

**Welkom bij
de Landelijke
TI docentendag**

Workshops

RONDE 1

1. VERANTWOORDING CURRICULUM

o.l.v. Avans Den Bosch

Hoe verantwoord je je curriculum m.b.v.
competenties en BoKS

2. HARDWARE – WIE BETAALT WAT?

o.l.v. Hogeschool Rotterdam

Inventarisatie hoe de TI opleidingen met
hardware kosten omgaan voor de
opleiding en voor de student

3. WISKUNDE

o.l.v. Saxion

Tot welk niveau gaan we met wiskunde?

RONDE 2

1. DIGITAAL TOETSEN

o.l.v. Saxion

Welke vormen / waarom doen we het /
welke problemen en uitdagingen zien we?

2. TOETSEN VAN PROGRAMMEREN

o.l.v. Avans Breda

Hoe en wat beoordeel je bij
programmeertoetsen?

3. AFSTUDEREN

o.l.v. Avans Den Bosch

Hoe toets je het eindniveau / welke processen?

(intentionally left empty)

What do they look for when they look for us

Dawid Zalewski

*Academie Life Science, Engineering & Design
Saxion Hogeschool, Enschede*

From the flyer (disclaimer)

De TI docentendag is voor iedereen die zich interesseert in het domein van de Technische Informatica. Tijdens de dag wordt er vooral veel gedeeld en geleerd. Er wordt gestart met een eigen keynote spreker: Dawid Zalewski van Saxion. Hij heeft een applicatie gemaakt waarmee hij de TI vacatures uit Indeed haalt. Vervolgens worden de vacatures gescreend op welke talen er gevraagd worden en welke kennis en kunde er gevraagd wordt van de huidige TI'er op de markt. Daarnaast heeft Dawid per regio waar een TI stamopleiding zit, een overzicht gemaakt waardoor regionale verschillen in gevraagde kennis en kunde inzichtelijk worden.



Cafe à 7m
|满分的旅遊札記|

By fullfen666 - <https://www.flickr.com/photos/135812973@N04/31934979951/>,
CC BY-SA 2.0, <https://commons.wikimedia.org/w/index.php?curid=57600244>



*By Bodhi Peace - Own work, CC BY-SA 4.0,
<https://commons.wikimedia.org/w/index.php?curid=65442092>*

Who is he?



- ~ 15 years professional experience
- ~ 25 years of programming
 - Doing mostly C++ & Python nowadays
 - Gets worked up about long discussions with no evidence

All the opinions are mine and not representative of Saxion or its employees.

Curriculum Board Discussions



“The key issue we face is that there are 10 of us, but only 9 biscuits....”

vacatures voor embedded software in Enschede

Aanbevolen vacatures 63 nieuwe

Mijn recente zoekopdrachten

"machine learning" - Enschede 5 nieuwe

tensorflow - Enschede

embedded AND engineer - Enschede
25 nieuwe

elektrotechniek AND hbo - Enschede
31 nieuwe

elektrotechniek hbo - Enschede

electronics - Enschede 12 nieuwe

electronic AND engineer - Enschede
7 nieuwe

elektrotechniek - Enschede

"technische computerkunde" -
Enschede

» zoekopdrachten wissen

Sorteer op:

relevantie - datum

Afstand:

binnen 100 km

Wat

functie, trefwoorden of bedrijf

embedded AND software

Waar

plaats, provincie of postcode



Enschede



Vacatures zoeken

**Plaats je cv - In enkele
seconden**

Pagina 1 van 428 vacatures

Toon: alle vacatures - [115 nieuwe vacatures](#)

**EMBEDDED SOFTWARE ENGINEER
(C++/VB.NET) - nieuw**

ICPGroup

Holten

Binnen het team van ontwikkelaars werk je als embedded software engineer nauw samen met hardware-engineering aan het implementeren van klant specifieke...

Eenvoudig solliciteren

Gesponsord [vacature opslaan](#)

Embedded Software Engineer - nieuw

ICT Group 58 reviews

Deventer

Minimaal 2 jaar ervaring als Embedded Software Engineer. Wij zijn op zoek naar een embedded software engineer die graag real-time applicaties maakt met embedded...

Gesponsord [vacature opslaan](#)

E-mail mij GRATIS de nieuwste vacatures voor deze zoekopdracht

Mijn e-mail:

Stuur mij ook een e-mail met voor mij aanbevolen vacatures

Alert opslaan

Als je een vacature-alert maakt of aanbevolen vacatures ontvangt, betekent dit dat je akkoord gaat met onze **Voorwaarden**. Je kunt je instellingen voor toestemming te allen tijde wijzigen door je af te melden of door de aanwijzingen in onze voorwaarden te volgen.

Dit bedrijf heeft vacatures voor embedded AND software

ICT+



+

`requests`
`BeautifulSoup`

(web & html)

`Pandas`
`geopy`
`geocode`

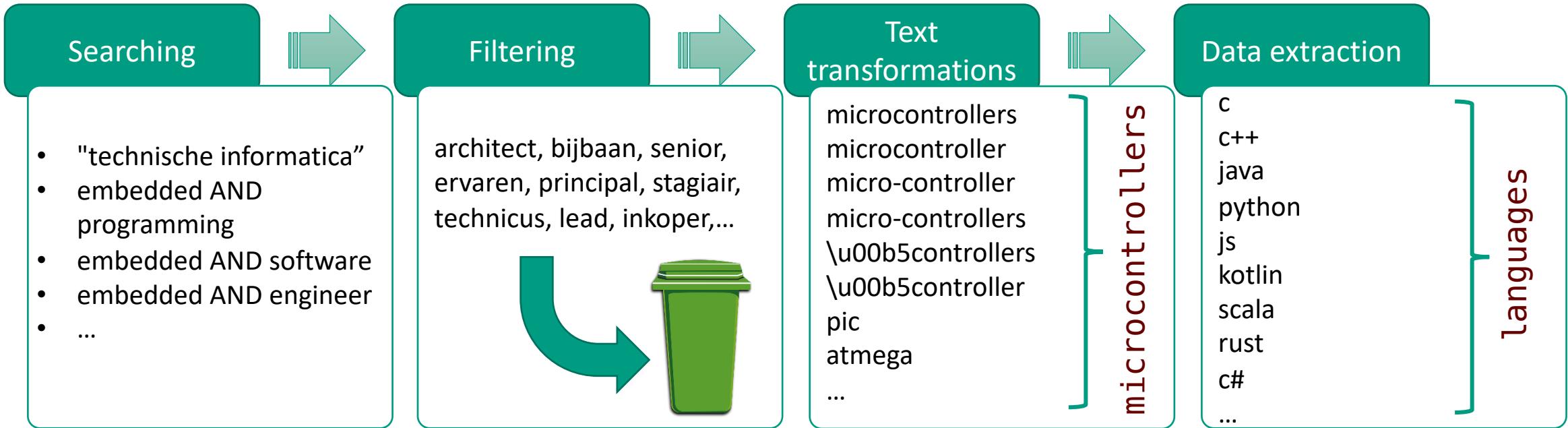
data handling

`nltk`
`langdetect`
`editdistance`

(natural language processing)

`numpy`
`matplotlib`
`wordcloud`
`seaborn`

(statistics & visualization)



Searching

"technische informatica"

"technische computerkunde"

"technische computerwetenschappen"

embedded AND programmeren

embedded AND programming

embedded AND software

embedded AND engineer

...

Filtering

sales business
inkoop marketing manager
mechanica supply chain
docent architect
senior internship ervaren
inkoopassistent phd position trainee
projectleider principal
system engineer
electrical engineer afstudeer
electronica engineer
afstudeerde afstudeerde
traineeship traineeship
recruiter electromechanica
bijbaan hardware engineer
operator afstudeeropdracht stage
technicus sr. (afstudeer)opdracht
designer stageopdracht leider
stagiair management
inkoper marketeer
monteur lead



Text transformations

microcontrollers
microcontroller
micro-controller
micro-controllers
uc
microcontroller-architecturen
atmega
arduino
\u00b5controllers
\u00b5controller
pic



microcontrollers

Keywords counting

- c
- c++
- java
- python
- js
- kotlin
- rust
- c#
- swift
- vhdl
- labview
- matlab
- simulink
- php
- visual basic
- assembler
- delphi



Category: languages

Extracted data

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    "place": "Eindhoven",  
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    "geo": [ 5.478633, 51.4392648 ],  
    "terms": {  
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        "machine vision",  
        "real-time",  
        "databases",  
        "python",  
        "linux",  
        "build systems",  
        "vcs",  
        "networking",  
        "cloud computing"  
    }  
}
```

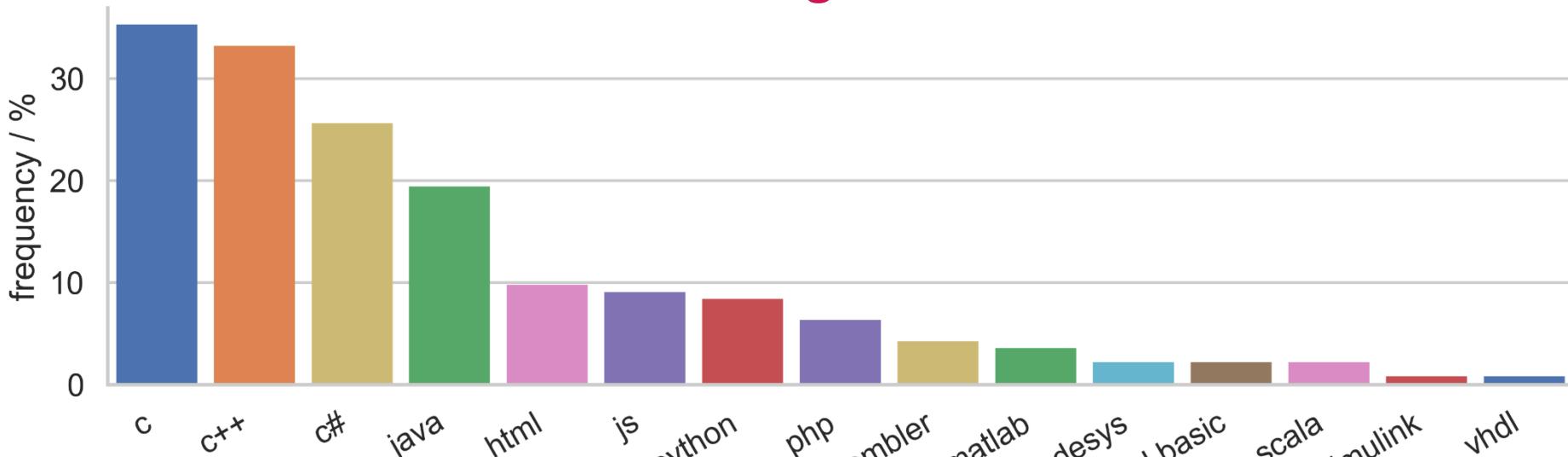
Typical advert

We are looking for C++ developers, familiar with Deep Learning and machine learning, responsible for building applications, which will be used to process digital geographic data of world leading data providers. The processed geographic data will be used in worldwide navigation products of market leading customers like VW, BMW and Daimler. Your responsibility will be to design and develop these applications, and to coordinate with the rest of the team (computer vision engineers). You will also lead the processes from data cleaning, and pre-processing, to deploying trained models to production. You will join our multi-cultural team Deep Learning/Computer Vision engineers within our European Advanced Research Labs. While most of the team is located in our Eindhoven office, our team is partially distributed across Europe. Our processes support remote work, yet our preference is to extend our team in Eindhoven. Keeping our team motivation on highest level is a core concern to us. Therefore, we allow a certain degree of individual flexibility to support a sustainable work/life balance. The Individual A MSc or BSc degree, preferably in computer science. Strong proficiency in C++, with fair knowledge of the language specification. Advanced practical experience in (embedded) software development using modern C++. Expert knowledge in efficient algorithms. Good understanding of memory management in non-garbage collected environments. Understanding of dynamic polymorphism and C++ specific notions, such as friend classes. Knowledge of low-level threading primitives and real-time environments. Enthusiasm for software and the automotive sector. Good knowledge/experience in database systems (relational and non-relational). Ideal candidate not necessarily has a driver license but does have the ambition to work with us on the roadmap for self-driving cars. Proficiency with OpenCV. Familiarity with Linux. Proficiency with Python and basic libraries for machine learning such as scikit-learn and pandas. Good knowledge in fundamentals of machine learning and at least one Deep Learning framework (Tensorflow). Good knowledge of Linux or Windows, CMake, Git, Python

Extracted data

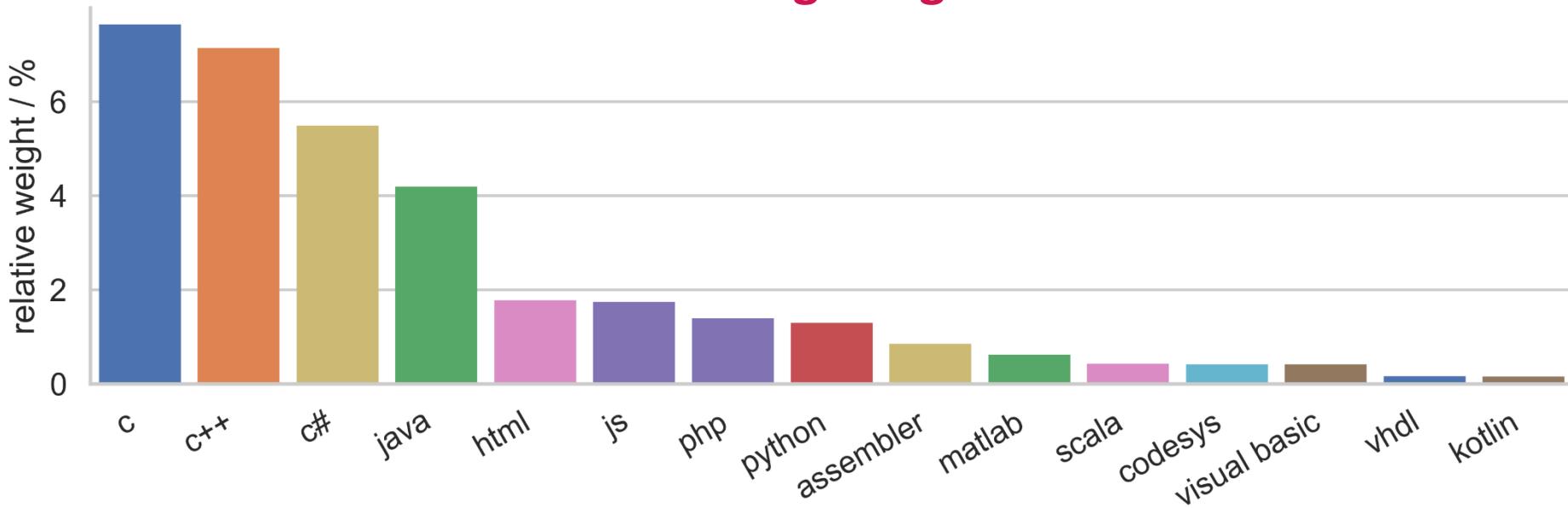
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    "terms": {  
        "c++": 1.0,  
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        "cloud computing": 0.31003071719716957  
    }  
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Using Counts

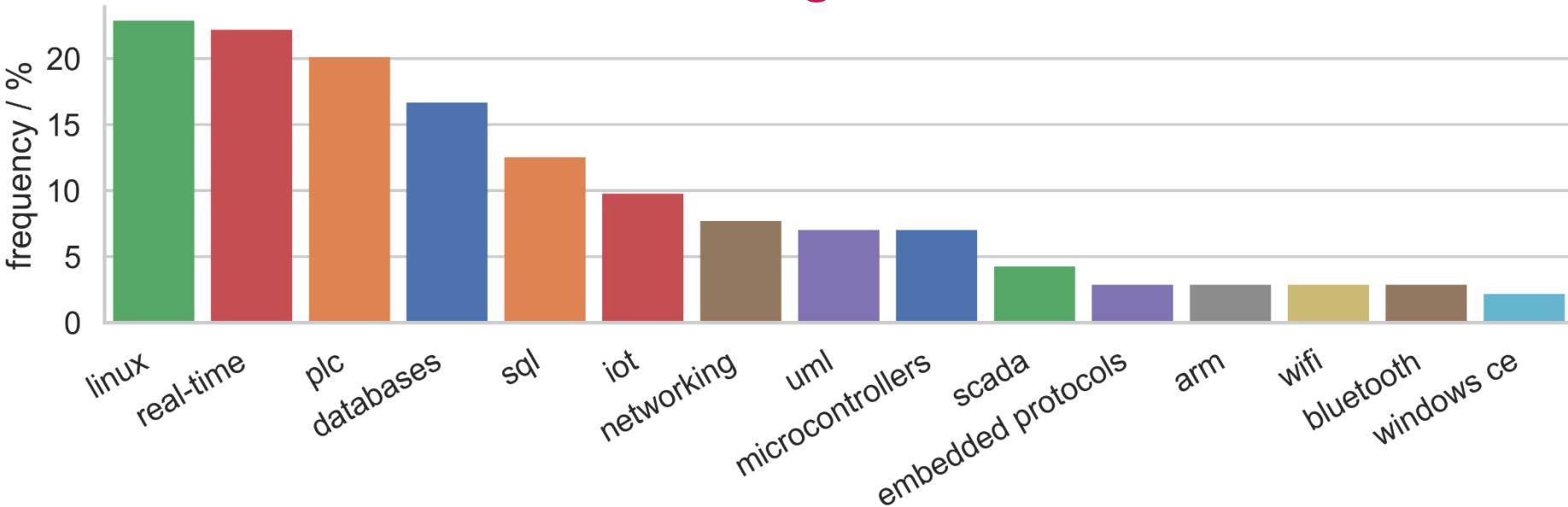


Languages (Enschede)

Using Weights

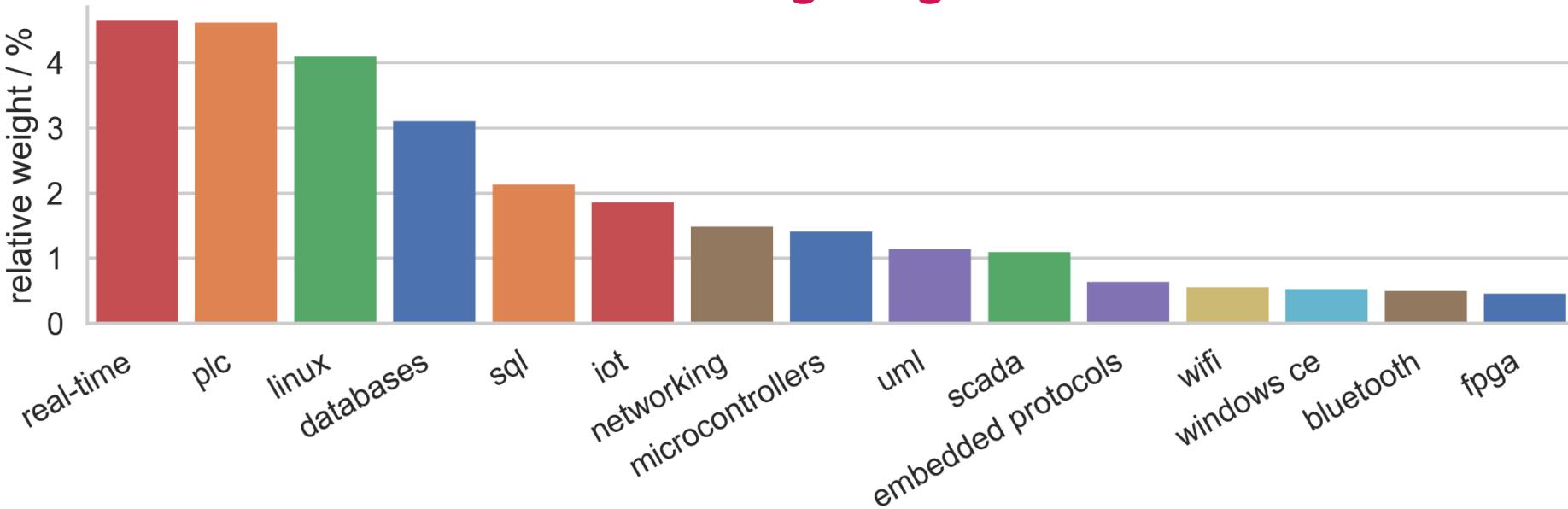


Using Counts



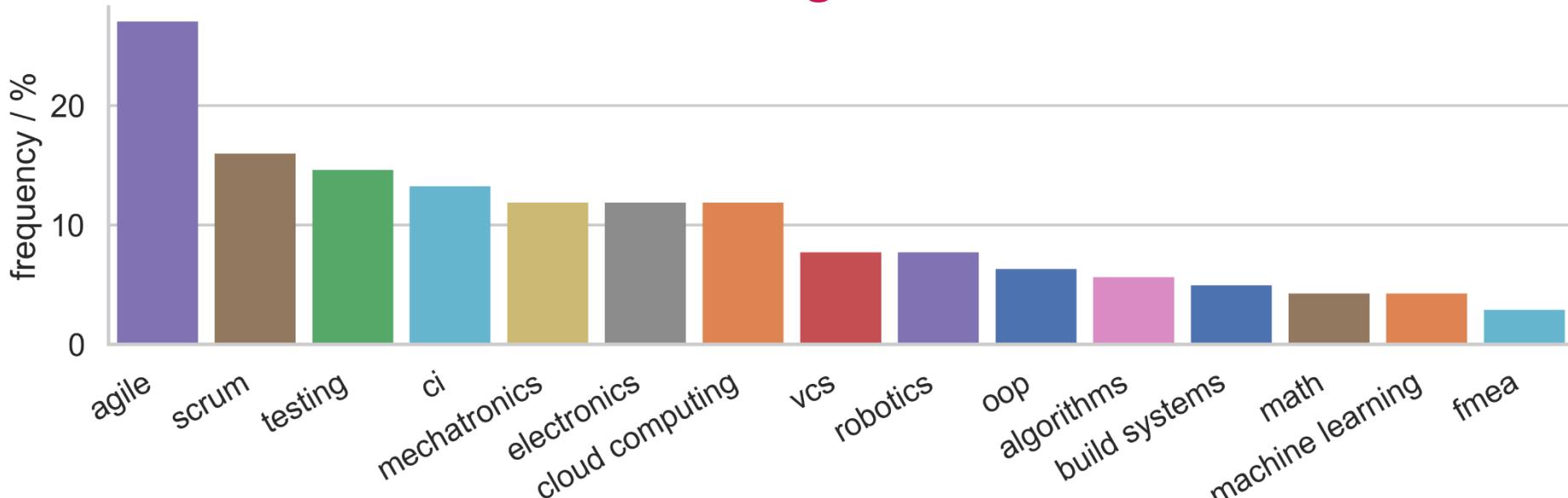
Techniques (Enschede)

Using Weights

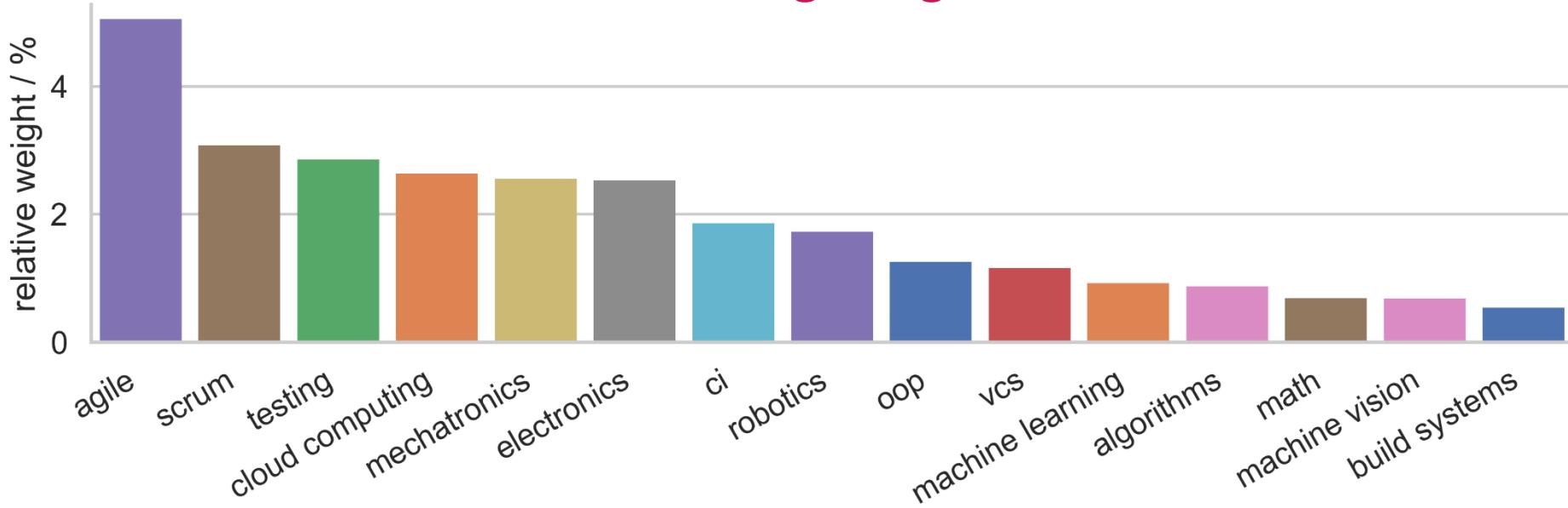


Concepts (Enschede)

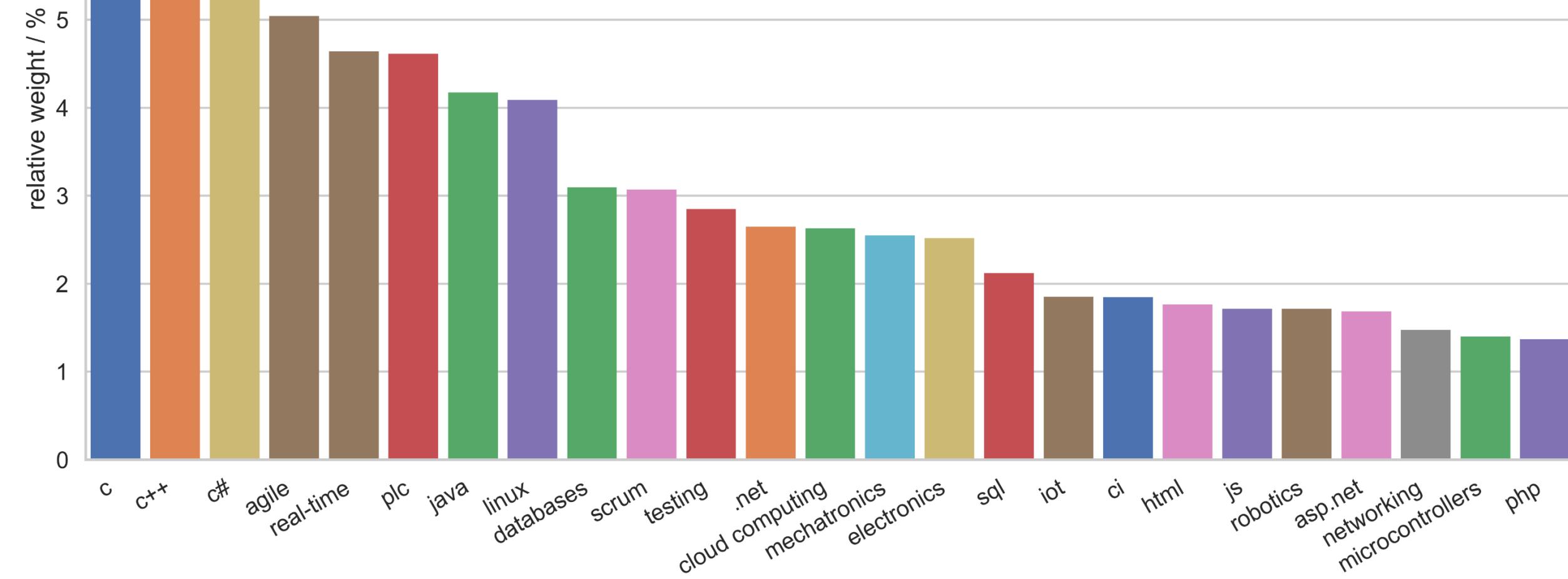
Using Counts



Using Weights

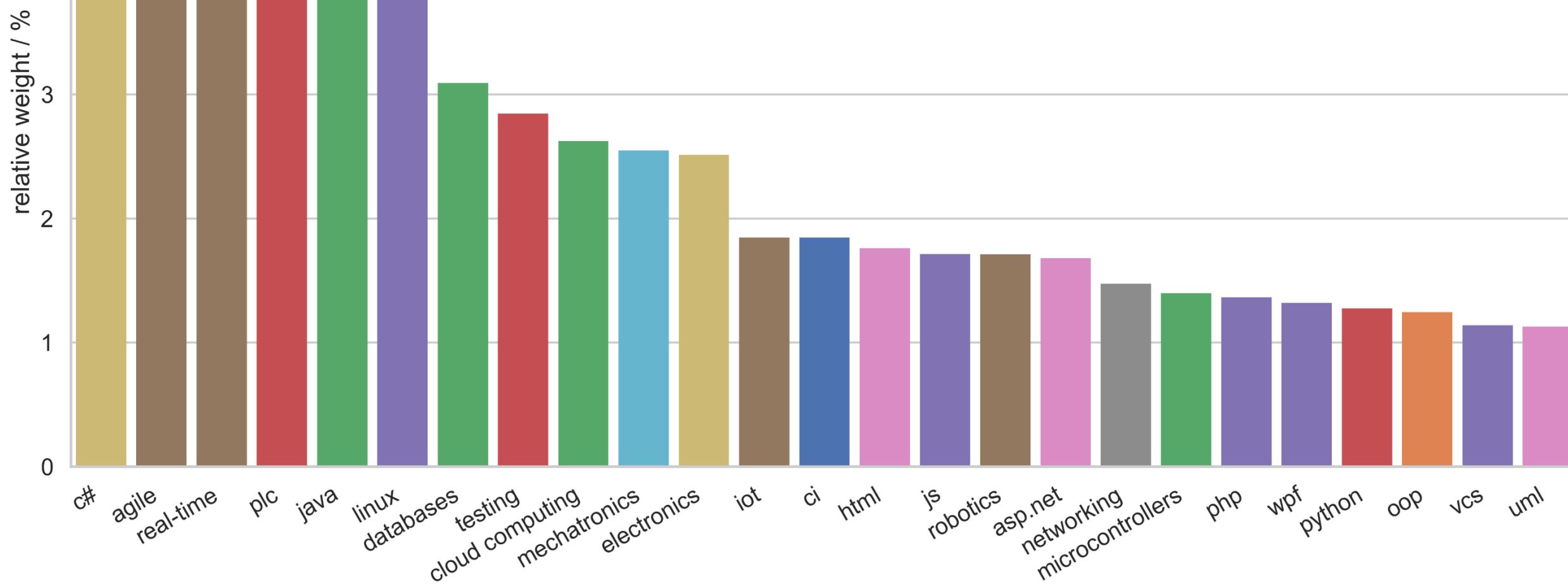


25 MOST WANTED



25 MOST WANTED

(-C&C++ and dups removed)



Job market vs. curriculum

1.1	1.2	1.3	1.4		2.1	2.2	2.3	2.4
Digital (5ec)	Electric Circuits DC	Electric Circuits AC			Mathematical modelling	Data Networks	Digital Signal Processing	
Hardware Lab (4ec)	Measurements DC	Measurements AC	UML software Design		Microcontrollers 1	HDL	Project Integration (8ec)	
Algebraic Abilities	Trigono & Complex Numbers	Differen. & Integration	Diff. Eq. & Laplace		C++	Data-structures	Microcontrollers 2	Internet & Wireless
Programming 1	Programming 2	Java	Java 2		Project Software Engineering (9ec)	OS 1	OS 2	System Modelling
					Databases			

Job market vs. curriculum

$$\frac{weight_{term}}{\sum_{all} weight_{term}}$$

	<i>frequency</i>	<i>weight %</i>	<i>ECTS</i>	<i>ECTS %</i>
assembler	4.1 %	0.8 %	0.6	0.5 %
uml	6.9 %	1.1 %	2.4	2.1 %

$$\frac{weight \%}{ECTS \%} \in [0.5, 2.0] \quad \checkmark$$

The good, the (not so) bad...

	<i>frequency</i>	<i>weight %</i>	<i>ECTS</i>	<i>ECTS %</i>	
c	35.2 %	7.6 %	21.8	19.5 %	✓
agile	26.9 %	5.0 %	1.8	1.6 %	✓
linux	22.8 %	4.1 %	2.1	1.9 %	✓
java	19.3 %	4.2 %	7.2	6.4 %	✓
databases	16.6 %	3.1 %	2.4	2.1 %	✓
testing	14.5 %	2.8 %	1.8	1.6 %	✓
iot	9.7 %	1.8 %	2.5	2.2 %	✓
python	8.3 %	1.3 %	0.8	0.7 %	✓
vcs	7.6 %	1.1 %	1.8	1.6 %	✓
networking	7.6 %	1.5 %	3.0	2.7 %	✓
uml	6.9 %	1.1 %	2.4	2.1 %	✓
µcontrollers	6.9 %	1.4 %	5.5	4.9 %	✓

... and the ugly

	<i>frequency</i>	<i>weight %</i>	<i>ECTS</i>	<i>ECTS %</i>
c	35.2%	7.6%	21.8	19.5%
c++	33.1%	7.1%	3.6	3.2%
c#	25.5%	5.5%	0	0.0%
plc	20.0%	4.6%	0	0.0%
java	19.3%	4.2%	7.2	6.4%
python	8.3%	1.3%	0.8	0.7%

- Why so little C++ and so much C?
- Why Java and no C#?
- Where is PLC?

... and the ugly

	<i>frequency</i>	<i>weight %</i>	<i>ECTS</i>	<i>ECTS %</i>	
real-time	22.1%	4.6%	0	0.0%	
cloud computing	11.7%	2.6%	0	0.0%	 We don't do these...
ci	13.1%	1.8%	0	0.0%	
mechatronics	11.7%	2.5%	0	0.0%	
robotics	7.6%	1.7%	0	0.0%	
matlab	3.5%	0.6%	3	2.7%	
fpga	2.1%	0.4%	3	2.7%	
control systems	1.4%	0.3%	3	2.7%	 ...but we do those
dsp	0.7%	0.1%	3	2.7%	

... and the ugly

	<i>frequency</i>	<i>weight %</i>	<i>ECTS</i>	<i>ECTS %</i>
math	4.1%	0.7%	15.3	13.7%
electronics	11.7%	2.5%	24.1	21.5%
c	35.2%	7.6%	21.8	19.5%
c++	33.1%	7.1%	3.6	3.2%

What next?

- We must change how & what languages we teach.
- We seem to have too much electrical engineering.
- Some subjects should go
vhdl, dsp, control systems
- Some should come
real-time, cloud computing

The Netherlands

General stats

Total NL adverts count: **2530**

Position mismatch: **-1148**

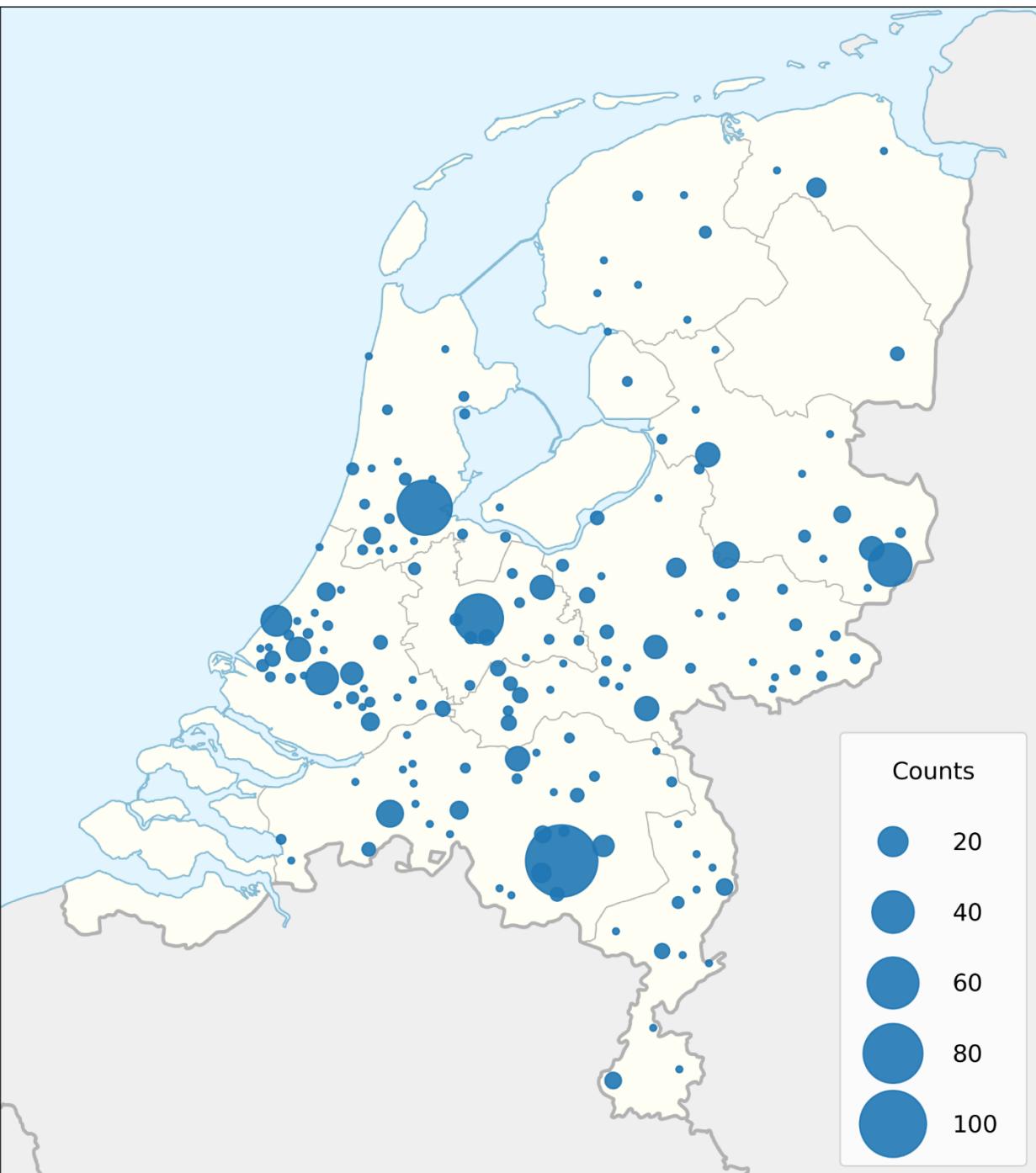
Company filter: **-369**

Similarity filter: **-66**

=====

1007

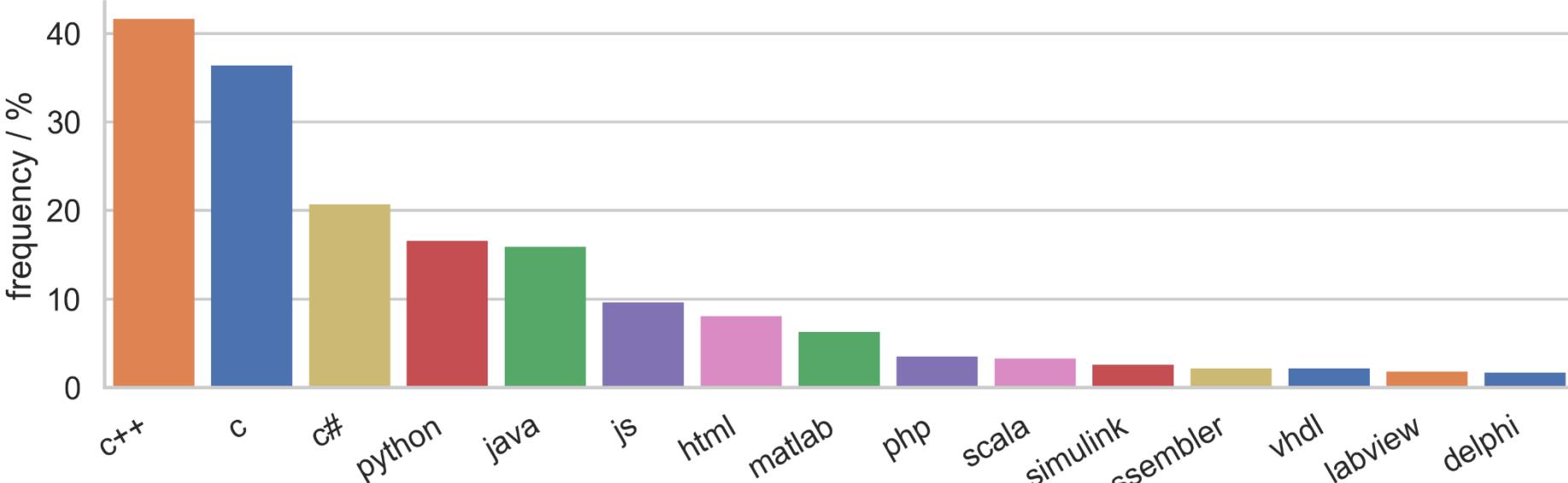
Geographic distribution



Results

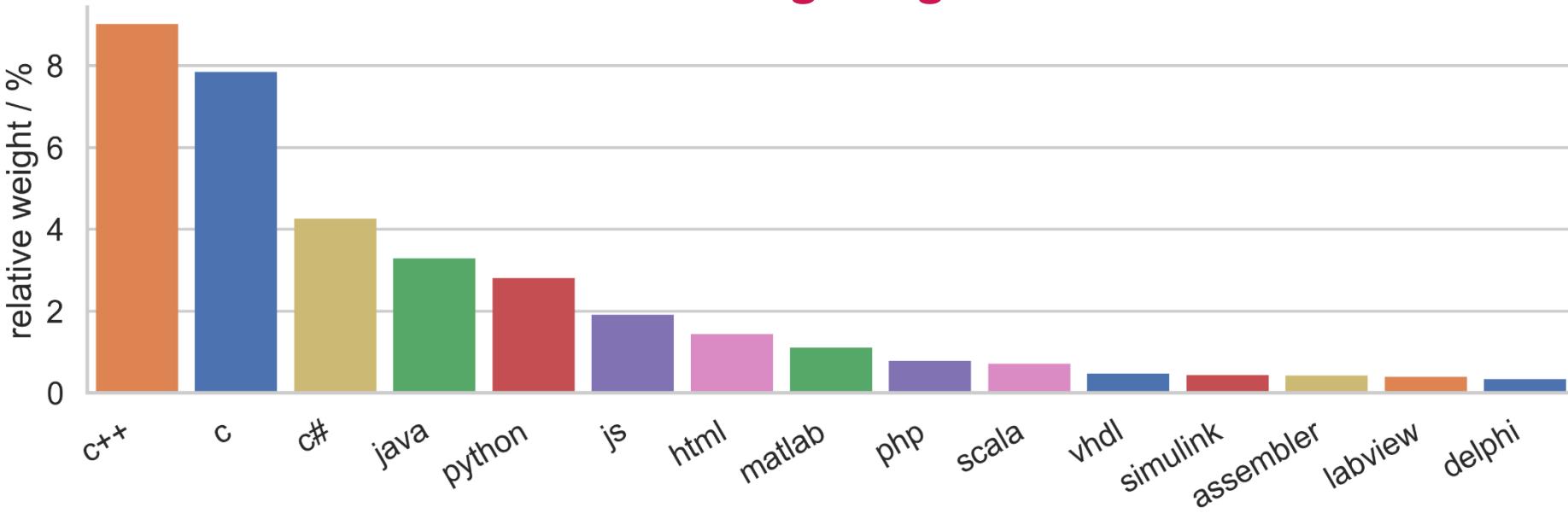
- LANGUAGES, CONCEPTS, TECHNIQUES
- REGIONAL DIFFERENCES

Using Counts

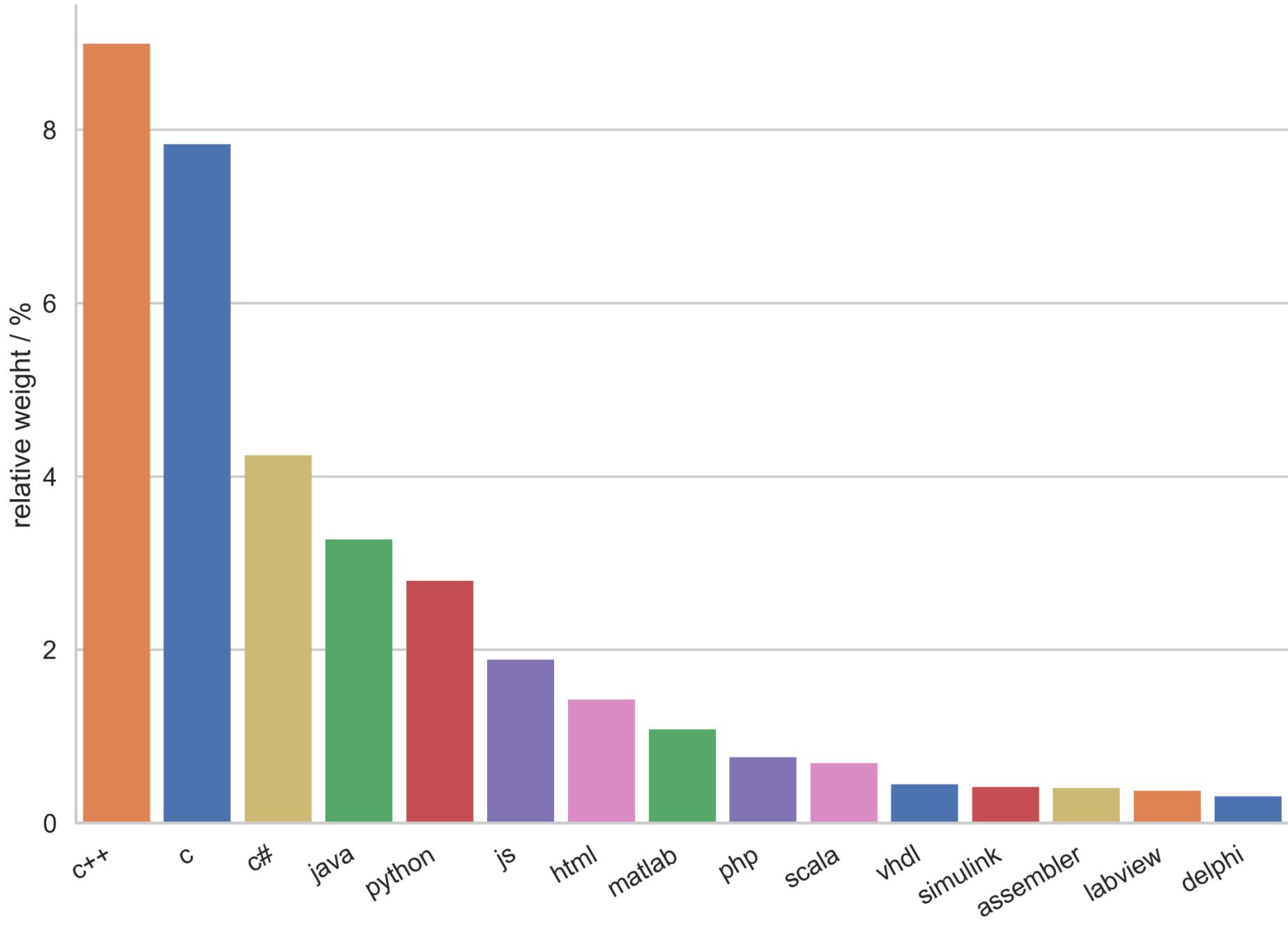


Languages

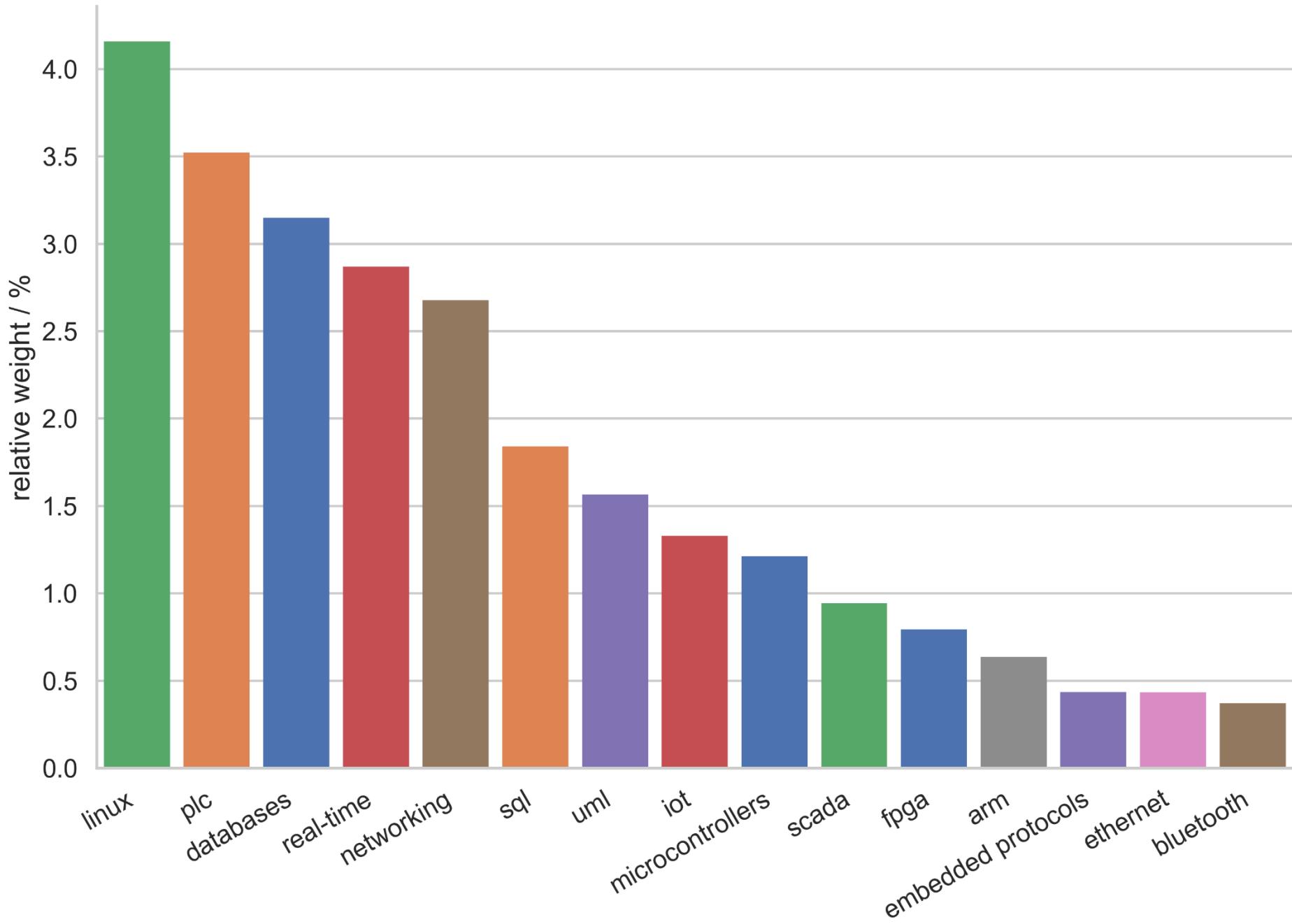
Using Weights



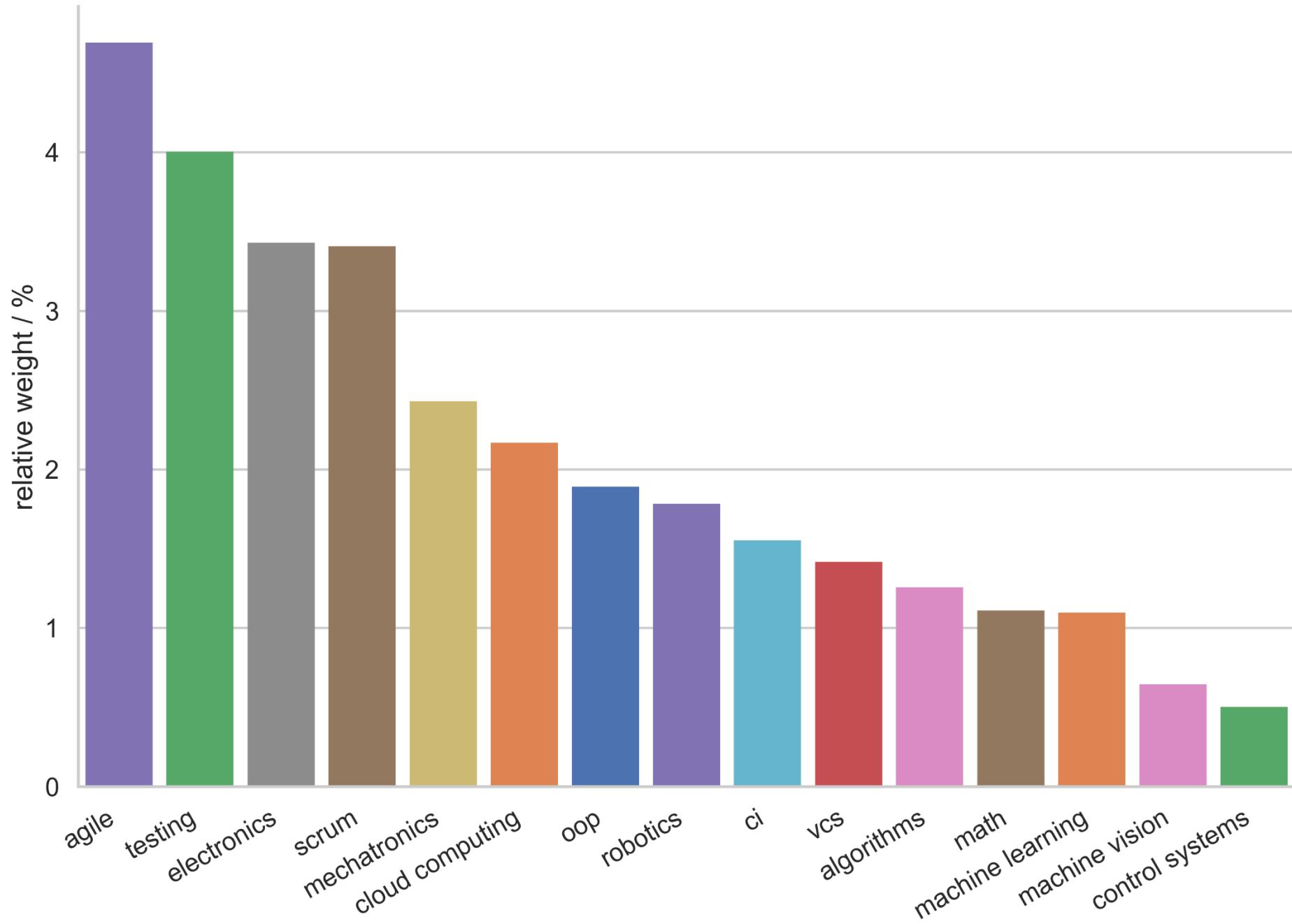
Languages



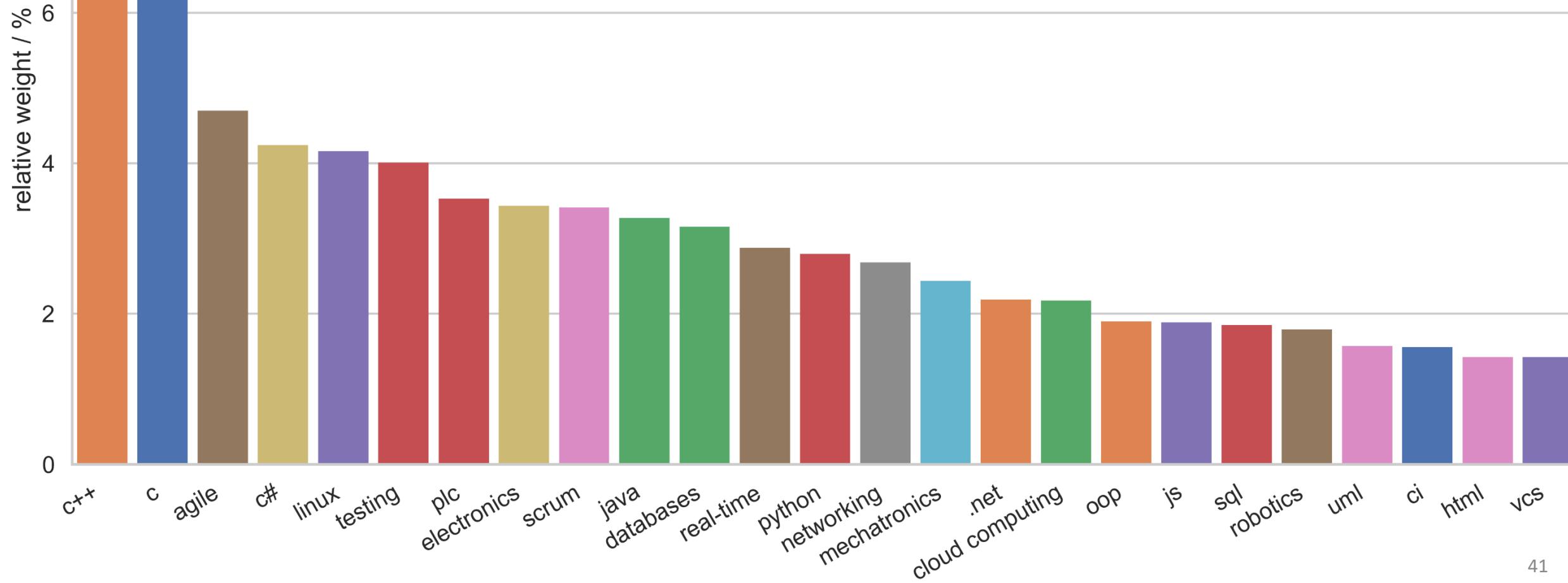
Techniques



Concepts

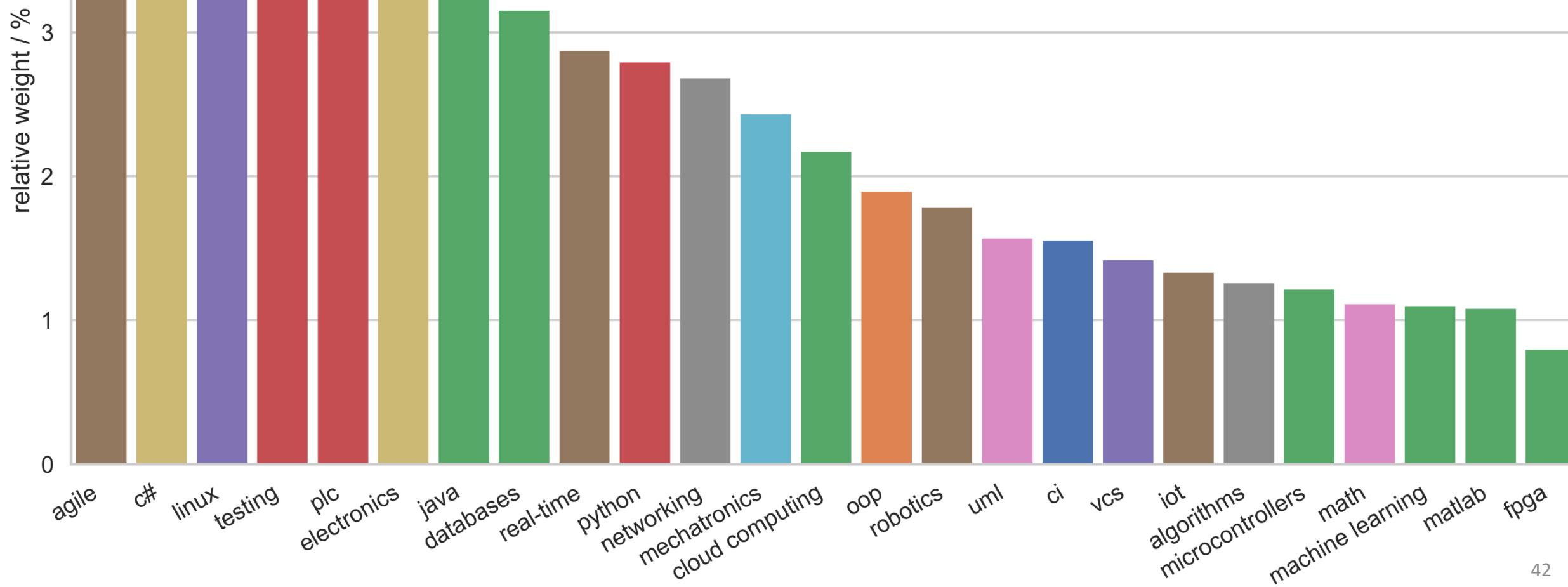


25 MOST WANTED



25 MOST WANTED

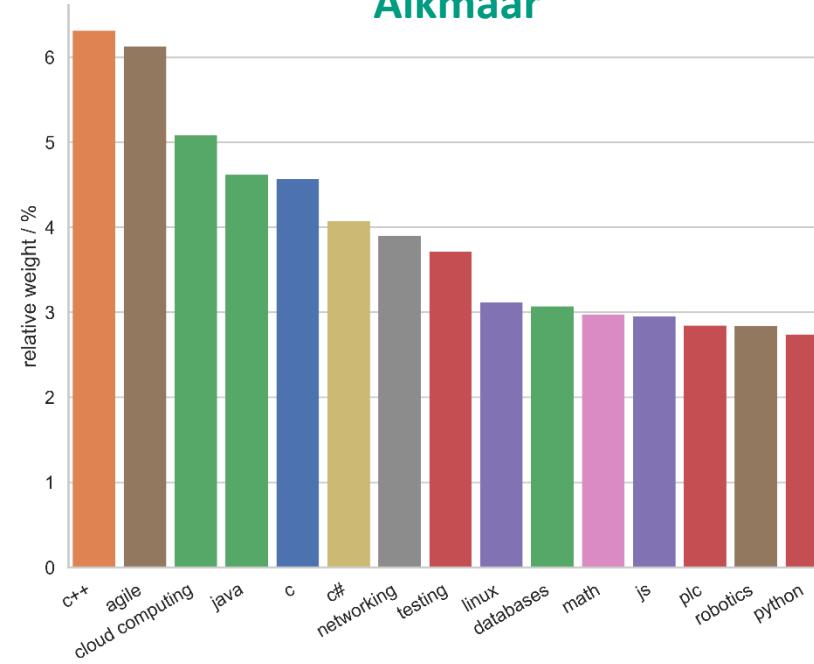
(-C&C++ and dups removed)



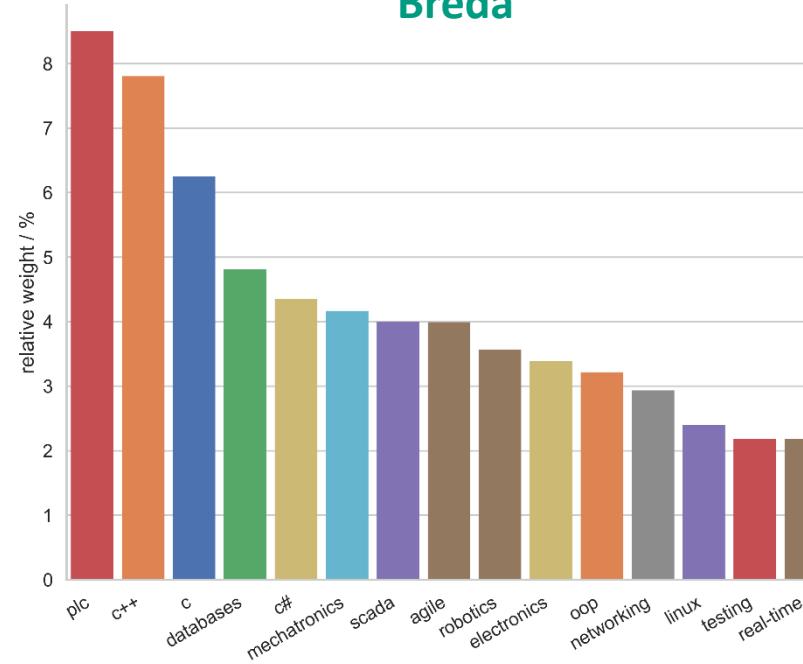
The Nether**?**lands



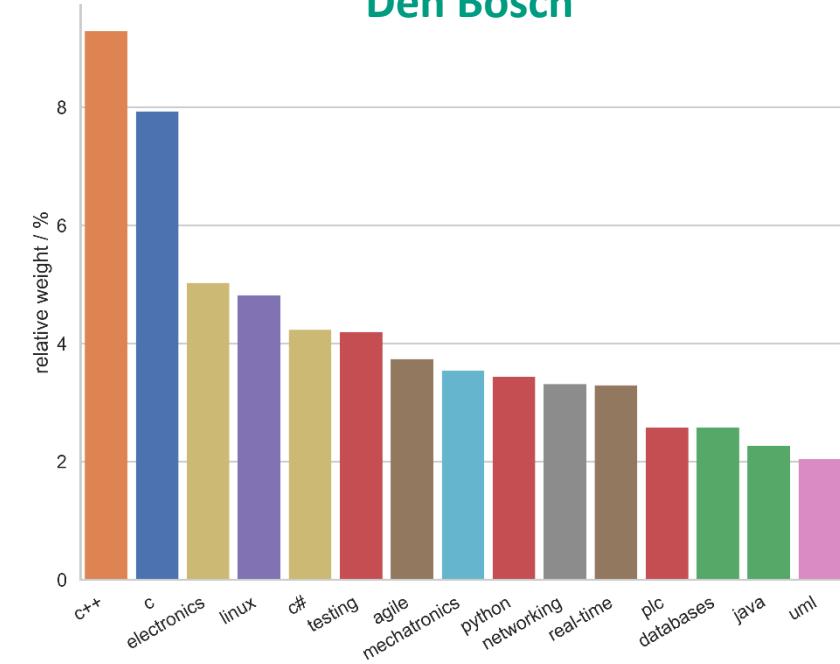
Alkmaar



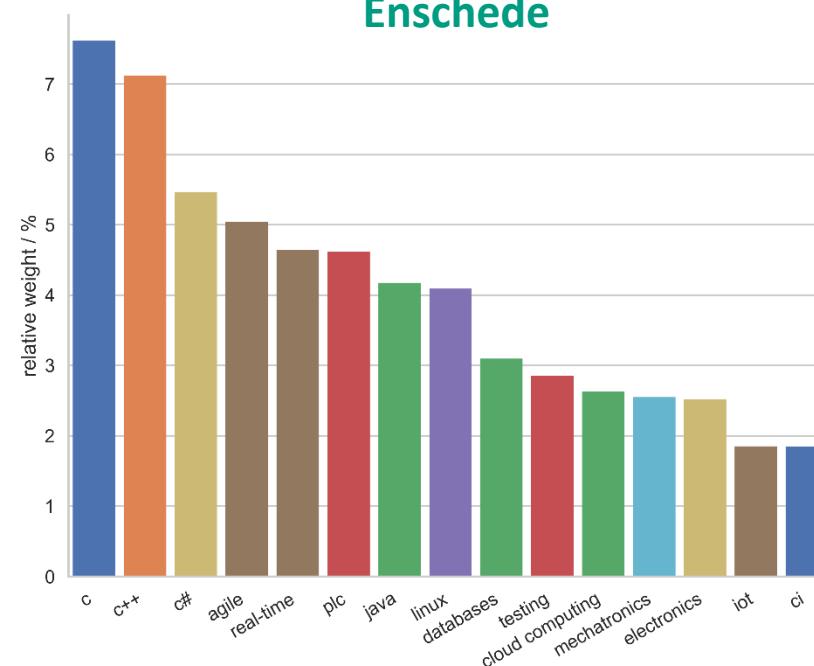
Breda



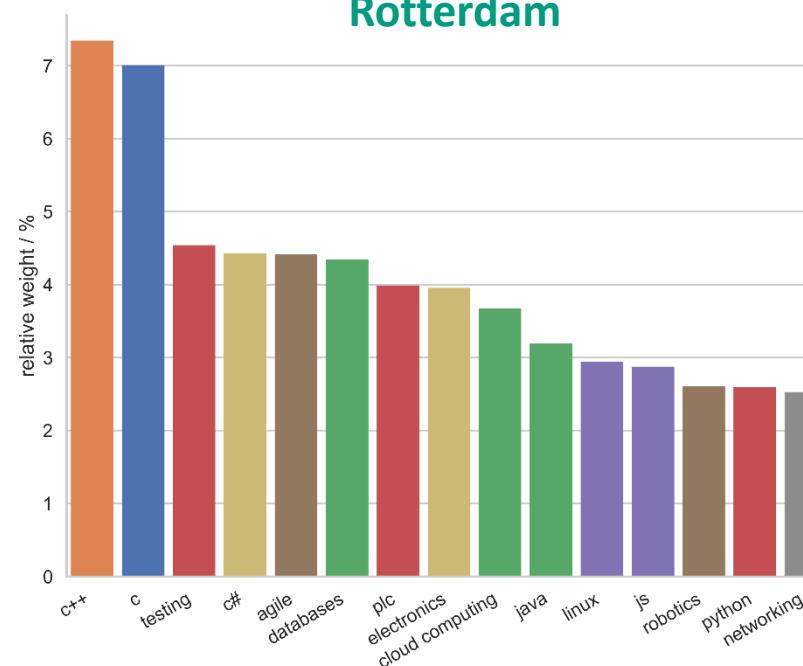
Den Bosch



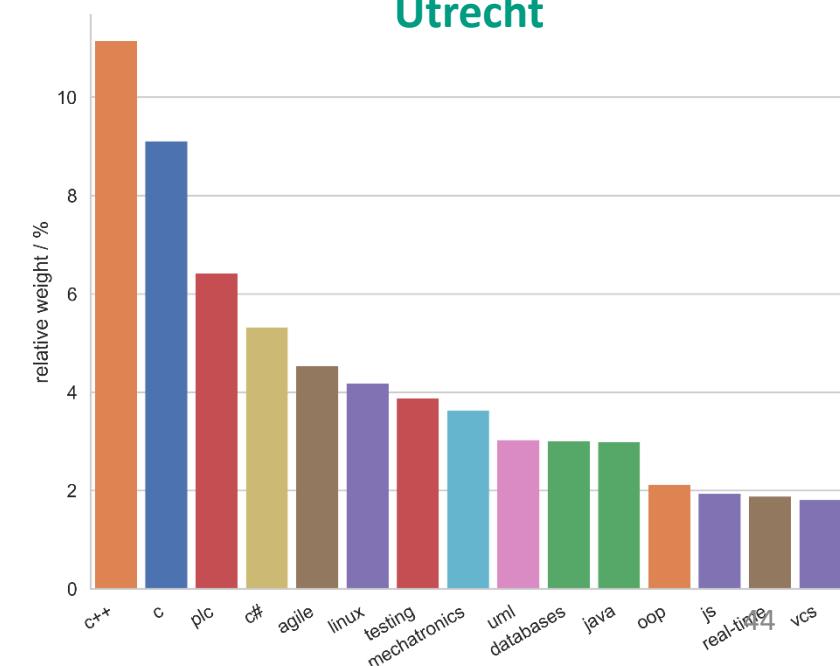
Enschede

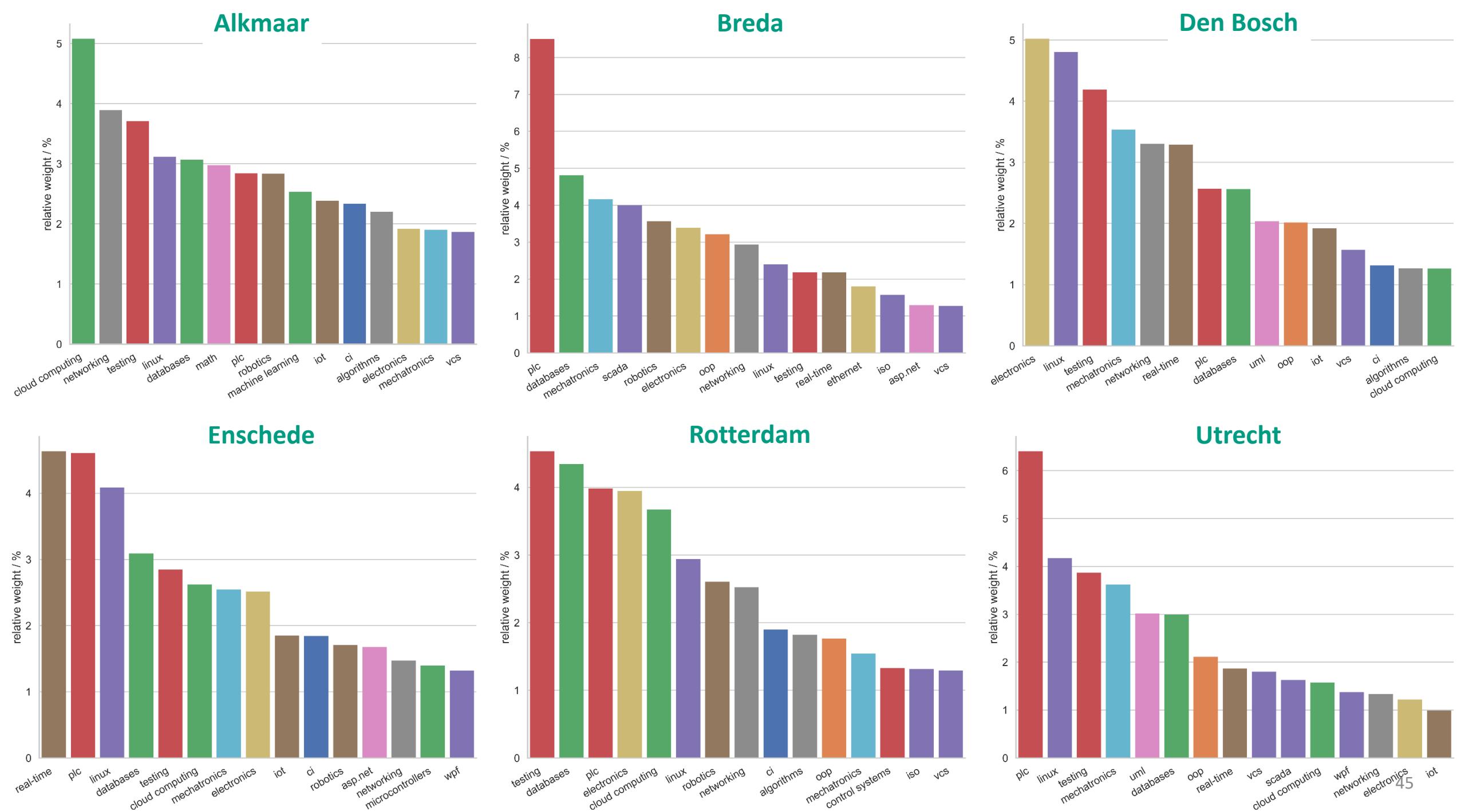


Rotterdam

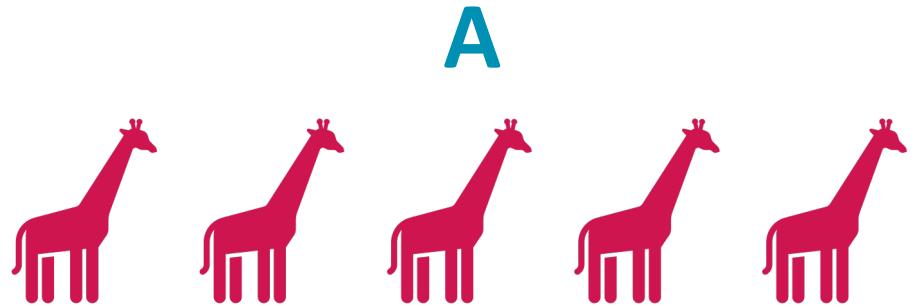


Utrecht





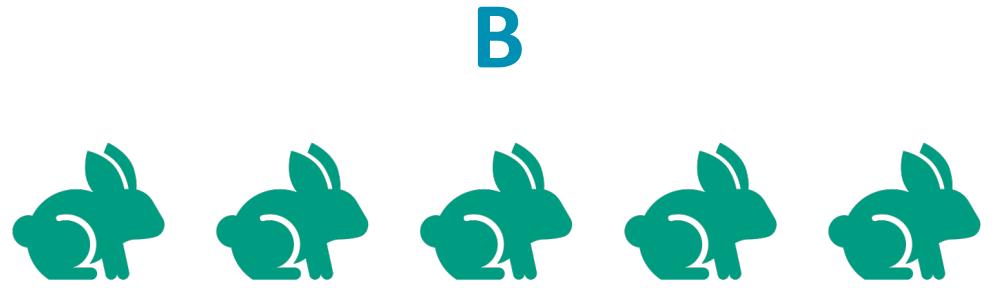
Excess



0.5

0.2

$$0.2 - 0.5 = -0.3$$



0.5

0.8

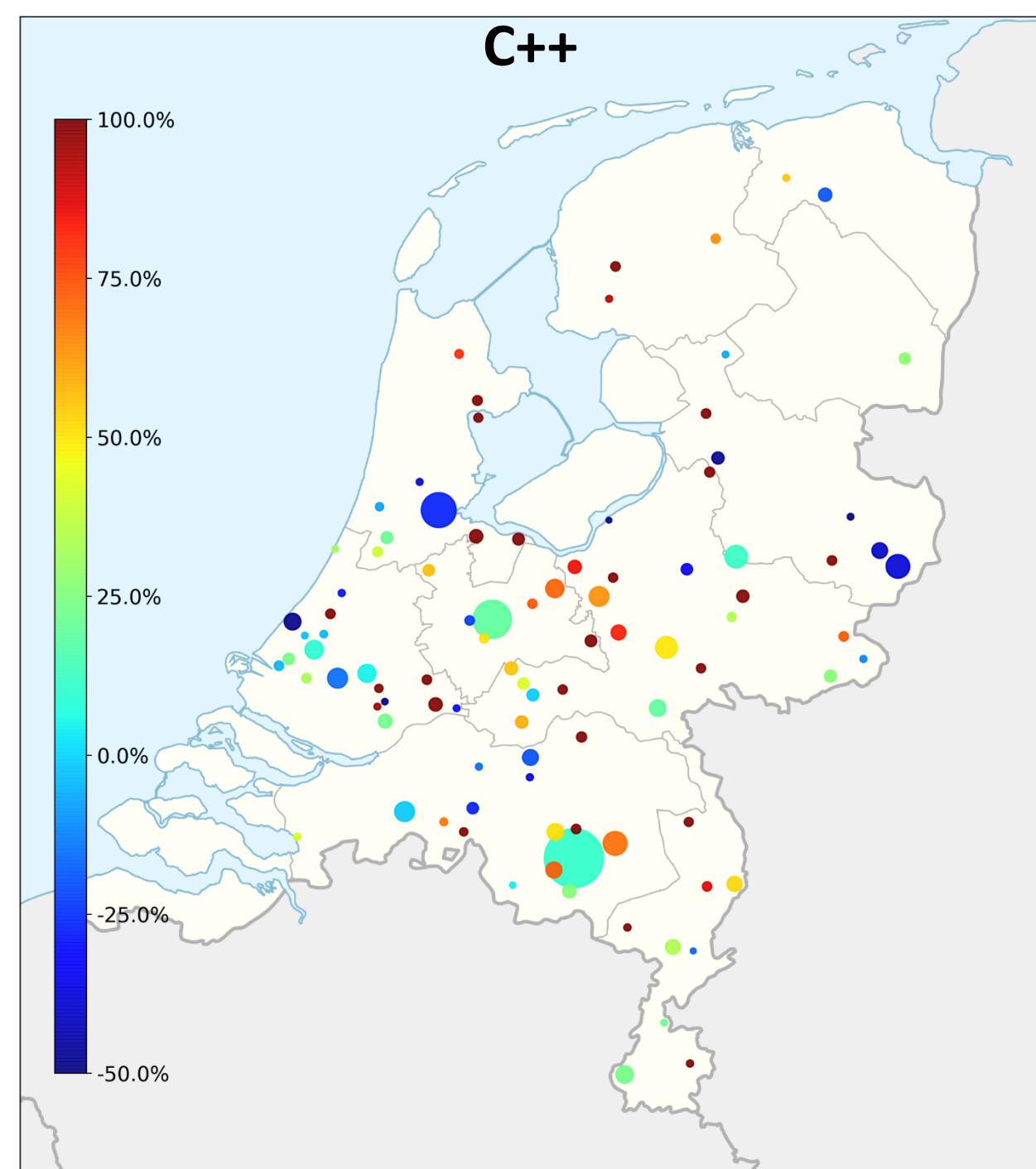
$$0.8 - 0.5 = 0.3$$

Population
Fraction

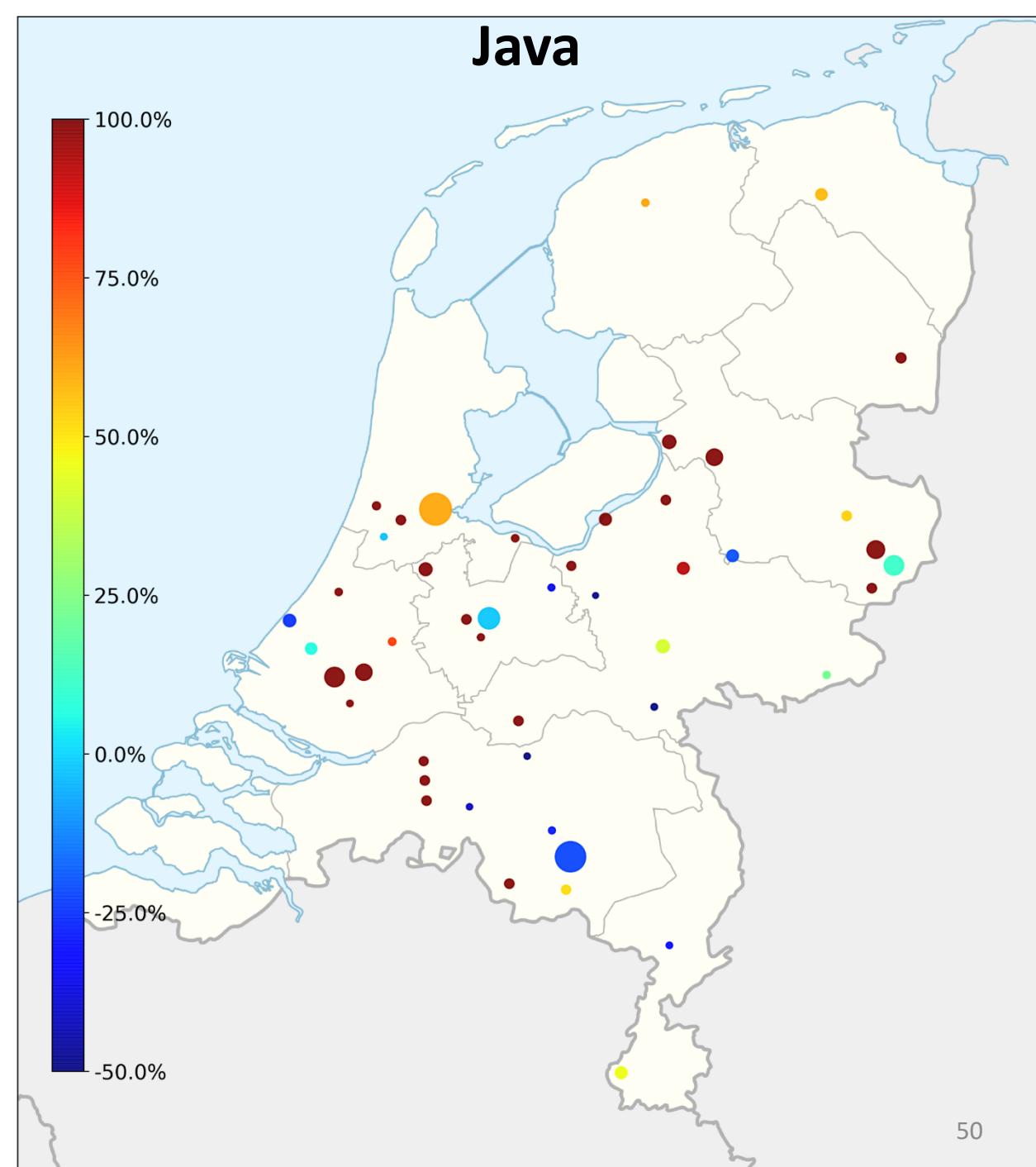
Rabbit
Fraction

Rabbit
Excess

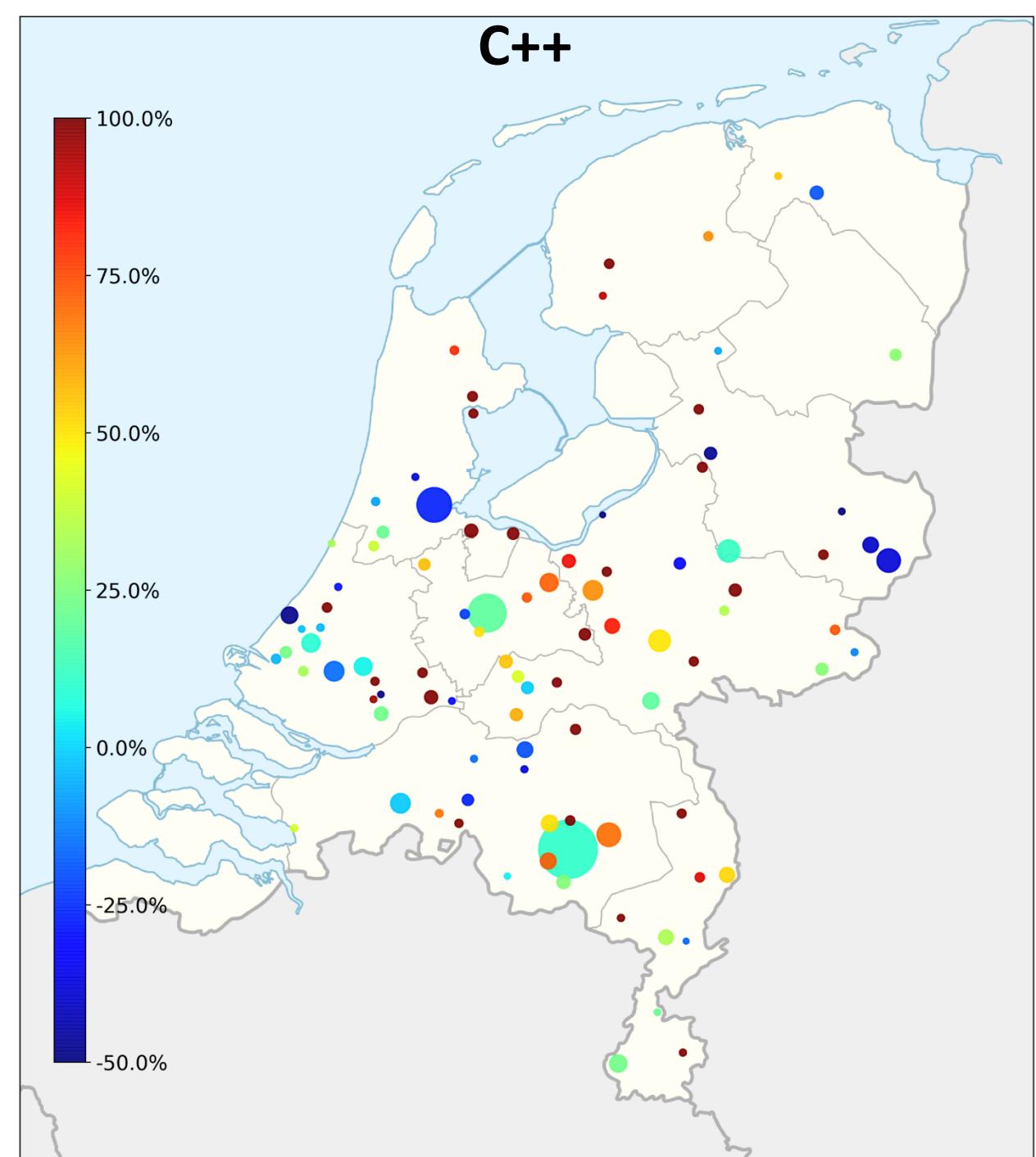
C++



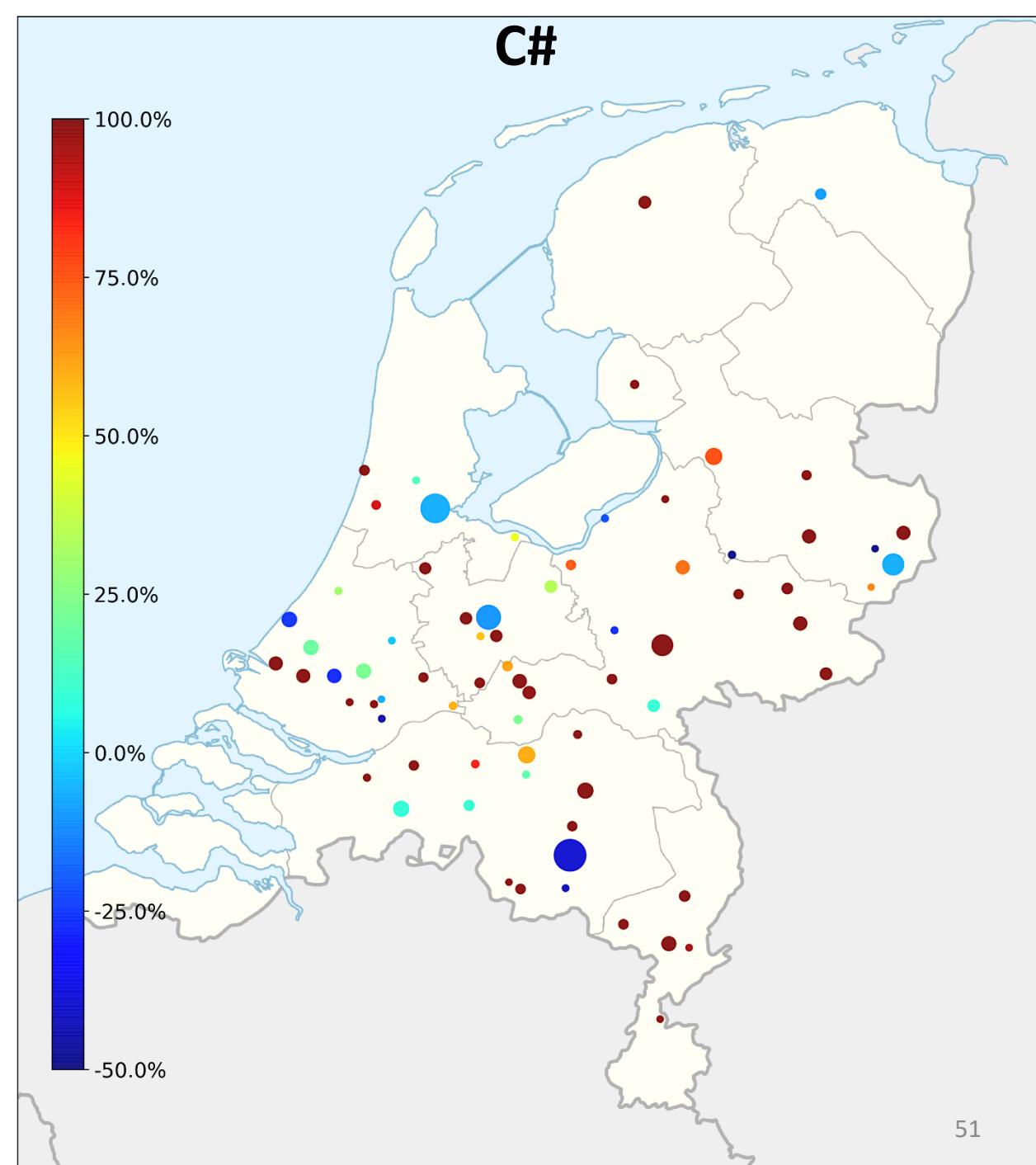
Java



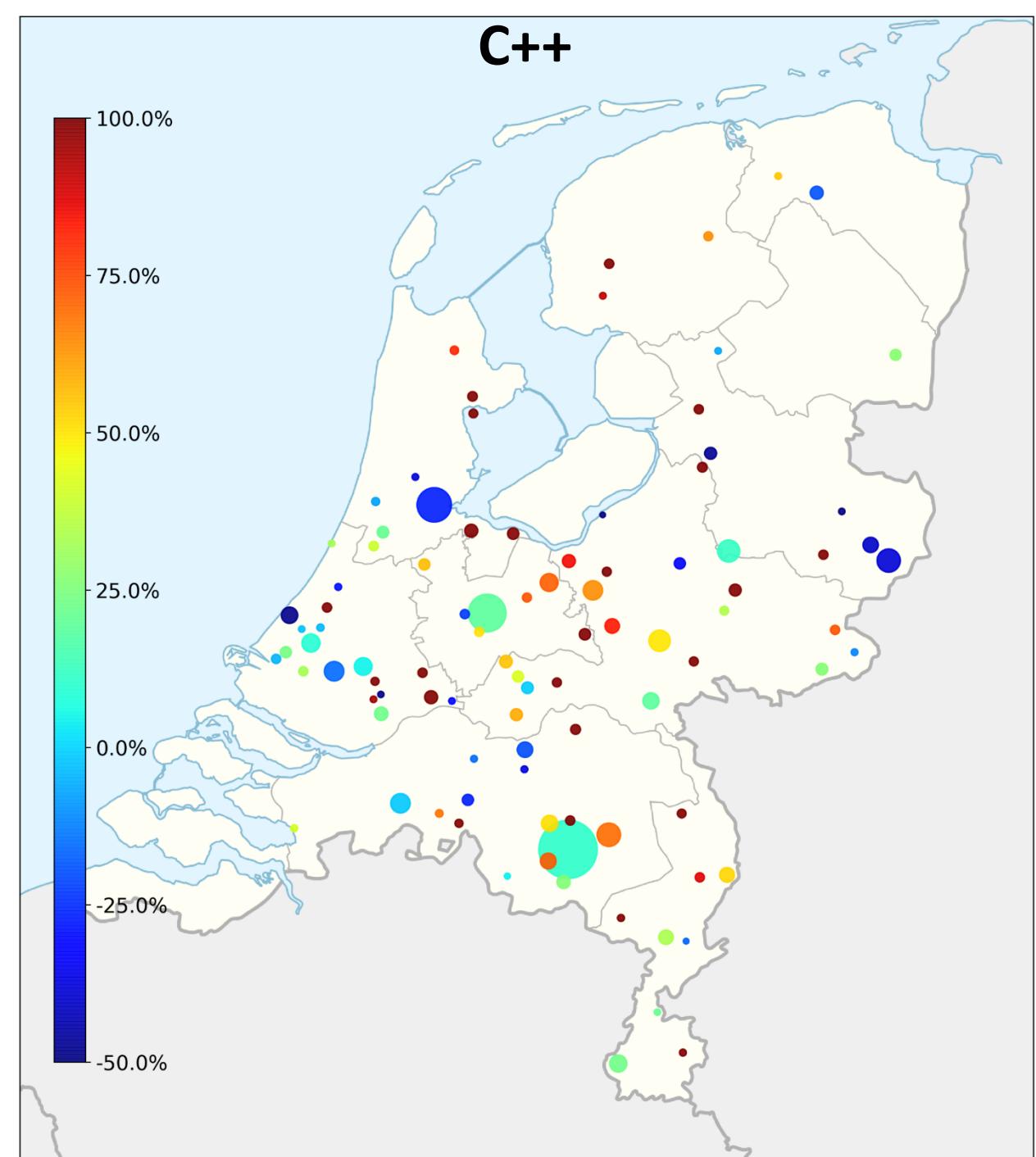
C++



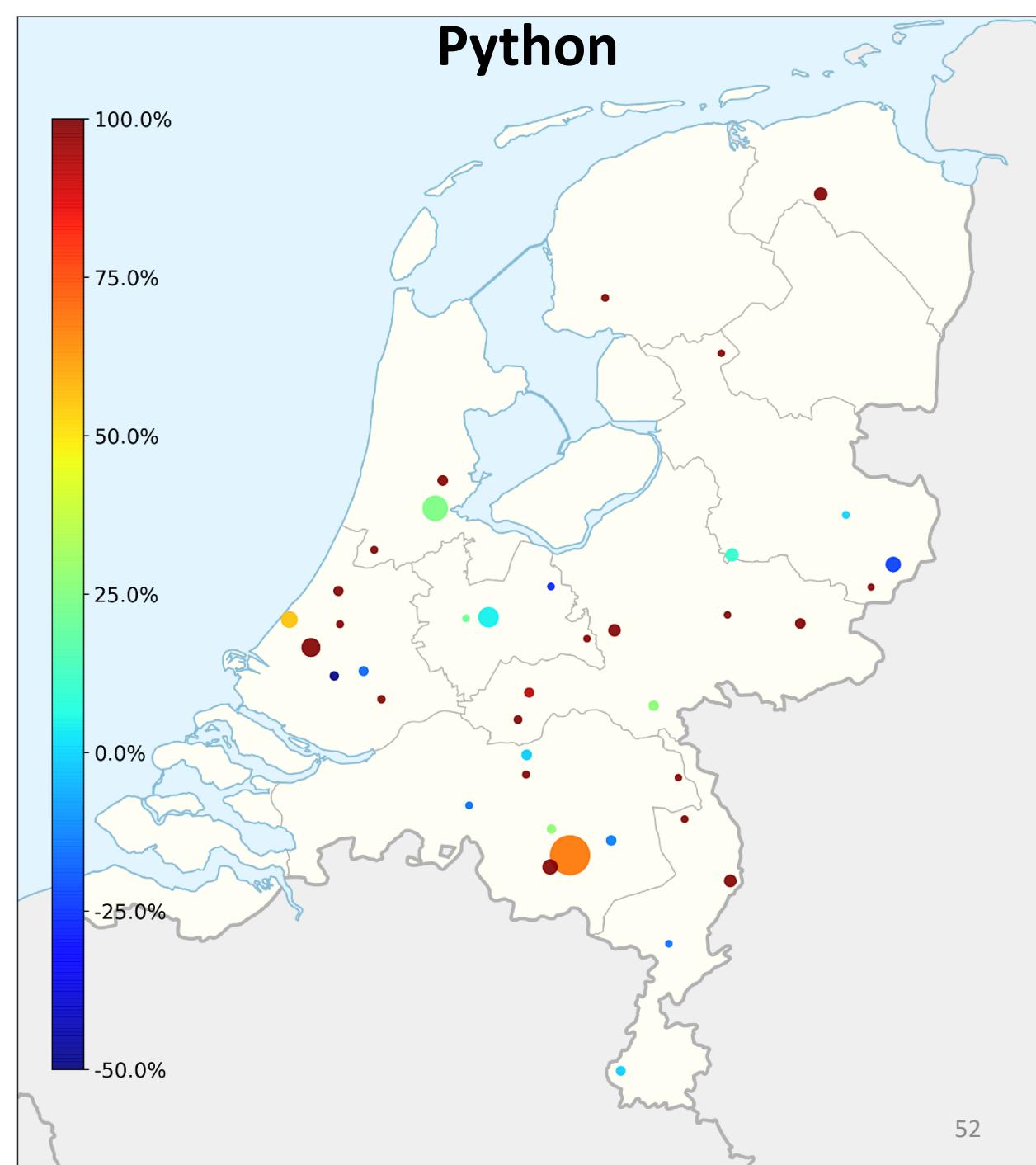
C#



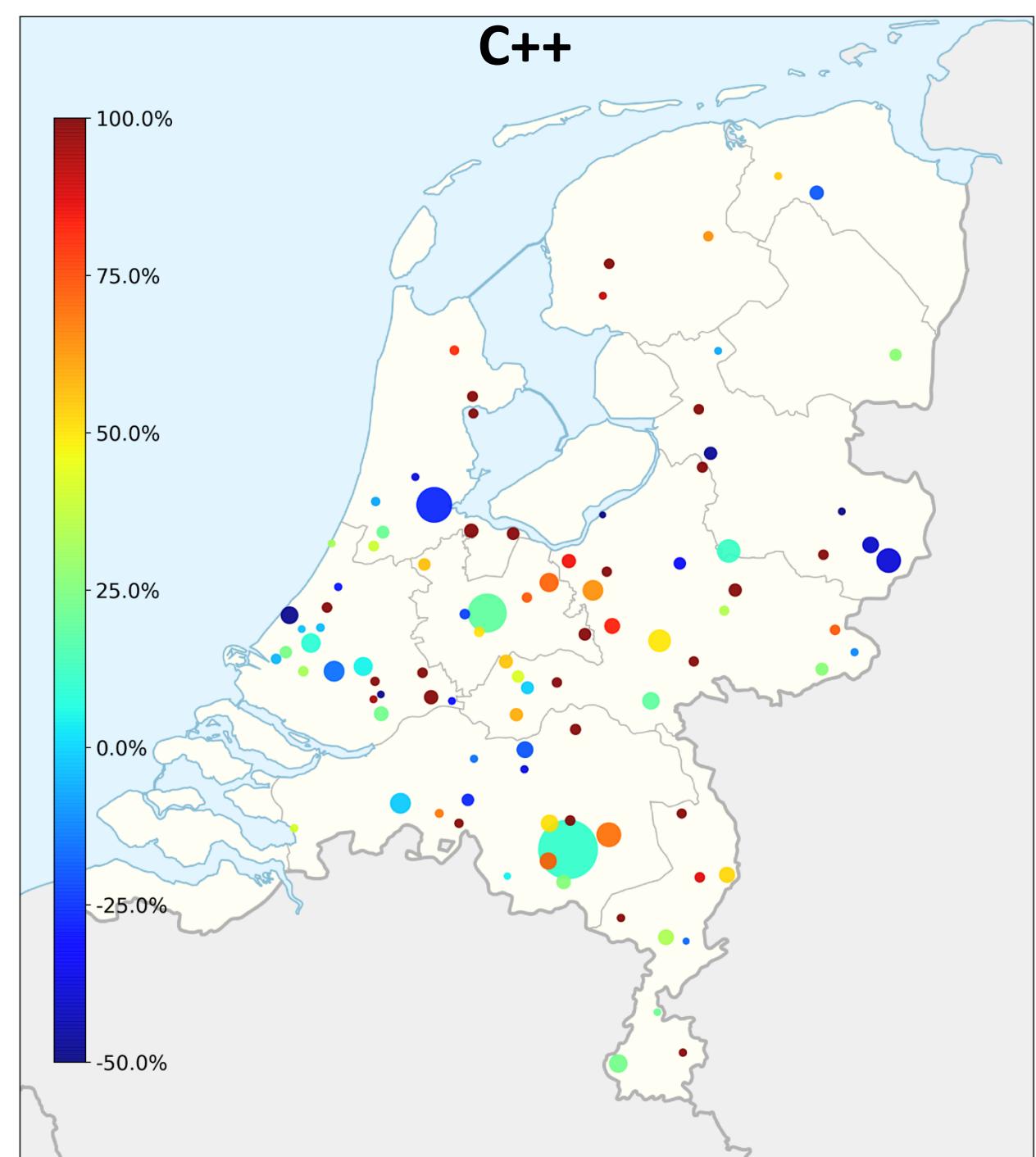
C++



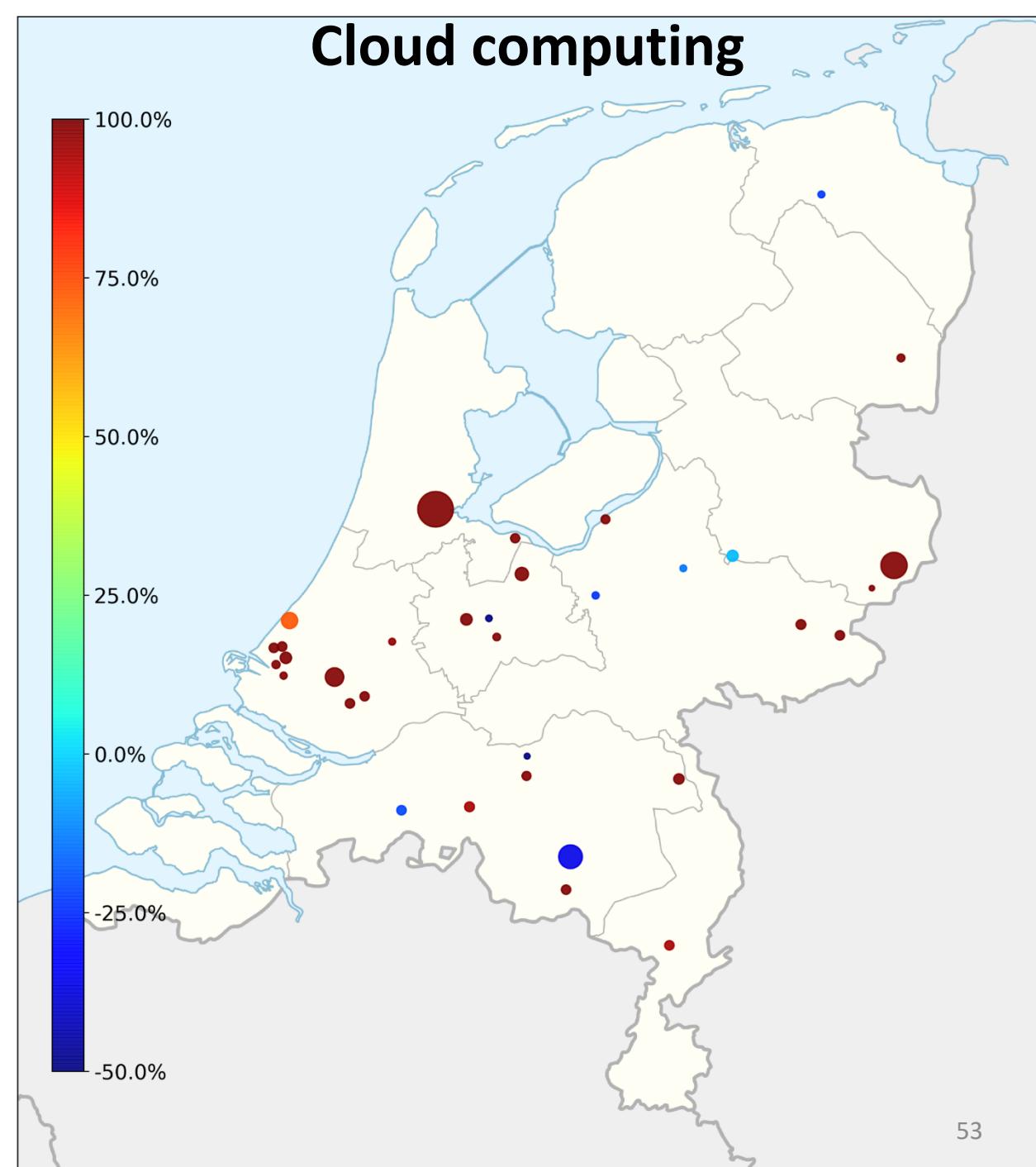
Python



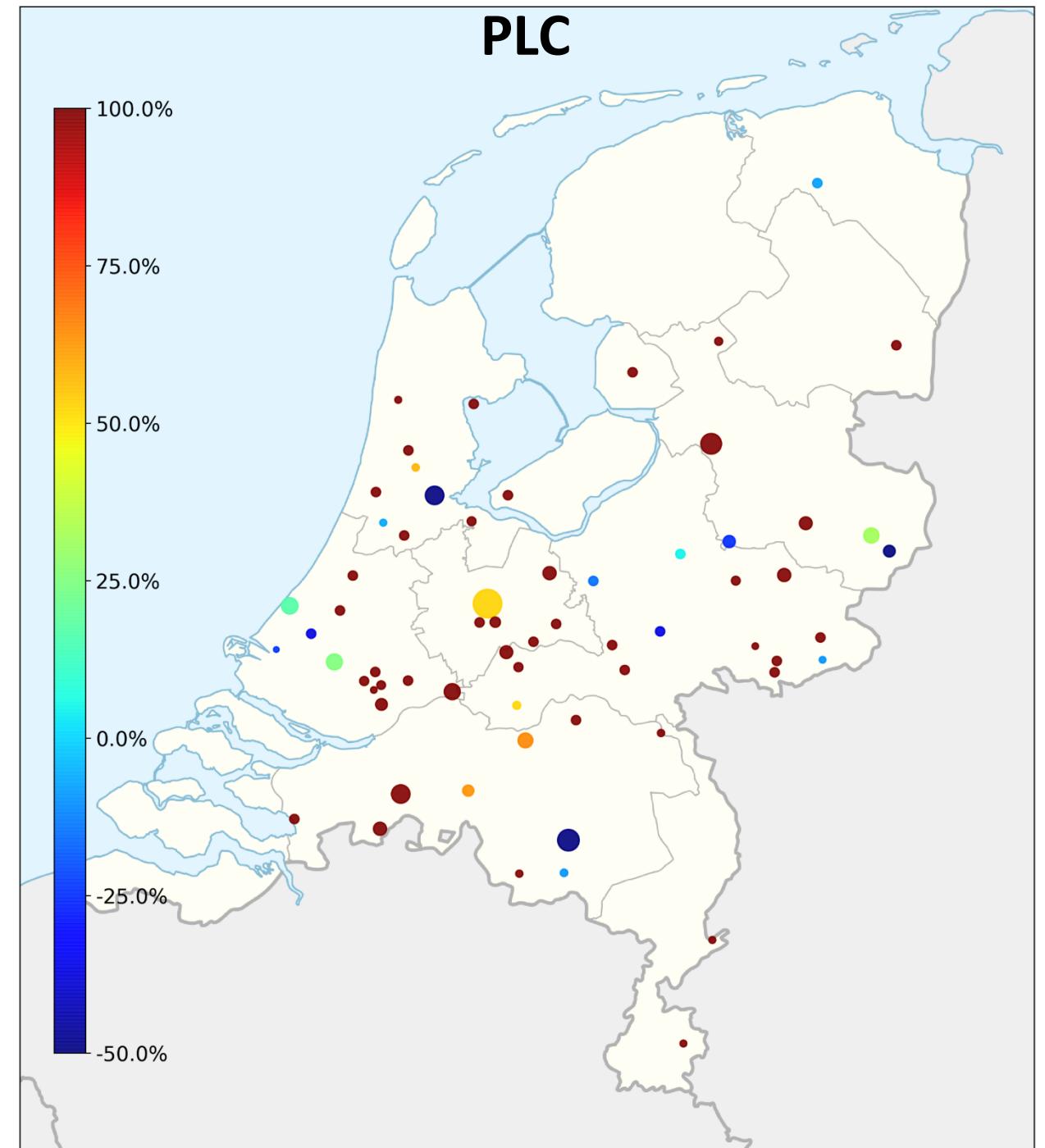
C++



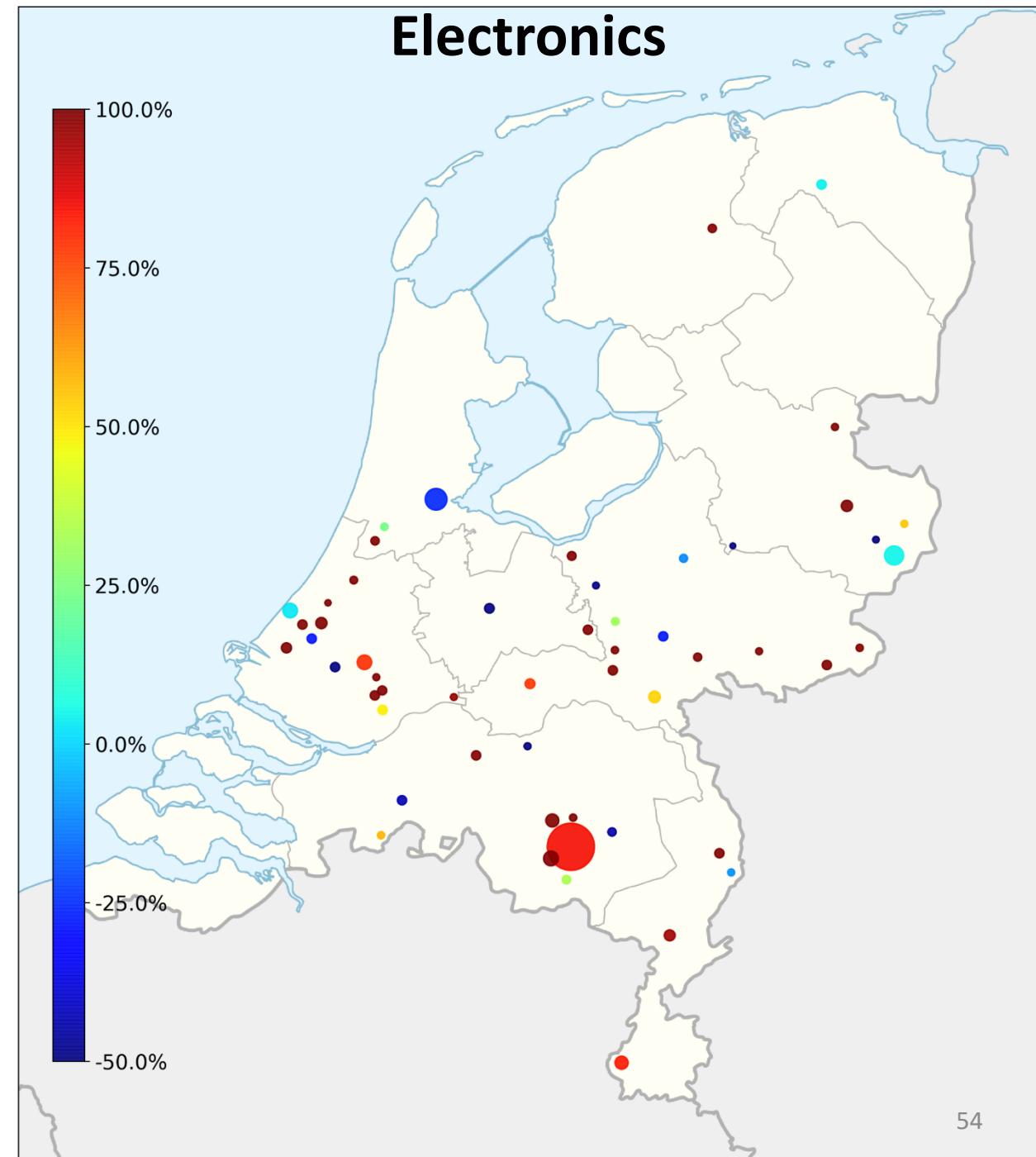
Cloud computing



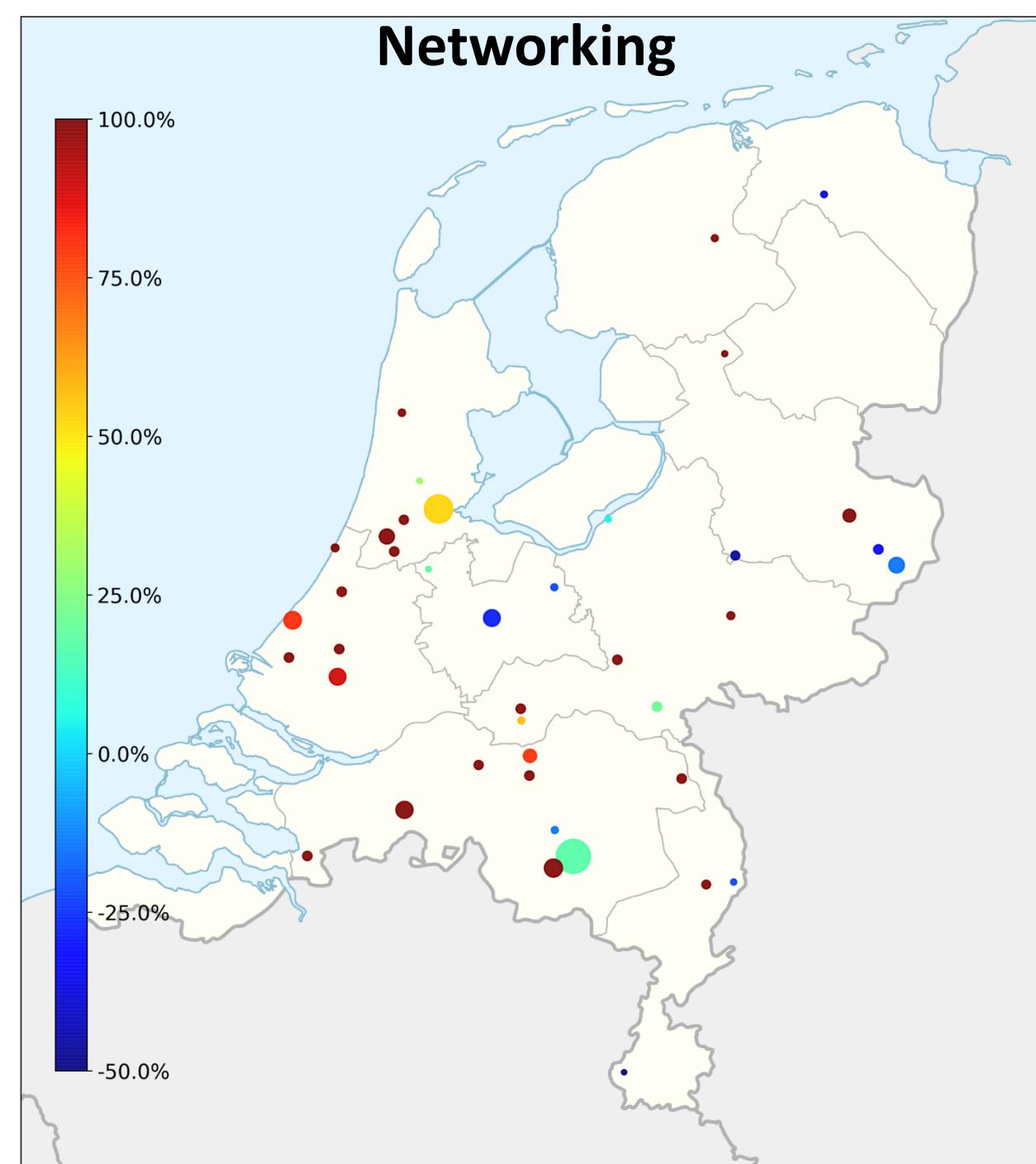
PLC



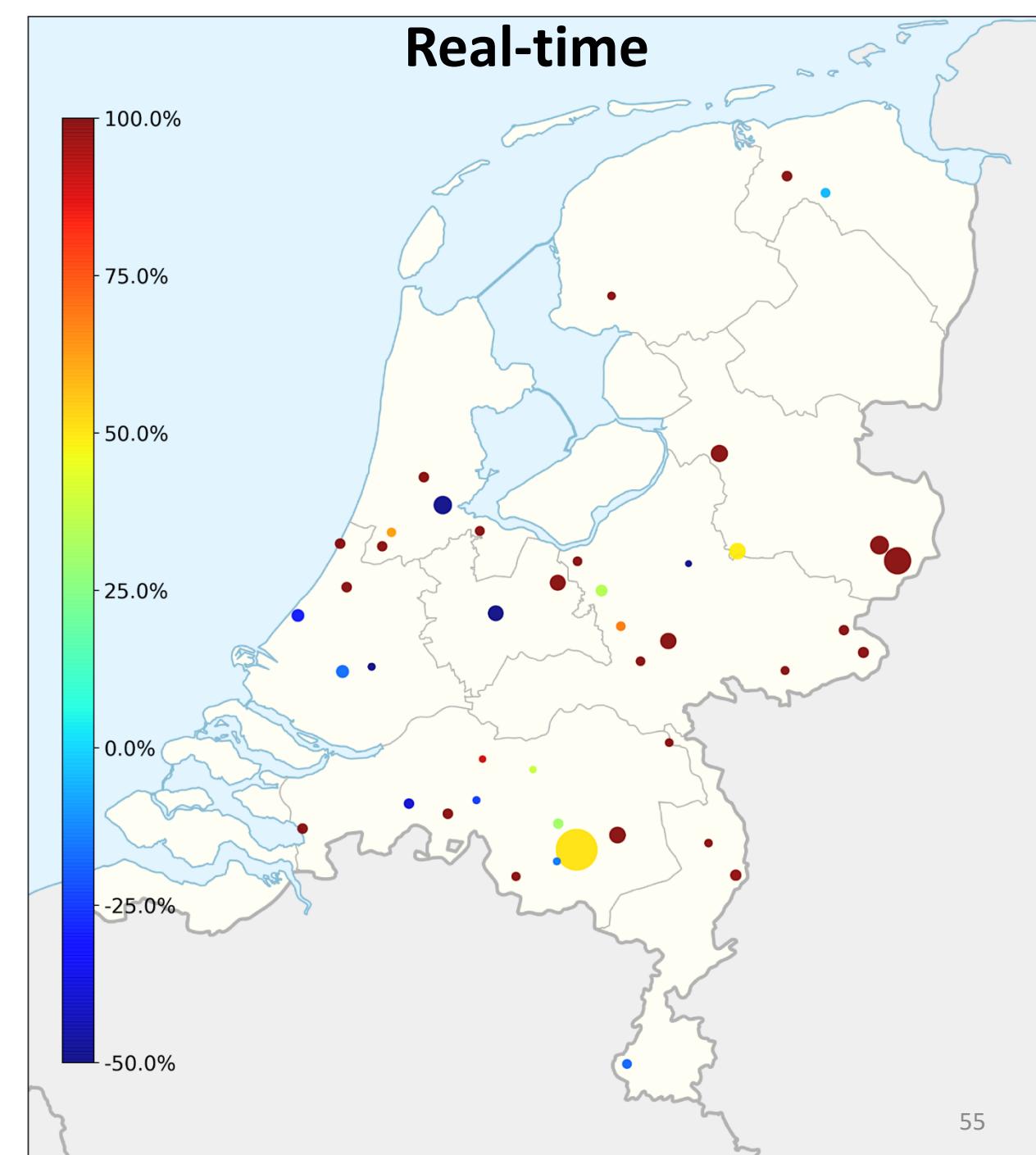
Electronics



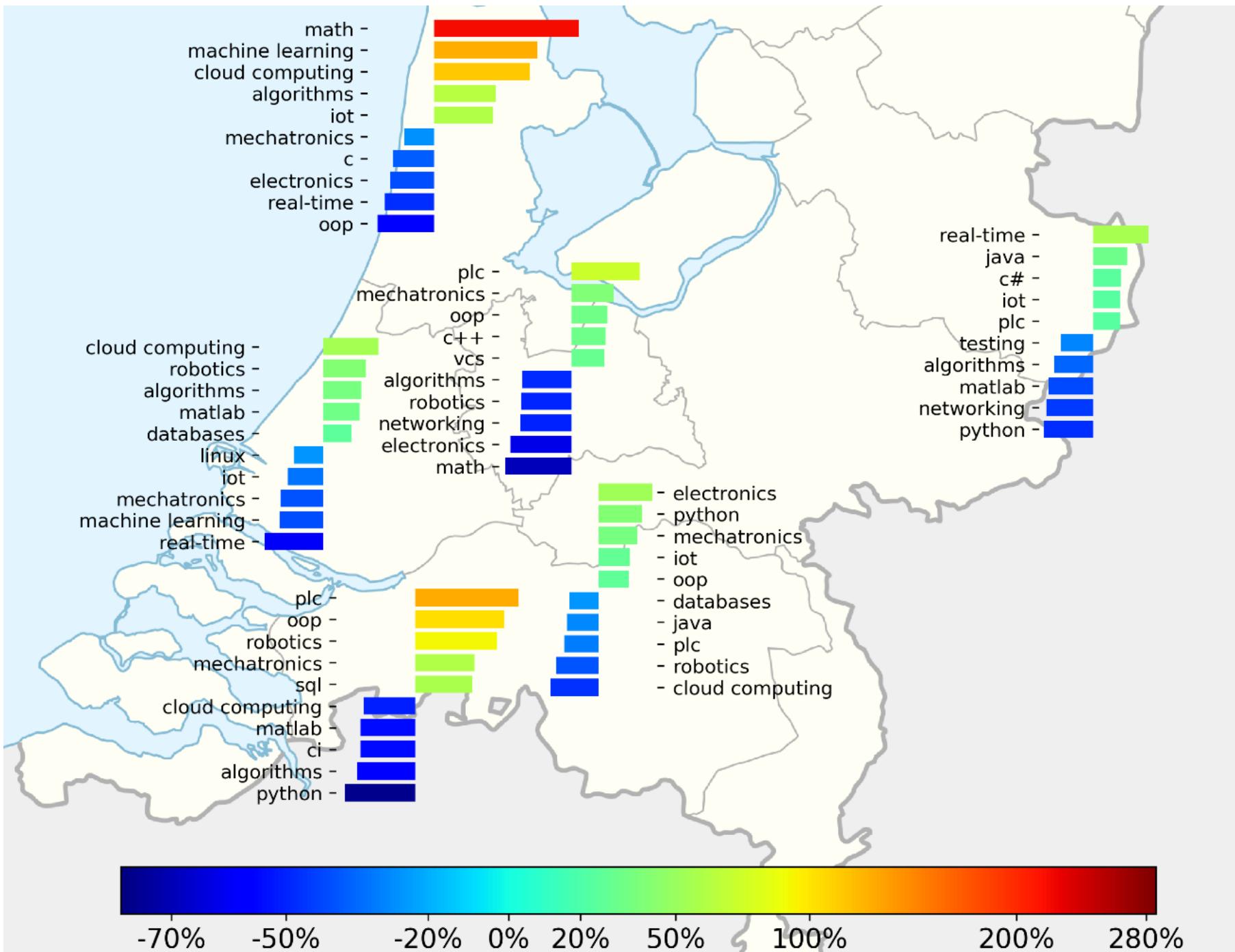
Networking



Real-time



E X C e s s



What next?

- Do we recognize the job market in contacts with companies?
- Do our curricula meet the job market needs?
- Is our BoKS up to date?
- Do we need regional differentiation?
- Do we need specializations?

Thank you