A photograph showing a group of diverse individuals (men and women) holding hands in a circle. They are dressed casually, with one woman in a striped shirt and another in a white t-shirt. The background is blurred, focusing on the hands and the sense of community.

A BUDDY

Data Mining & Machine Learning Project

Pietro Tempesti, Benedetta Tessa

THE APPLICATION

Accountabilibuddy

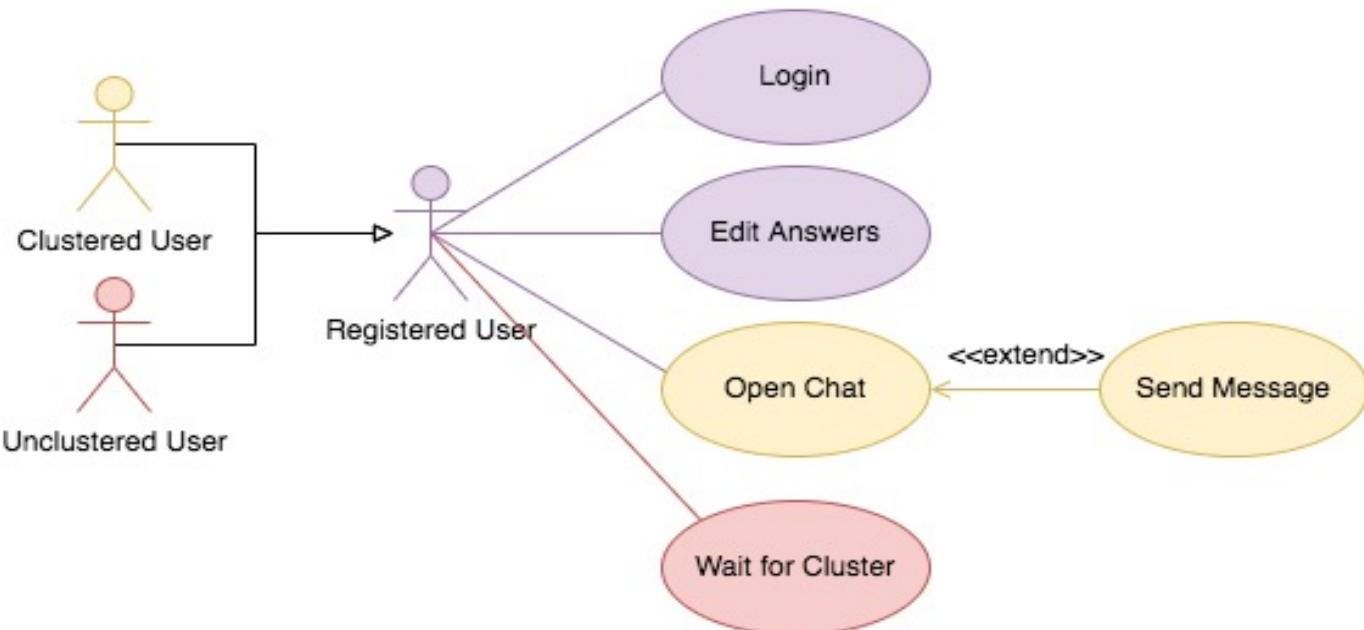
[noun]

A friend you love so much, you hold yourself accountable for their well-being

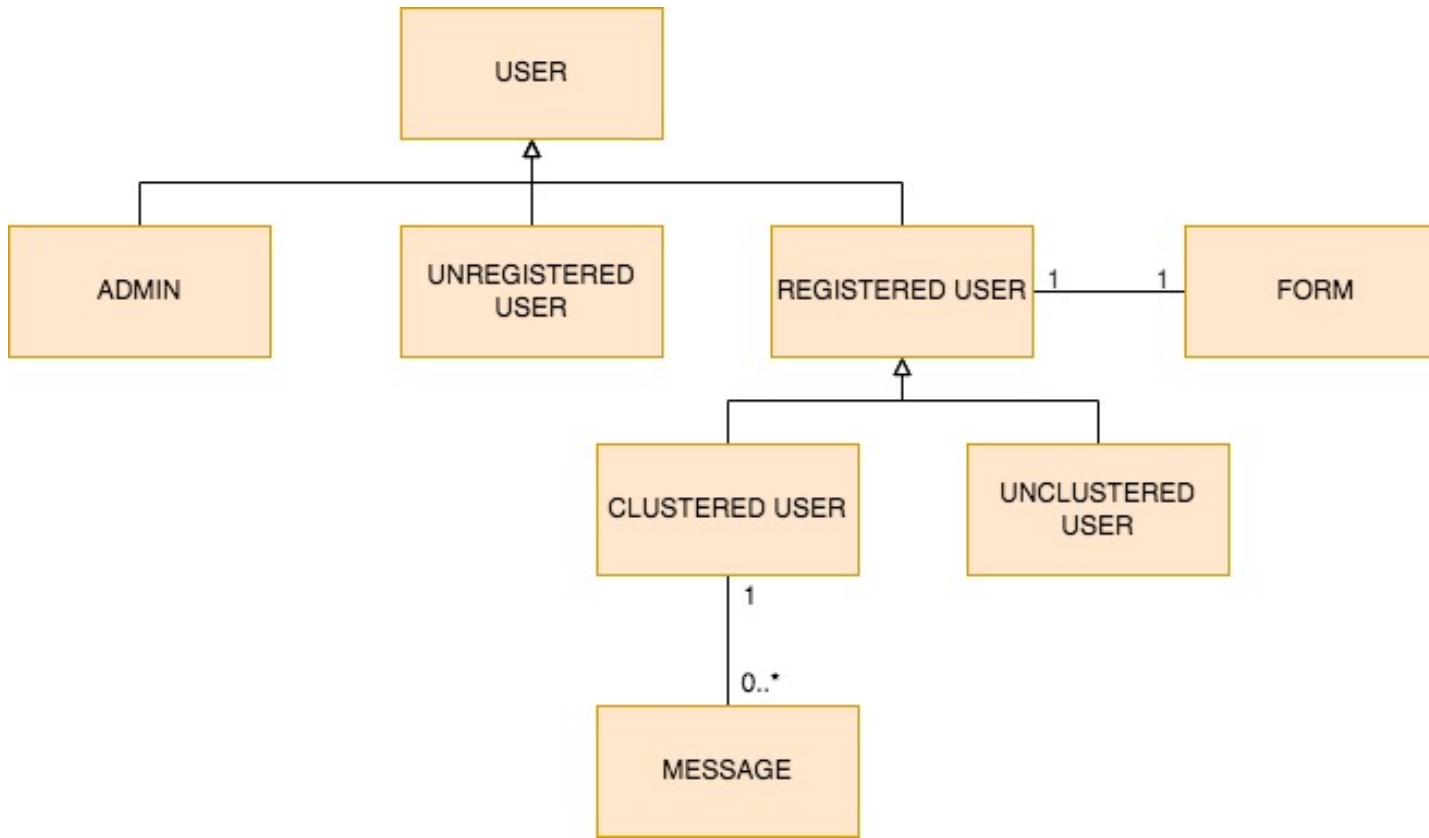
- Worsening mental health has become an increasingly concerning issue during the pandemic, but recent studies have shown that peer-to-peer support has been nothing but beneficial to young students.
 - What we aim to do is connect them through ABuddy so that they build a relationship based on empathy which may lead to a mutual mental health improvement.
-

WHAT IS ABUDDY?



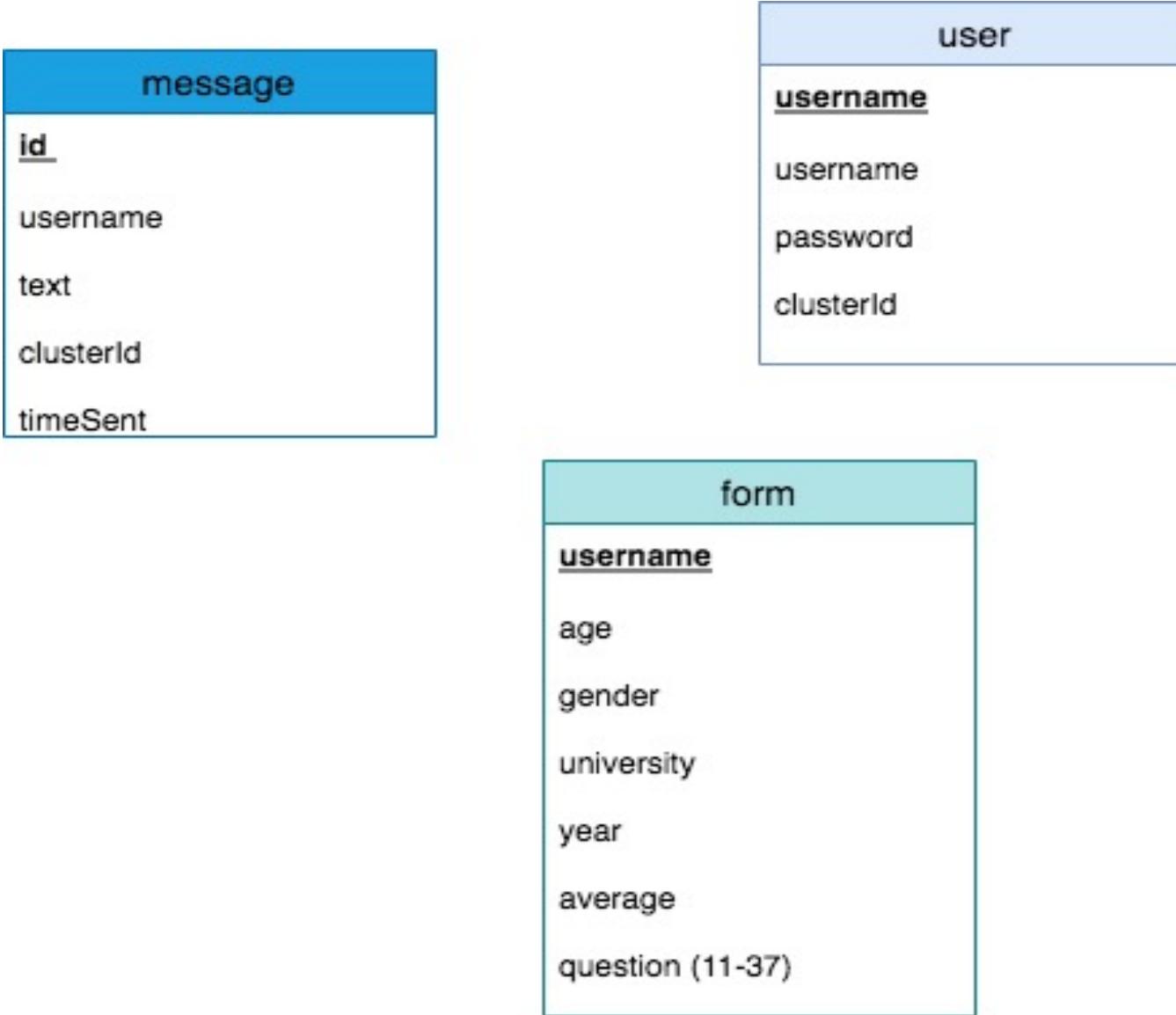


USE CASE DIAGRAM

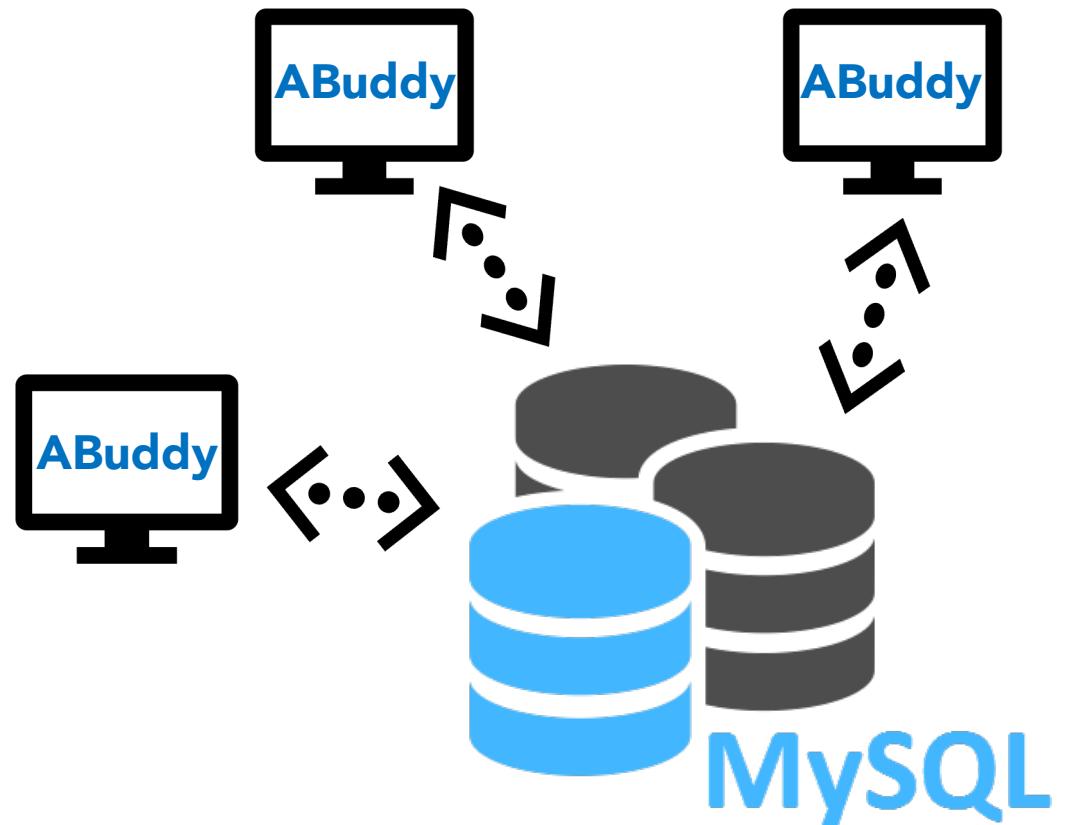
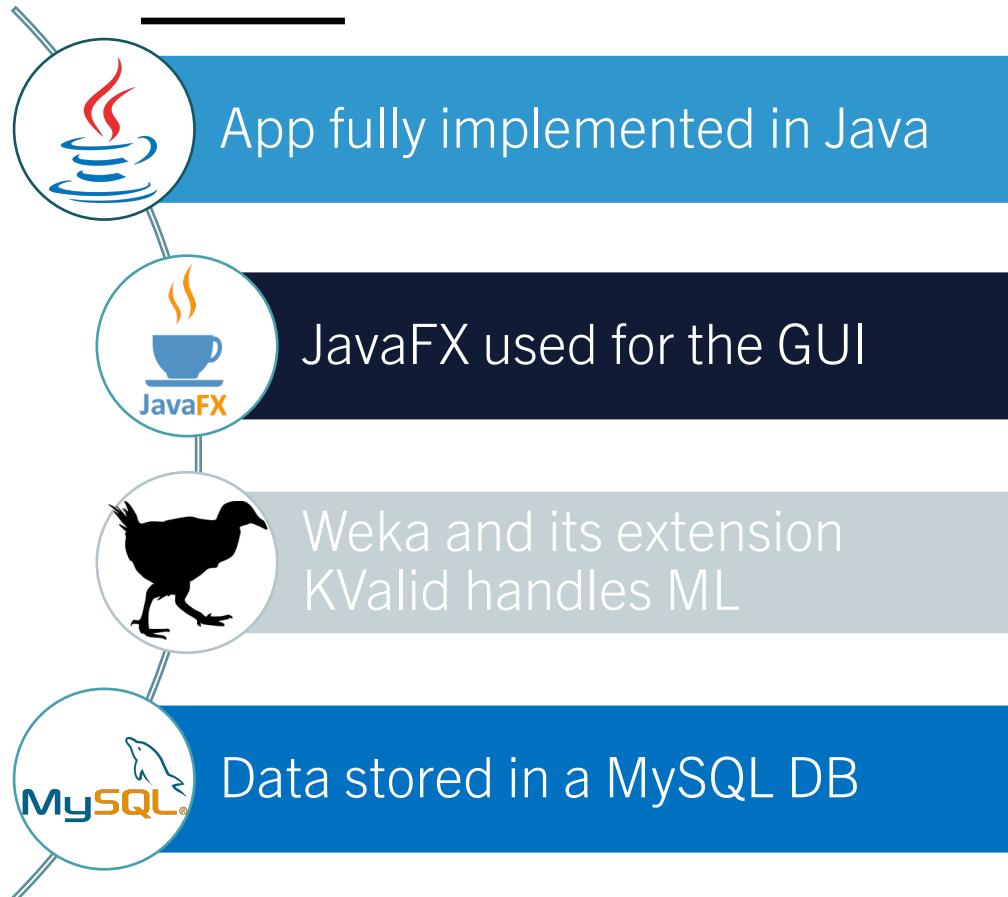


UML DIAGRAM

DATA MODEL



IMPLEMENTATION



MACHINE LEARNING

Accountabilibuddy

[noun]

A friend you love so much, you hold yourself accountable for their well-being

OUR DATASET

<https://data.mendeley.com/datasets/thnzm3yk23/1>

This dataset contains two main sections; the first contains demographic information and the second reports on the psychosomatic impact of COVID-19's e-learning digital tools on university students' well-being.

The same survey was proposed to our friends and colleagues as well

Sleeping Habits							
	I have fixed hours for bed time and wake up.	Before COVID 19	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
		After COVID 19	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
	Prolonged use of digital tools for learning (mobile, laptop, i-pad) affected my sleeping habits.	Before COVID 19	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
		After COVID 19	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
	Continuous exposure to electronic screens in online learning is tiring and exhausting.	Before COVID 19	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
		After COVID 19	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
Social Interaction							
8	Prolonged use of digital tools (mobile, laptop, i-pad) results in social distancing.	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	Strongly Disagree
9	Prolonged use of digital tools (mobile, laptop, i-pad) causes students' isolation.	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	Strongly Disagree
10	University learning contributes to strengthening the social personality of students.	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	Strongly Disagree
11	Staying home for long periods of time leads to lethargy and laziness.	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	Strongly Disagree
Psychological State							
12	Prolonged use of e-learning tools often leads to boredom, nervousness, and tension.	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	Strongly Disagree
13	The psychological element is a key factor in the success of the educational process.	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	Strongly Disagree
14	Some students cannot afford buying all necessary digital tools, which is embarrassing and frustrating.	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	Strongly Disagree
15	I don't recommend continuing with the online learning model because it is socially and psychologically unhealthy.	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	Strongly Disagree

37 features

DATA PREPROCESSING

DATA
INTEGRATION

FEATURE
SELECTION

HANDLING OF
MISSING
VALUES

HANDLING OF
ORDINAL
ATTRIBUTES +
NORMALIZATION

CLUSTERING EVALUATION

DBSCAN

MODEL	NUMBER OF CLUSTER	UNCLUSTERED INSTANCES
MinPts = 6, epsilon = 0.9	7	734
MinPts = 2, epsilon = 0.9	30	651

CLUSTERING EVALUATION

KMEANS + KVALID

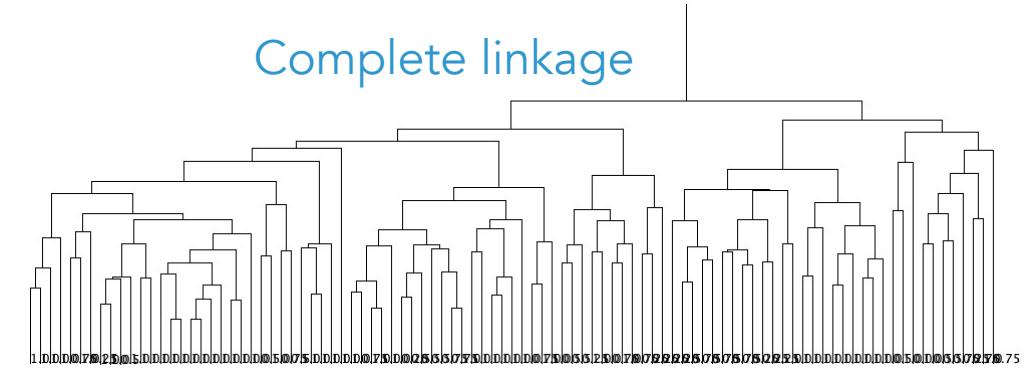
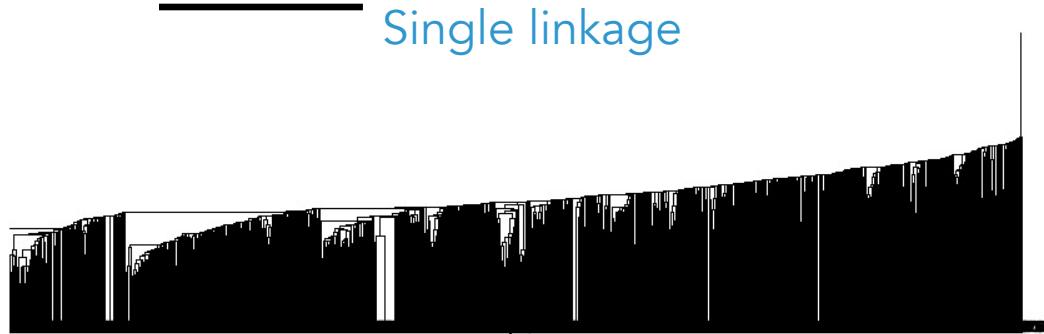
INITIALIZATION METHOD	MIN SQUARED ERROR	NUM CLUSTERS
Random	1340.700320618931	26
Kmeans ++	1183.1068721997253	48
Canopy	1224.757585595374	30
Farther First	1580.5897155672574	13

CLUSTERING EVALUATION

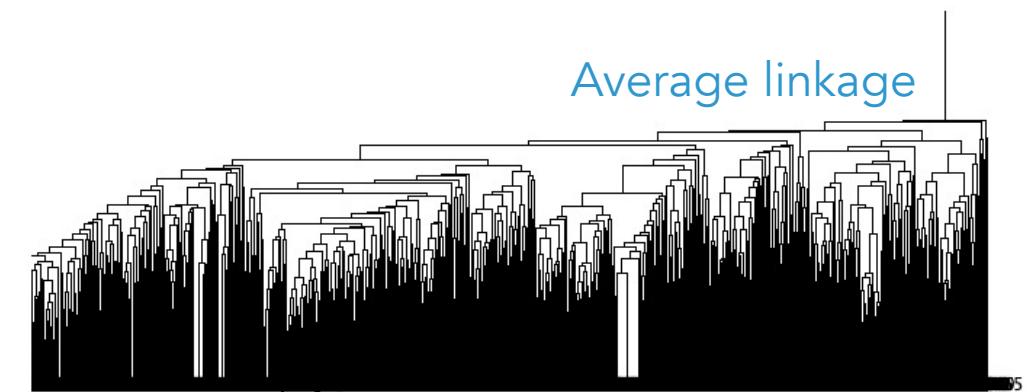
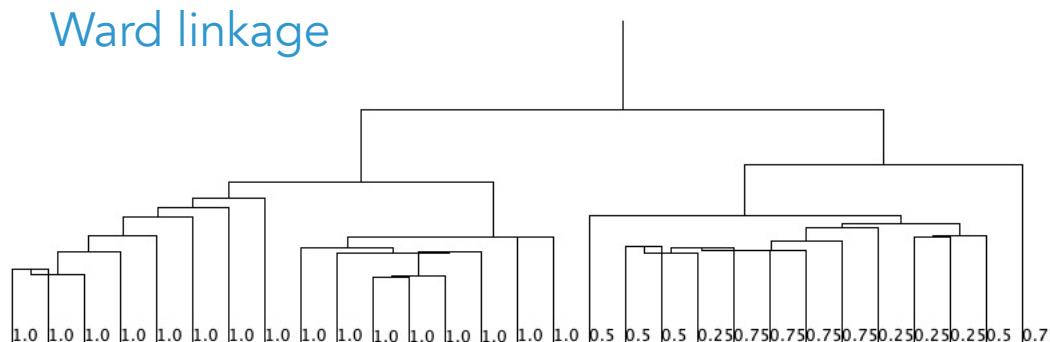
EM

NUM CLUSTERS INPUT	NUM CLUSTERS FOUND	LOG LIKELIHOOD
-1	3	4.65438
48	48	9.7165

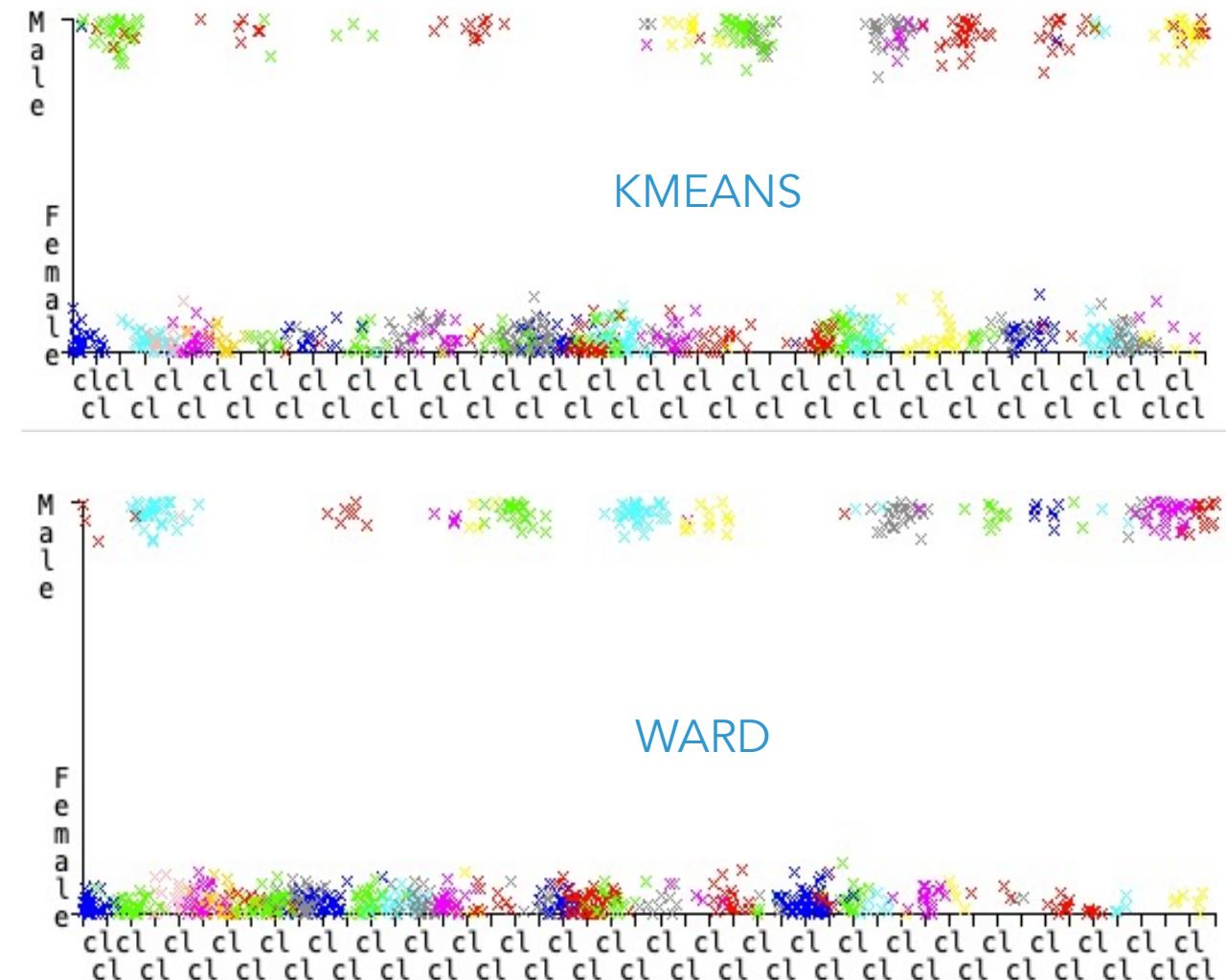
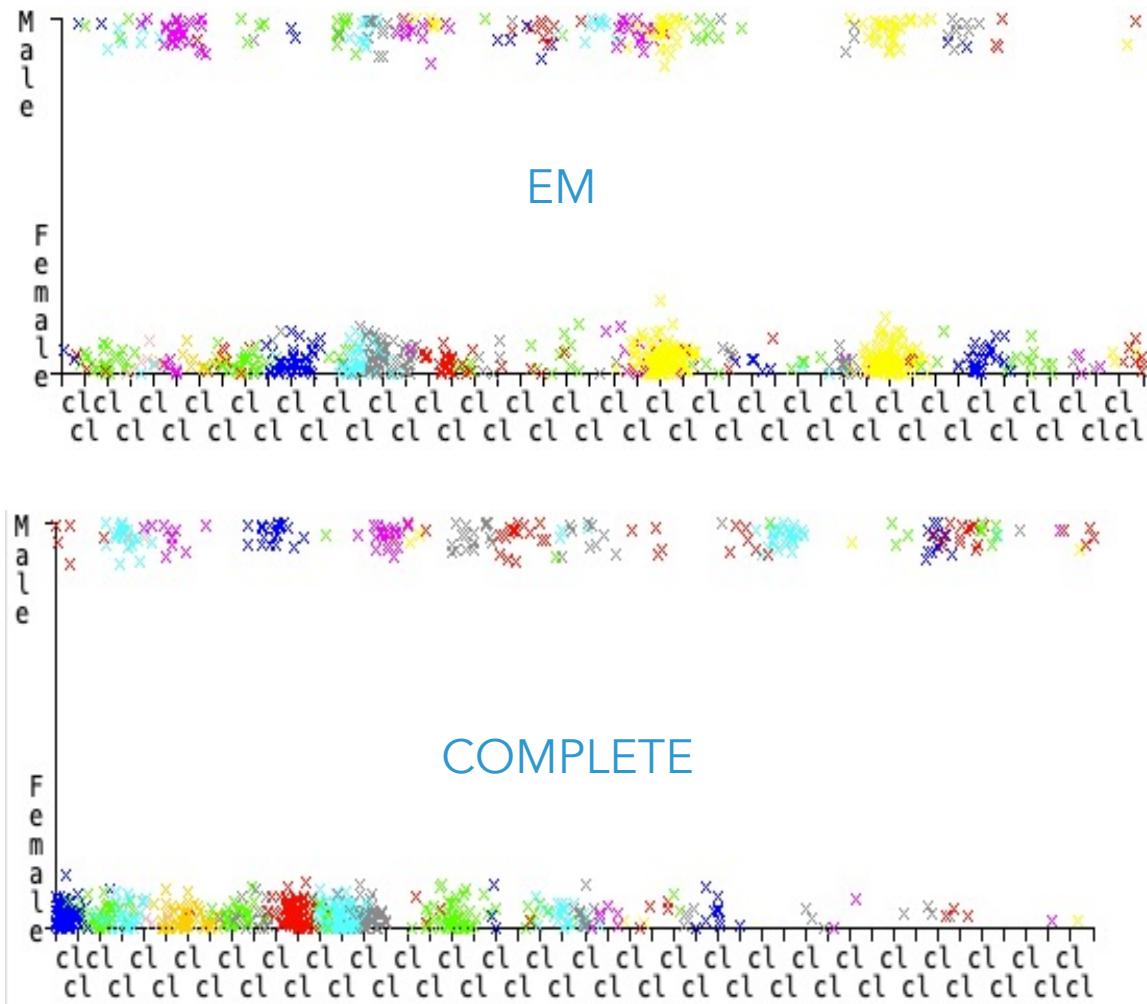
CLUSTERING EVALUATION



HIERARCHICAL

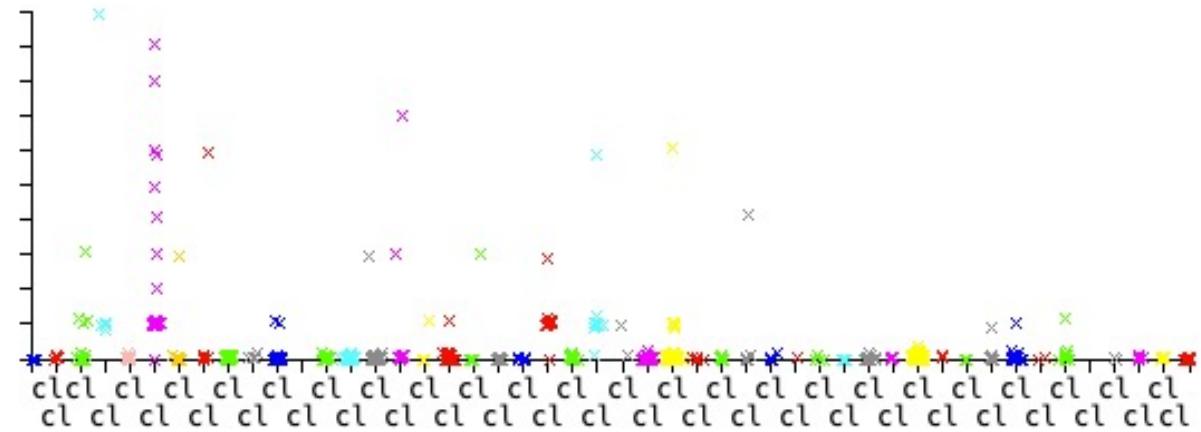


GENDER

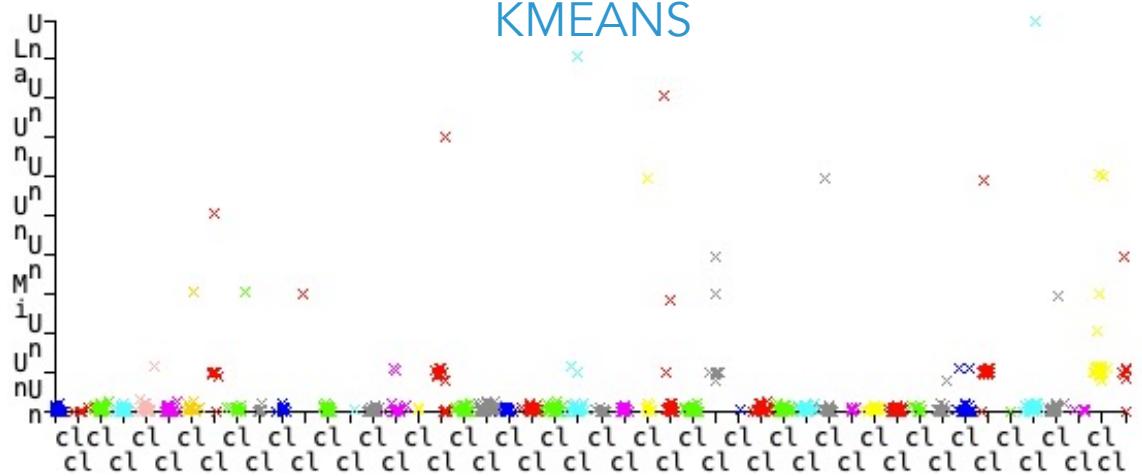


UNIVERSITY

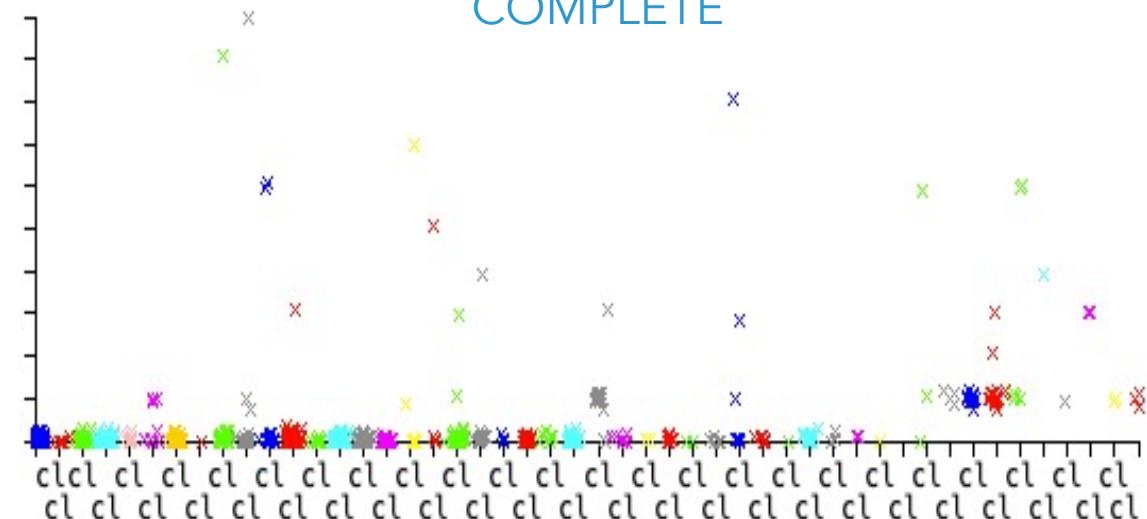
EM



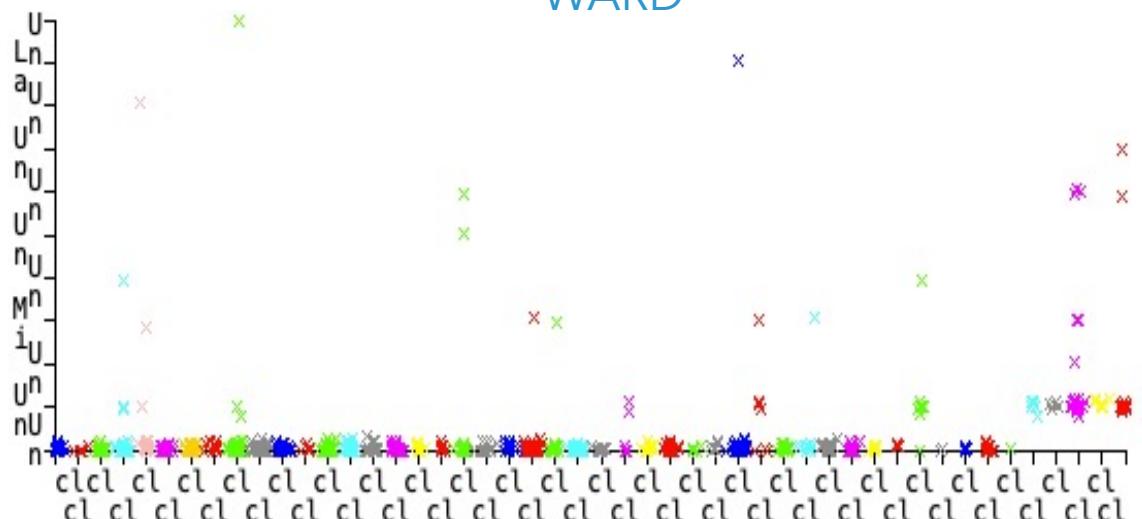
KMEANS



COMPLETE

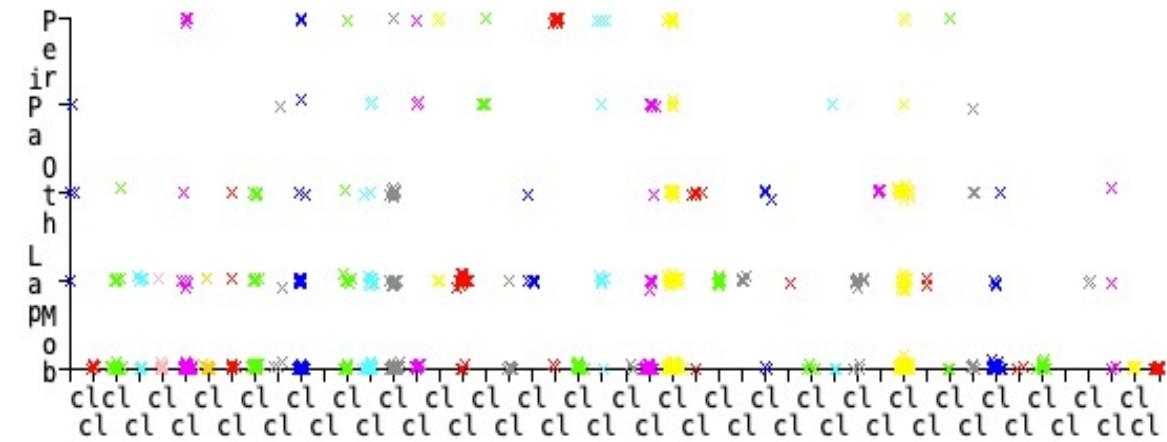


WARD

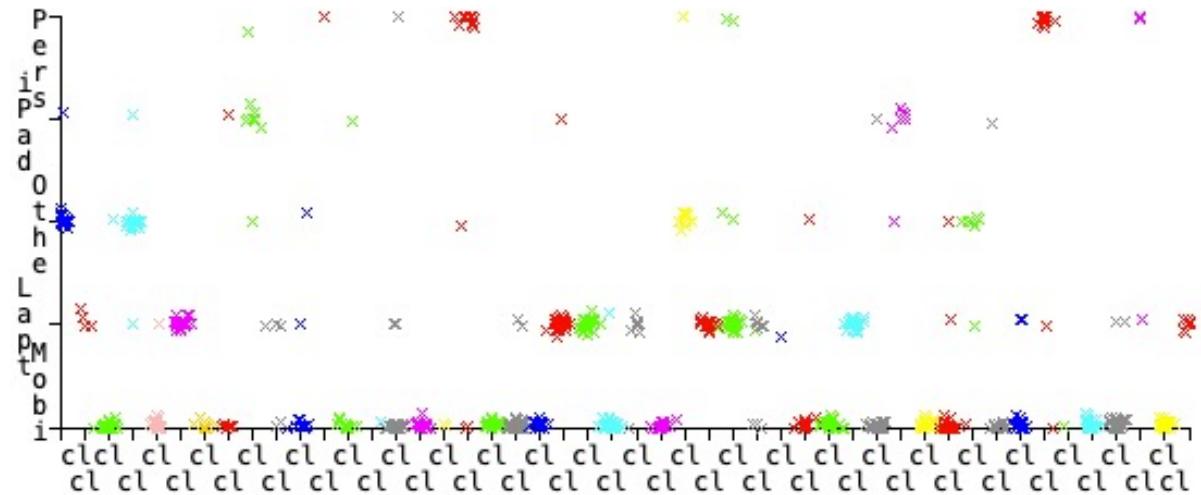


MOST USED DEVICE BEFORE COVID

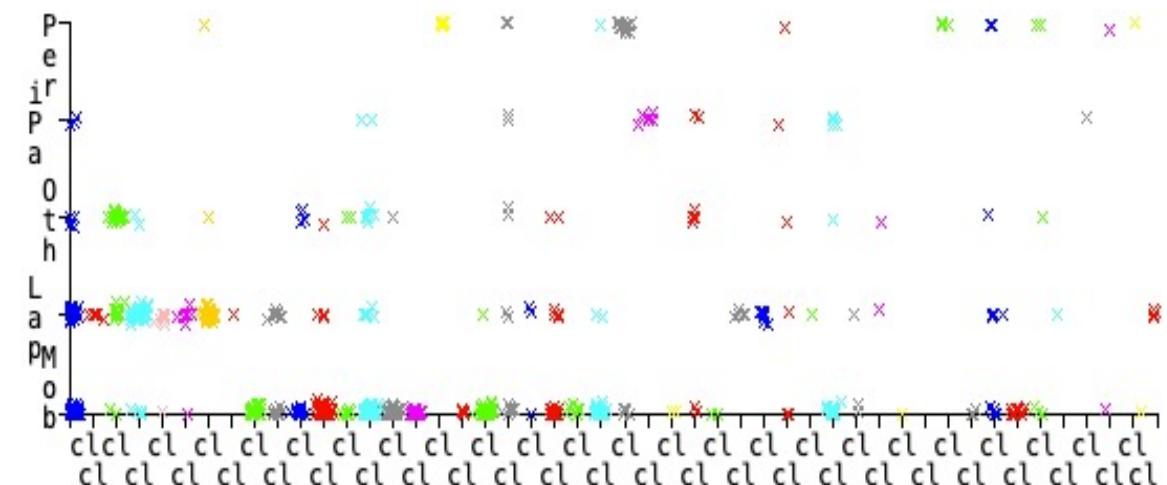
EM



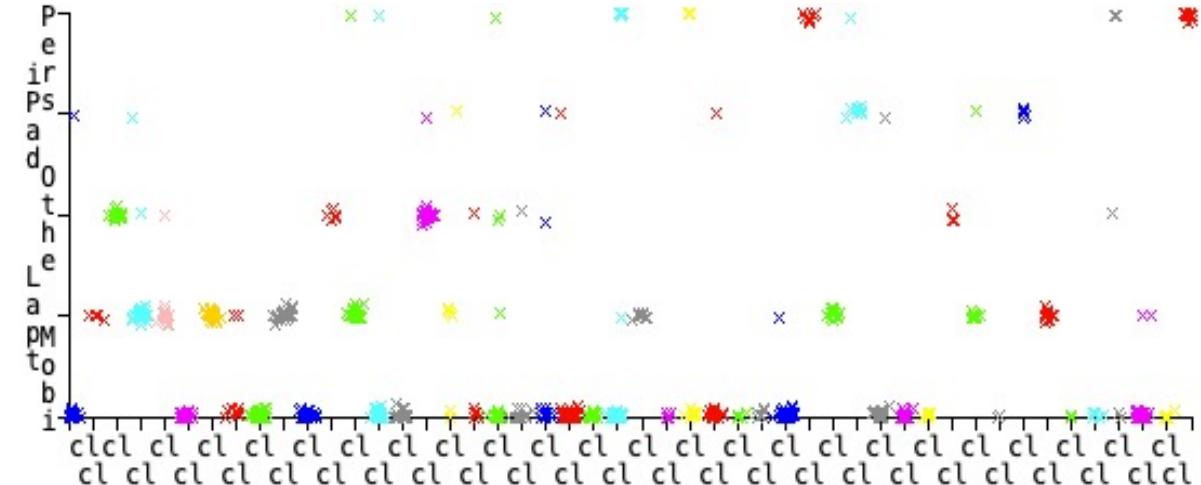
KMEANS



COMPLETE

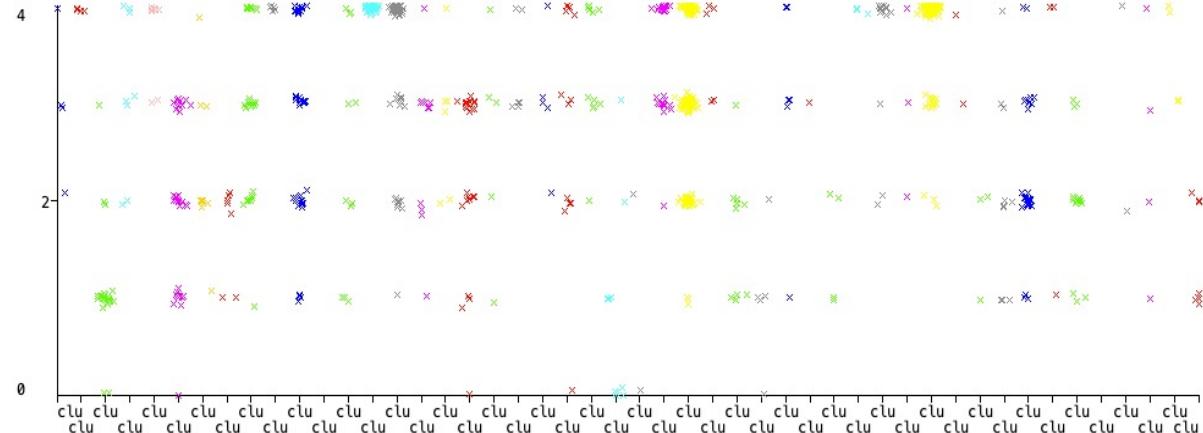


WARD

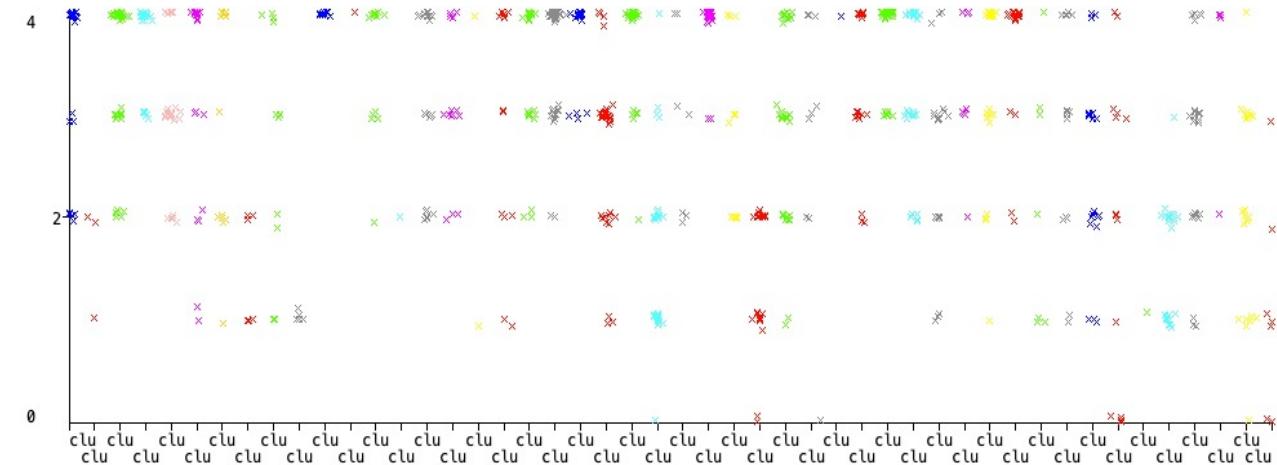


I DON'T RECOMMEND CONTINUING ONLINE LEARNING BECAUSE IS PSYCHOLOGICALLY UNHEALTHY

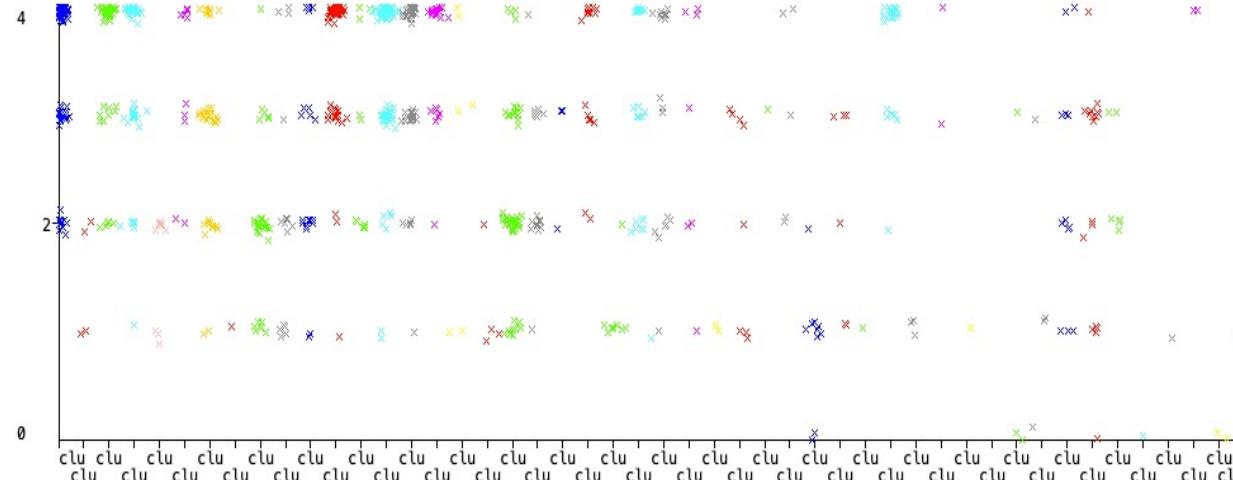
EM



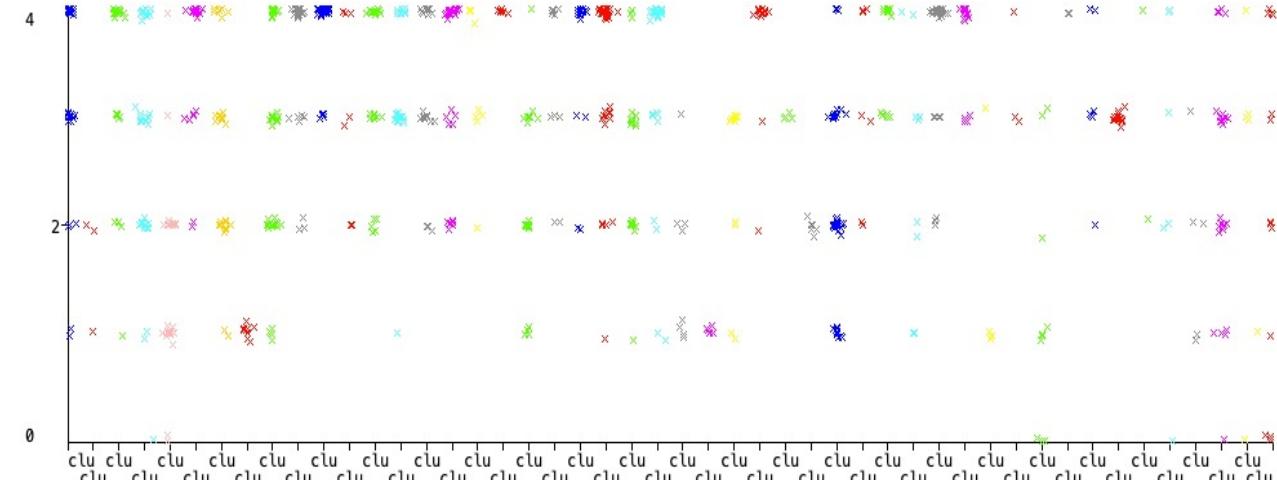
KMEANS



COMPLETE



WARD



FINAL CONCLUSIONS

Considerations

EM and Hierarchical – complete are slightly worse than the other models

Different answers clustered together may not represent a problem

Our choice

We chose Kmeans (with Kvalid) because it allows us to have always the optimal K

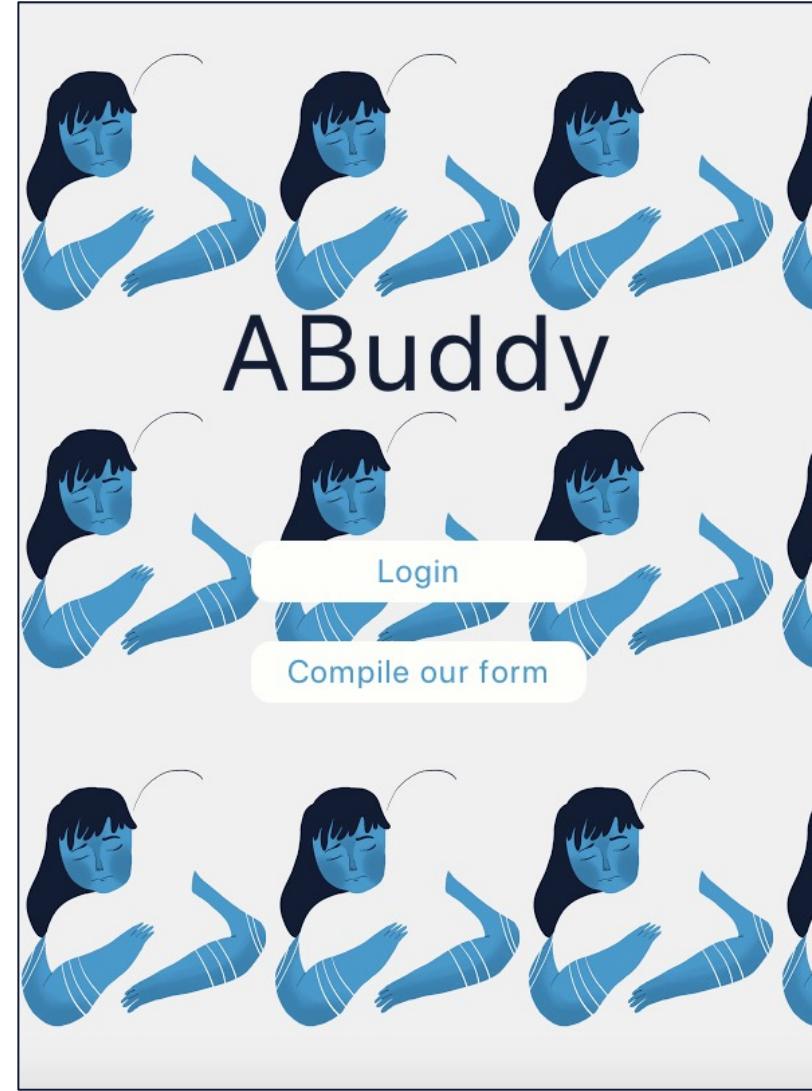
HOW DOES A BUDDY WORK?

Accountabilibuddy

[noun]

A friend you love so much, you hold yourself accountable for their well-being

**LOGIN OR
SIGN UP AND COMPILE
THE FORM**



CREATE YOUR ACCOUNT...

SIGN IN

Full name

Select an username

Email

Confirm email

Password

Confirm password

Sign in

Go back

FORM

Gender

Male

Age

18-24

Year

Fourth

University

University of Pisa

Your cumulative average

90

Before COVID-19: Which of the following digital tools do you use most frequently

Laptop

After COVID 19: Which of the following digital tools do you use most frequently

Laptop

Before COVID 19: How many hours do you spend using the digital tools you usually use

6-9

After COVID 19: How many hours do you spend using the digital tools you usually use

6-9

Submit

Go back

...AND COMPILE OUR FORM

ARE YOU IN A GROUP YET?

LOGIN

Username

test

Password

••••

Login

Go back

YES? START
SENDING MESSAGES!

NO? YOU'LL BE
ASSIGNED
TO ONE SOON

Hello, Tessa Tempesti

There are 42 buddies here!

Go back

Logout

test
Hi!
Fri Jan 07 22:44:16 CET 2022

Send

Refresh chat

Leave group

WAITING FOR
A GROUP...

REFRESH

GO BACK

LOGOUT



CLICK THIS BUTTON TO ASSIGN A GROUP TO THE
USERS WHO ARE NOT CLUSTERED YET OR WHO IS
UNSATISFIED OF THE PREVIOUS ASSIGNMENT