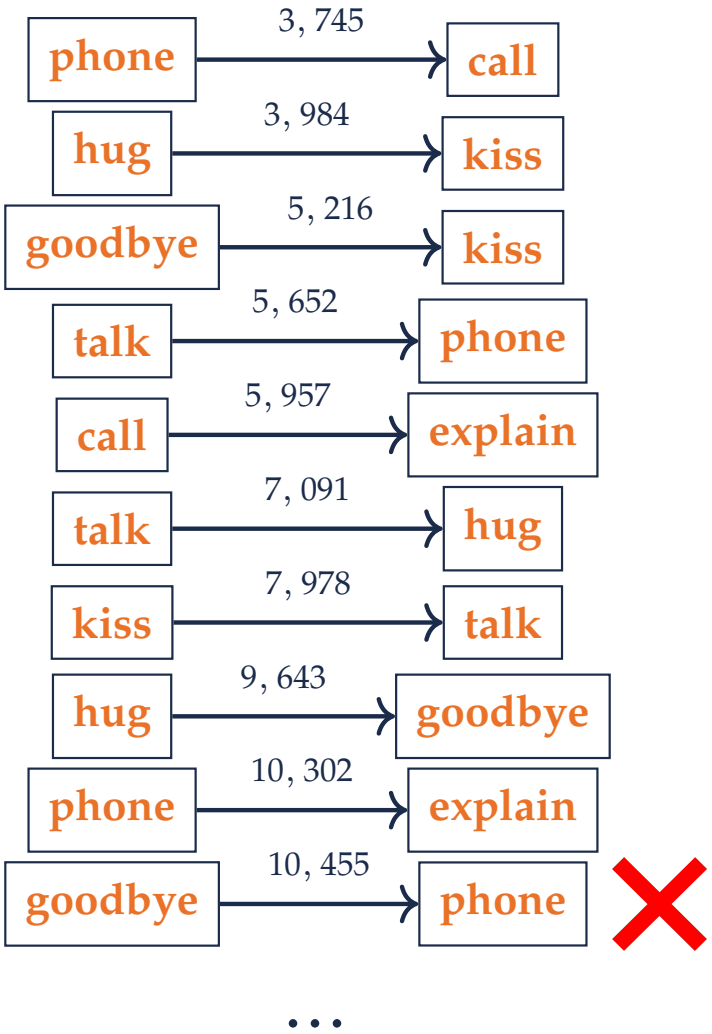

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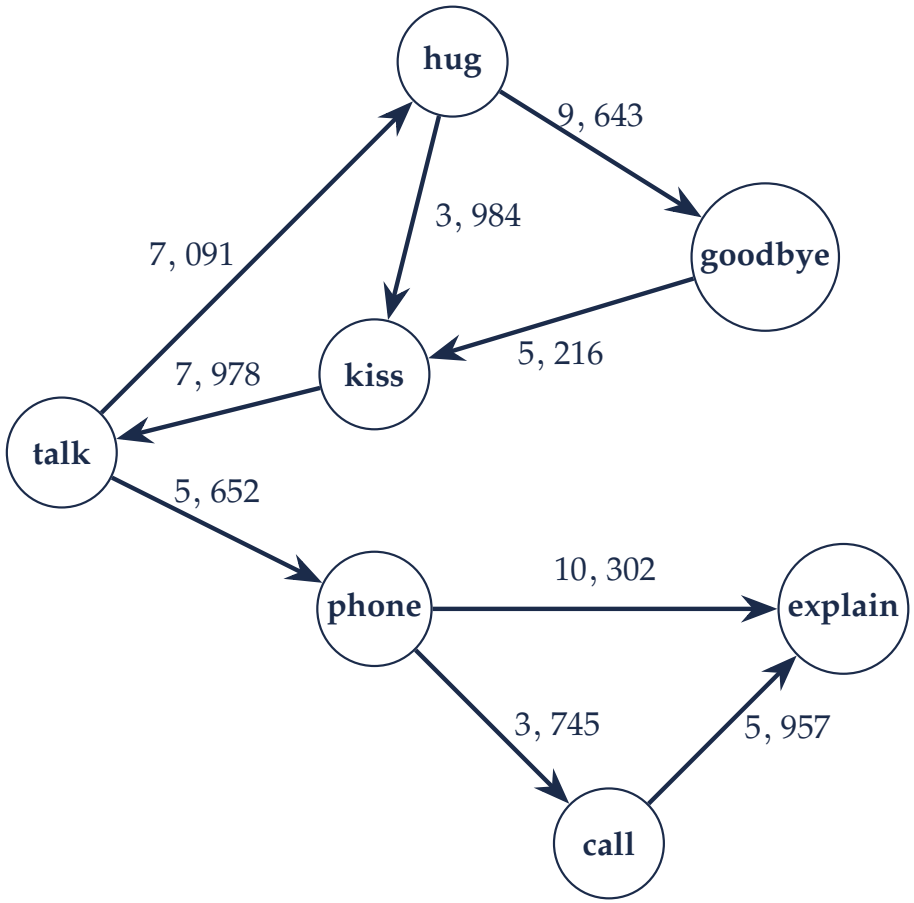
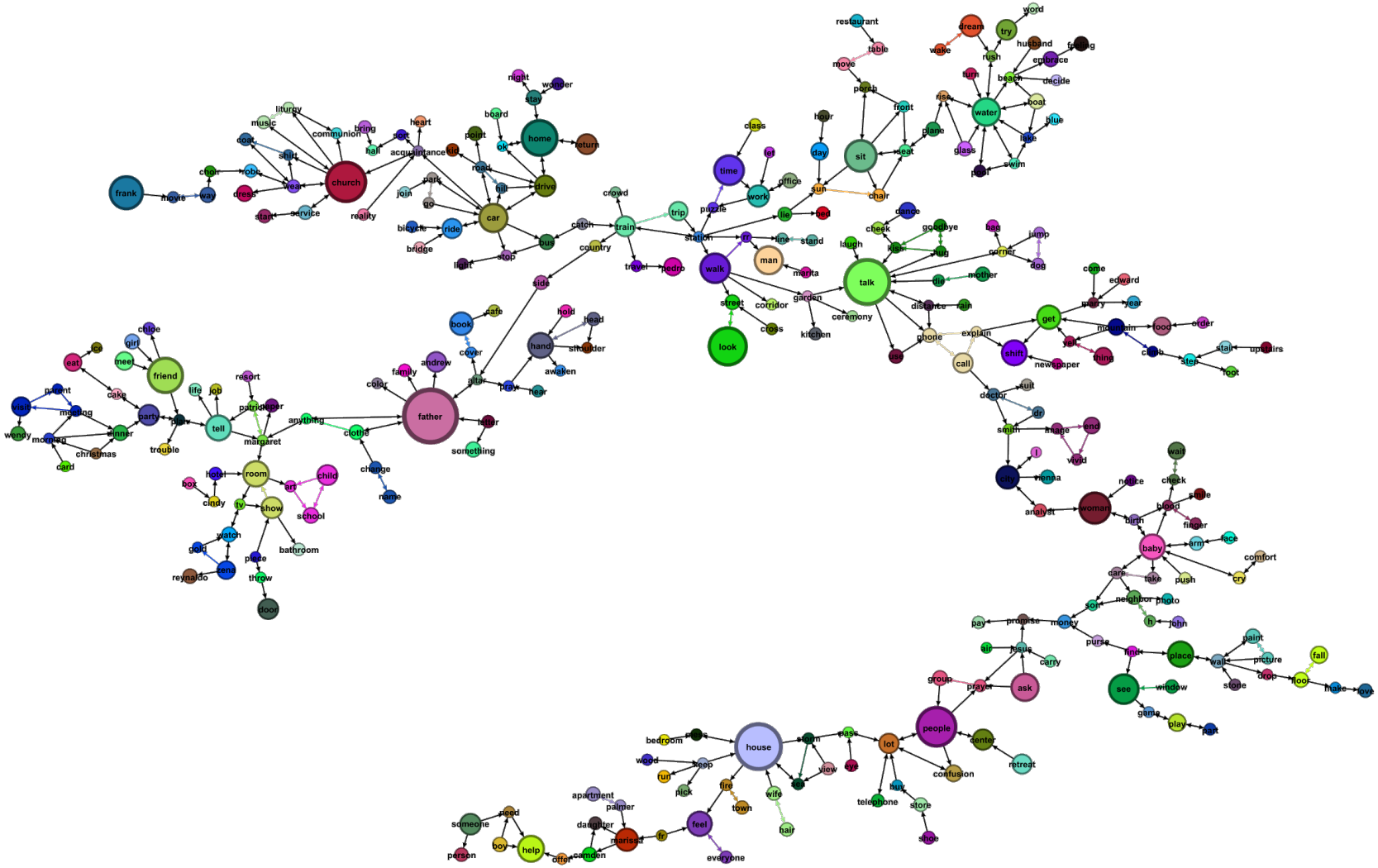
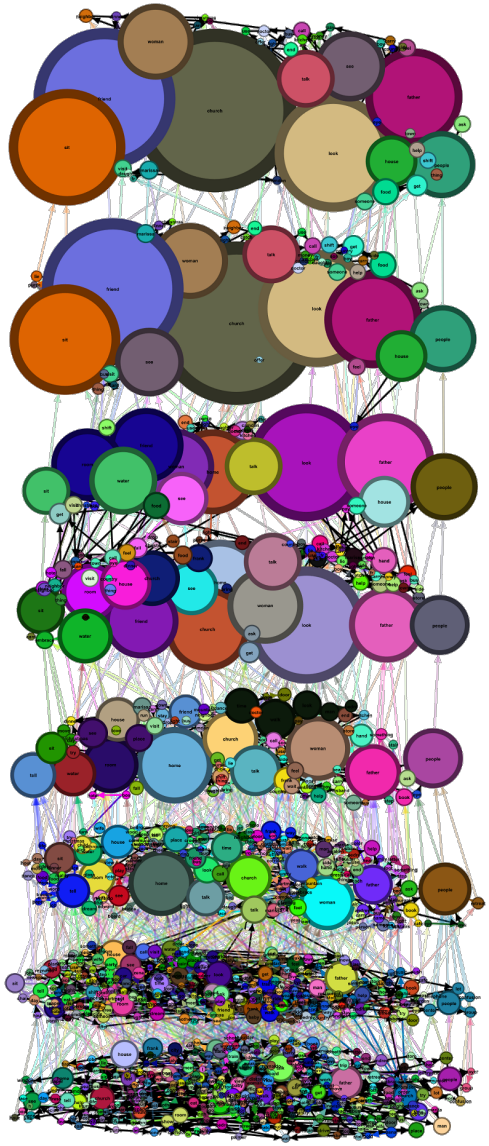


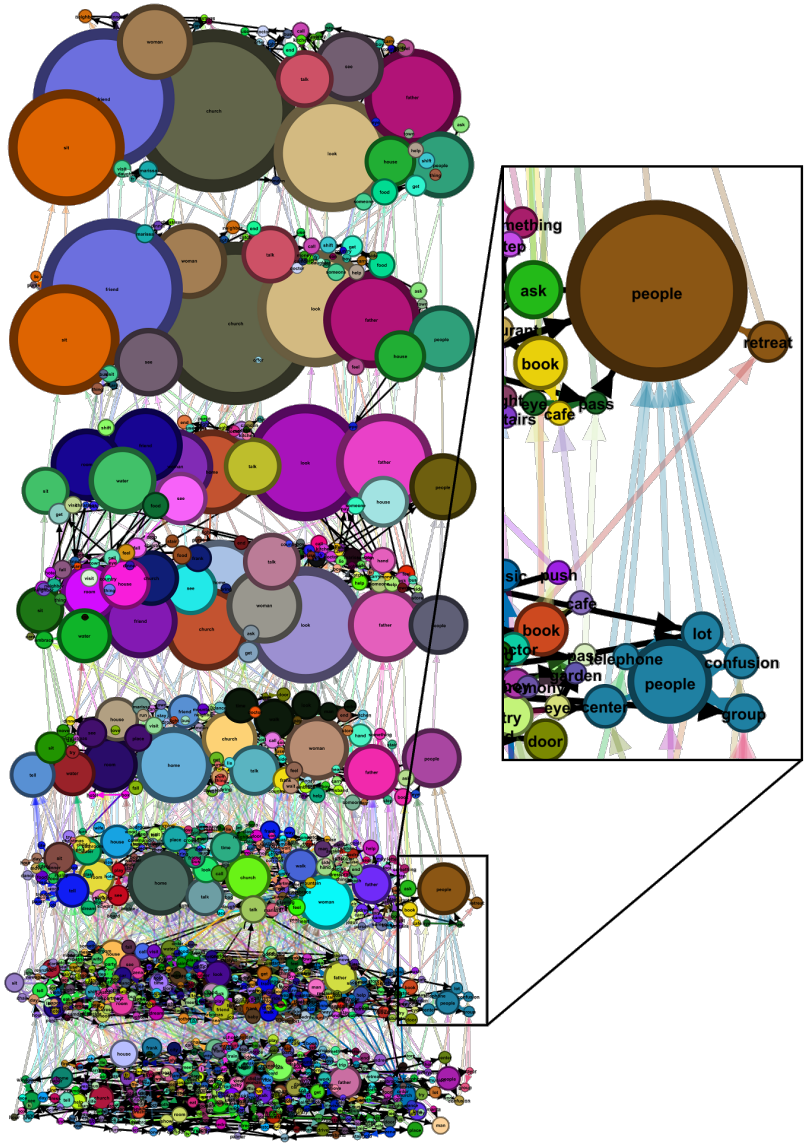
Grafo di Emma



Grafo multi-livello di Emma



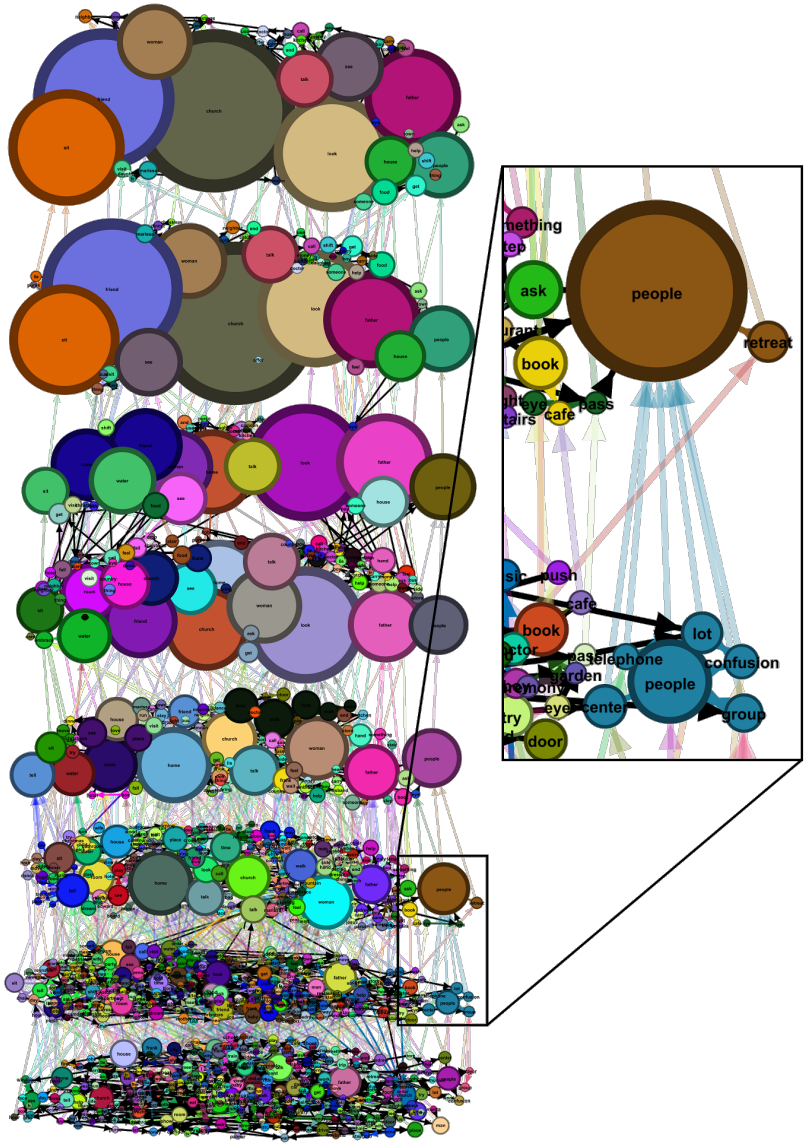
Grafo multi-livello di Emma



Grafo multi-livello di Emma

Esempi di circuiti

- “cake”-“party”
- “boat”-“lake”-“water”
- “trip”-“train”-“station”
- “road”-“car”-“drive”-“hill”
- “liturgy”-“church”-“music”



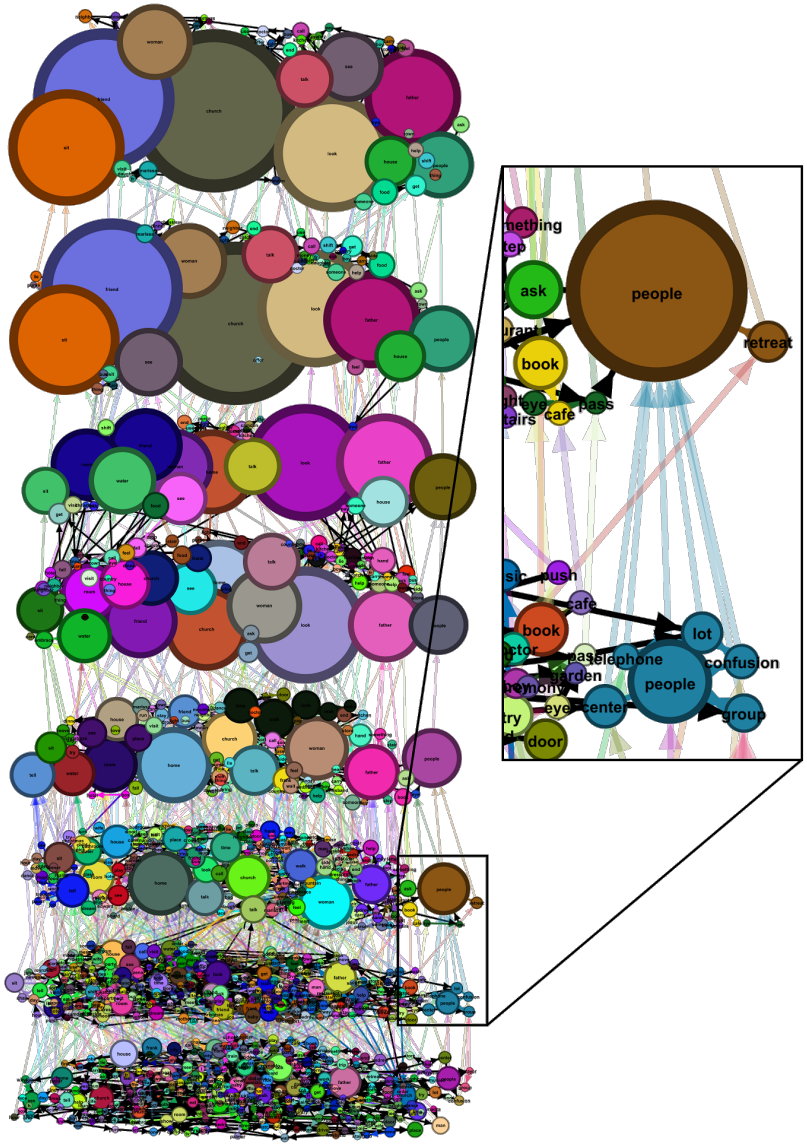
Grafo multi-livello di Emma

Esempi di circuiti

- “cake”-“party”
- “boat”-“lake”-“water”
- “trip”-“train”-“station”
- “road”-“car”-“drive”-“hill”
- “liturgy”-“church”-“music”

Esempi di SCC

- “sit”-“chair”-“front”-“porch”-“seat”-“plane”
- “lake”-“boat”-“water”-“rise”-“pool”-“swim”-“rush”




thank you
danke
謝謝
ngiyabonga
teşekkür ederim
gracias
спасибо
Баярлалаа
рахмат
dank je
tapadh leat
mochchakkeram
go raibh maith agat
dziękuję
bedankt
obrigado
hvala
mauruuru
sukriya
kop khun krap
terima kasih
sagolun
taiku
grazie
arigatô
takk
dakujem
мерси
merci
ευχαριστώ
감사합니다
ありがとう
хвала
enkosi
chnorakaloutioun
trugarez
dhanyavadagalu
shukriya
diolch
xièxie
tanemirt
rahmet
najis tuke
mèsi
sobodi
dekuji
faafetai lava
blagodaram
mersi
barka
welalin
tack
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grazzi
misaotra
matondo
vinaka
kiitos
dankie
dhanyavad
nanni
nandri
asante
manana
obrigada
mamnun
djiere dieuf
gratias ago
gràcies
sulpáy
koszonom
köszönöm
akun
dankon
mahalo
spas
tenki
murakoze
chokrane
merce
gracje
bayarlalaa
rahmat
kam sah hamnida
didi madloba
дякую
спасибі
aciu
tau
kia ora