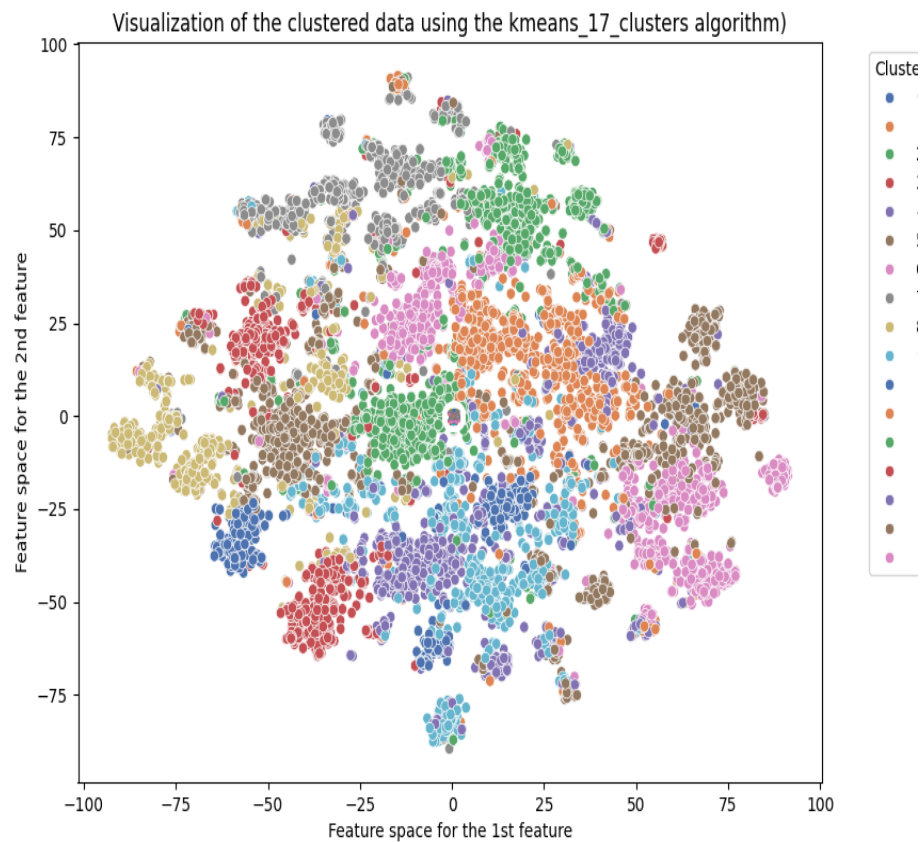


Clusters created by the kmeans_17_clusters algorithm



Cluster 0:

network 2274
wireless 745
spectrum 498
communication 369
learning 365
application 361
technology 338
design 326
device 281
algorithm 262
approach 251
information 247
method 247
analysis 213
resource 209
challenge 206
access 203
dynamic 202

community 197

framework 197

Cluster 1:

virus 1191

disease 887

infection 527

spread 474

viral 474

coronavirus 437

transmission 429

pandemic 400

rapid 374

health 360

public 326

human 322

provide 312

host 303

pathogen 298

understanding 291

result 268

novel 267

community 264

outbreak 264

Cluster 2:

phase 1204

technology 1123

small 1025

innovation 981

business 960

sbir 881

proposed 789

potential 715

patient 694

broader 632

cost 544

device 491

process 379

novel 354

application 350

treatment 328

advance 317

solution 311

high 305

method 294

Cluster 3:

chemical 1106

chemistry 844
reaction 759
molecule 542
process 518
university 494
catalyst 404
material 400
organic 373
undergraduate 358
structure 354
understanding 353
energy 346
metal 338
molecular 327
activity 312
group 308
surface 292
high 286
method 282

Cluster 4:

social 1953
people 411
behavior 403
health 376
community 357
information 332
individual 329
public 321
change 308
network 293
group 288
pandemic 273
medium 269
understanding 262
work 255
human 248
analysis 237
response 215
provide 210
different 205

Cluster 5:

engineering 1443
education 1373
community 1296
workshop 1247
conference 1163

faculty 1134
university 1109
field 1048
career 1012
undergraduate 986
opportunity 937
experience 918
professional 886
researcher 872
participant 858
group 854
training 848
college 816
provide 805
graduate 793

Cluster 6:

cell 3221
protein 1578
function 653
tissue 643
cellular 542
understanding 533
process 517
molecular 502
biological 494
gene 494
structure 491
mechanism 487
biology 464
provide 464
undergraduate 437
interaction 409
method 404
approach 402
activity 372
work 368

Cluster 7:

water 2210
ocean 1763
change 1461
climate 1335
process 1068
carbon 1062
understanding 999
earth 941
soil 916

ice 815
global 755
community 748
surface 736
provide 734
result 704
earthquake 619
temperature 615
record 583
time 580
field 572

Cluster 8:

particle 1019
flow 894
physic 851
wave 845
understanding 792
field 730
energy 708
simulation 652
experiment 631
process 595
work 589
measurement 586
star 575
provide 540
undergraduate 512
interaction 504
fluid 499
method 498
matter 486
high 482

Cluster 9:

design 1296
technology 1189
application 1158
control 978
user 908
software 892
robot 890
computing 874
device 848
learning 750
human 747
tool 709
approach 706

- performance 687
- technique 680
- work 651
- provide 645
- information 631
- security 618
- power 614

Cluster 10:

- quantum 3022
- material 626
- state 373
- physic 355
- information 339
- technology 331
- computer 316
- property 295
- computing 286
- pi 283
- device 281
- theory 267
- algorithm 248
- field 245
- electron 239
- application 220
- fundamental 199
- theoretical 197
- interaction 194
- problem 192

Cluster 11:

- community 1523
- health 1150
- policy 1005
- public 943
- risk 893
- pandemic 832
- change 754
- understanding 735
- information 713
- decision 701
- response 656
- social 652
- work 628
- knowledge 627
- approach 543
- researcher 543
- provide 530

state 525
people 517
economic 502

Cluster 12:

specie 1989
plant 1635
change 1146
community 896
understanding 749
population 747
gene 728
ecosystem 715
environmental 657
training 641
environment 617
provide 584
human 581
biology 577
undergraduate 553
fellow 545
interaction 539
evolution 531
researcher 530
genetic 514

Cluster 13:

theory 1414
problem 916
geometry 745
equation 722
group 635
pi 627
mathematical 611
space 597
application 501
structure 467
geometric 464
field 431
question 424
algebraic 416
mathematics 410
number 404
method 403
area 384
analysis 380
solution 353

Cluster 14:

learning 2465
algorithm 1411
method 1238
problem 1126
machine 1030
application 840
language 831
analysis 696
computational 672
technique 639
approach 625
information 604
tool 576
network 543
human 542
design 534
training 528
optimization 521
understanding 519
neural 488

Cluster 15:

material 4649
property 1475
structure 1018
polymer 921
energy 909
design 906
manufacturing 865
device 855
application 852
process 825
high 775
technology 722
understanding 714
fundamental 709
engineering 684
metal 605
undergraduate 564
mechanical 558
method 538
approach 512

Cluster 16:

stem 5226
learning 2978
teacher 2610
education 2198

school 1405
community 1286
practice 1278
engineering 1212
experience 1119
undergraduate 1118
course 1095
mathematics 1045
university 1037
teaching 1018
knowledge 963
college 885
career 877
professional 868
need 852
design 845