SARS-CoV-2 Variant Tracking

A targeted approach for nucleic acid-based diagnostics

Emma-Claire McCarthy

80,000+

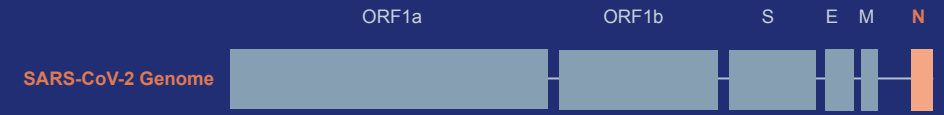
COVID-19 sequences available
with

29,903

base pairs each

NARROWING THE SCOPE

- Most nucleic acid-based COVID-19 tests are targeting the **N gene**
- Create custom variant designations based on this gene alone



VARIANT DESIGNATION USING UNSUPERVISED MACHINE LEARNING

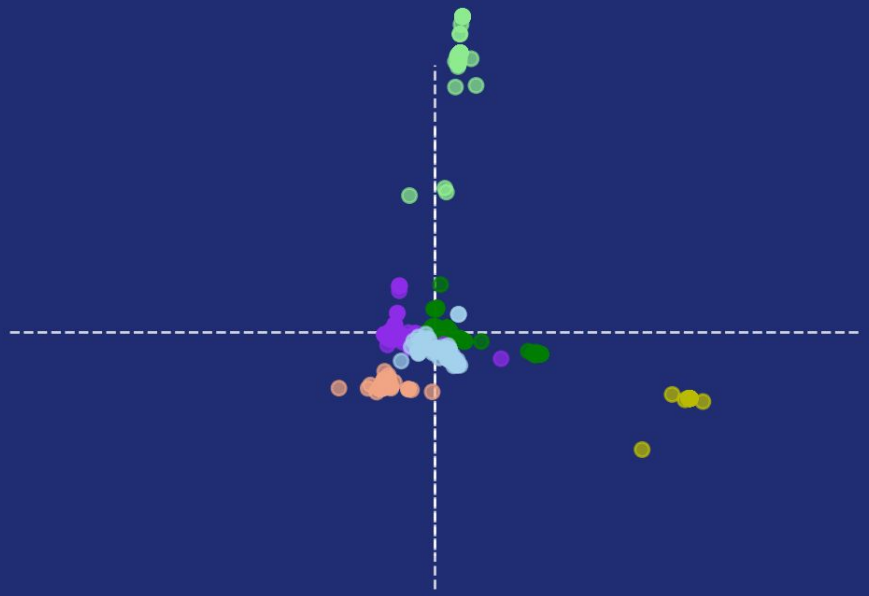
OBTAIN N GENE SEQUENCES … ATGTCTGATAATGGACCCCAAAATCAGCGAA ...

TRANSLATE INTO “TEXT” … atgtct tgtctg gtctga tctgat ctgata tgataa gataat ...

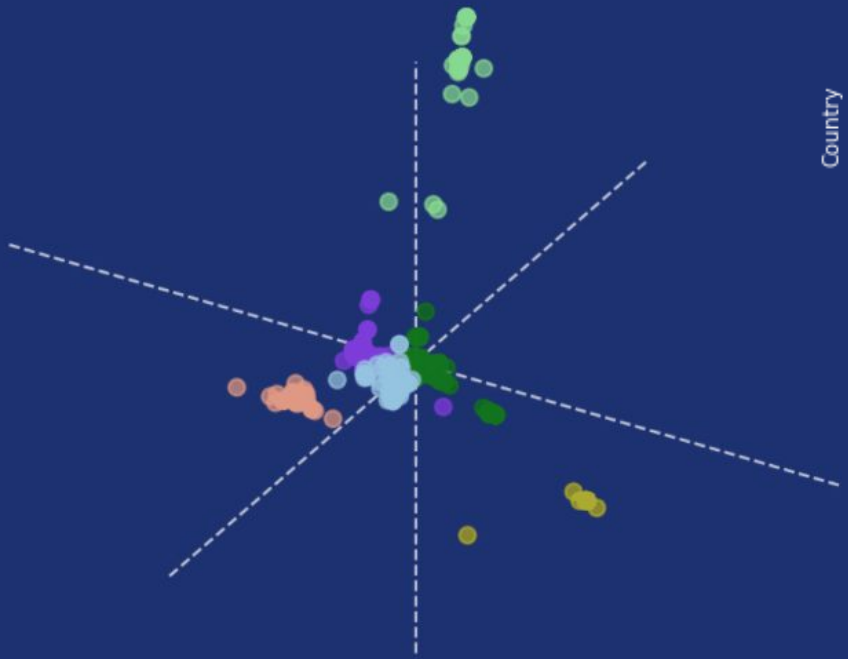
APPLY NLP AND CLUSTERING METHODS

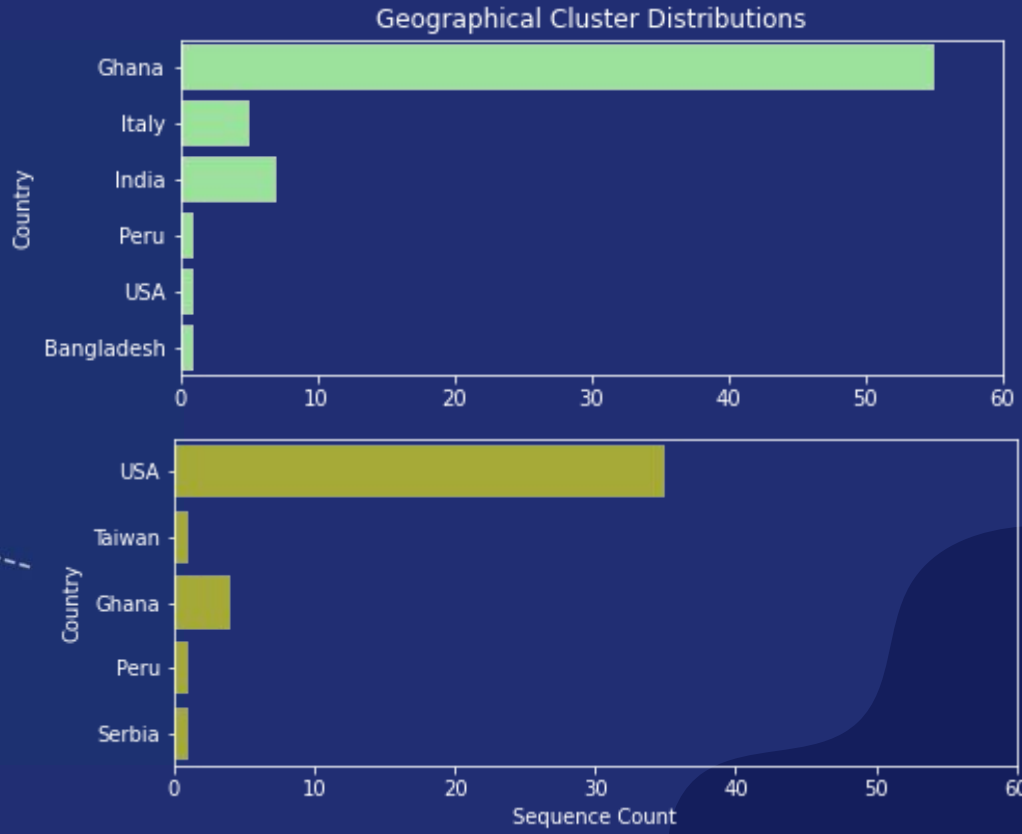
EXPLORE THE RESULTS

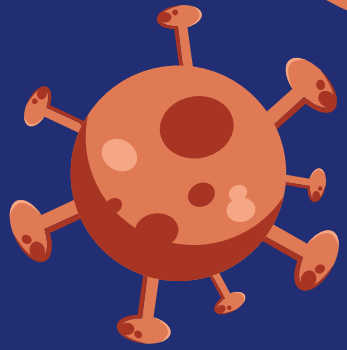
SIX CLUSTERS IDENTIFIED USING A K-MEANS MODEL



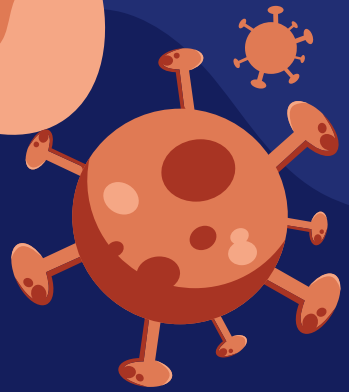
OUTLYING CLUSTERS HAVE DISTINCT GEOGRAPHICAL DISTRIBUTIONS

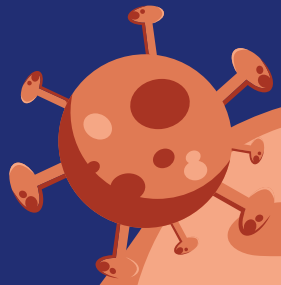






THANKS!





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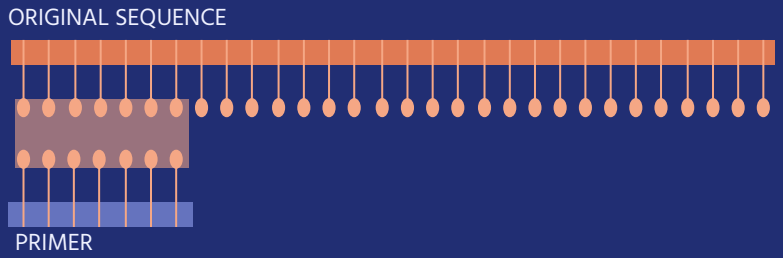
Appendix

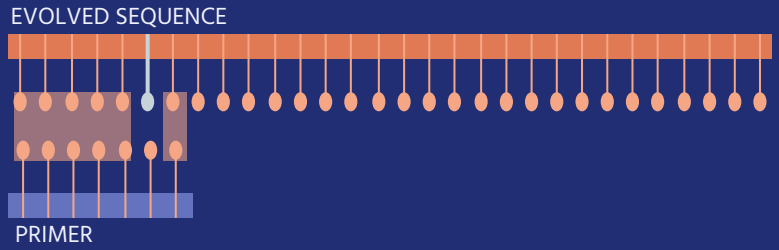
VIRAL EVOLUTION CAN IMPACT TEST SENSITIVITY

Perfect Alignment



High Sensitivity

Mismatch



Reduced Sensitivity

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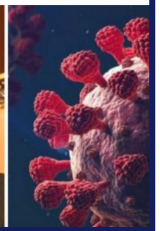
Covid-19 cases in Ghana today: Ghana record new strain of Covid-19 as infections rise catch 200 new cases daily

18 January 2021



Genomic analysis of SARS-CoV-2 reveals local viral evolution in Ghana

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Associated Data

Supplementary Materials

Abstract

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The confirmed case fatality rate for the coronavirus disease 2019 (COVID-19) in Ghana has dropped from a peak of 2% in March to be consistently below 1% since May 2020. Globally, case fatality rates have been linked to the strains/clades of circulating severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)