

# Assessing Bias and Inclusivity in YouTube Videos on Healthcare Topics: Analytics using Face and Speech Recognition Methods

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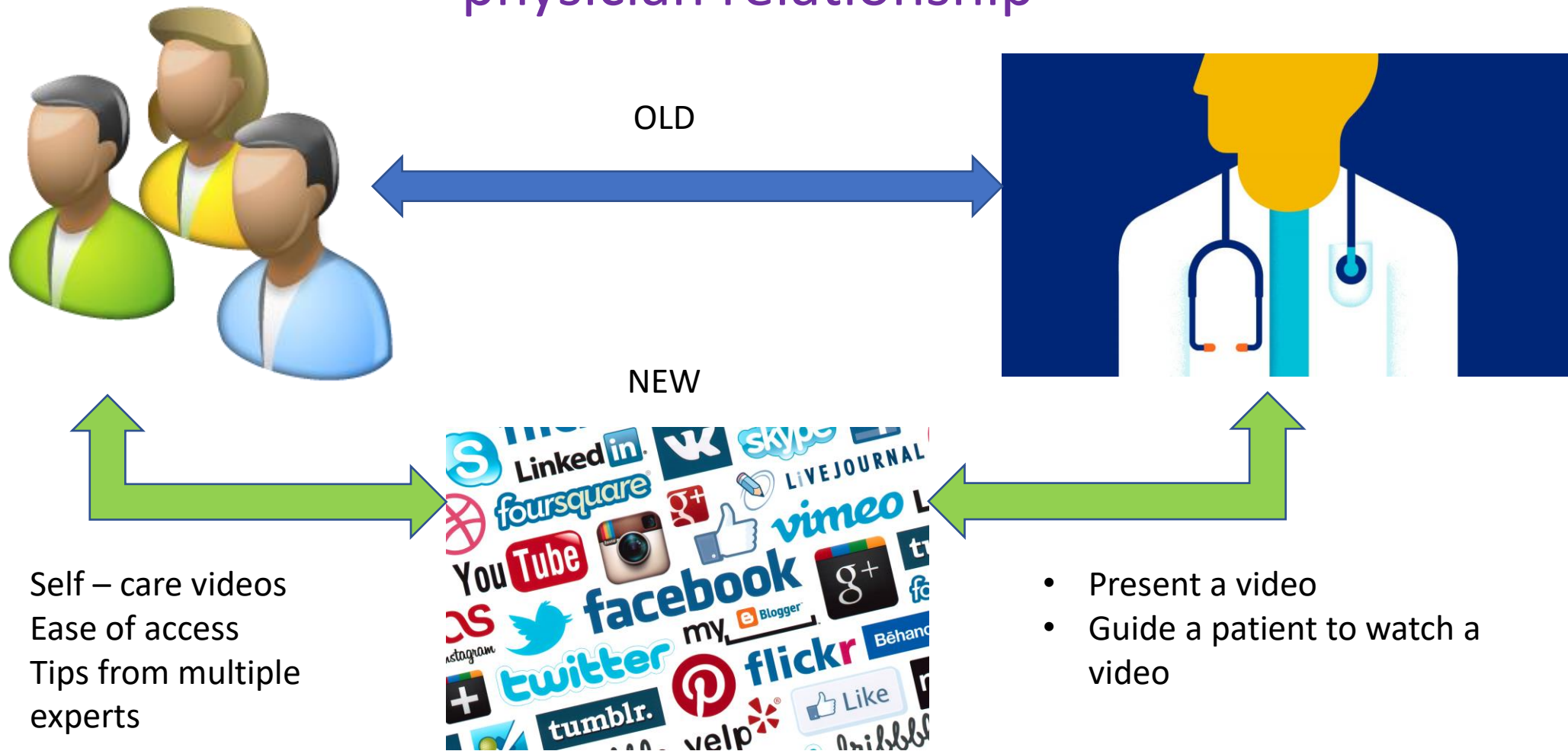
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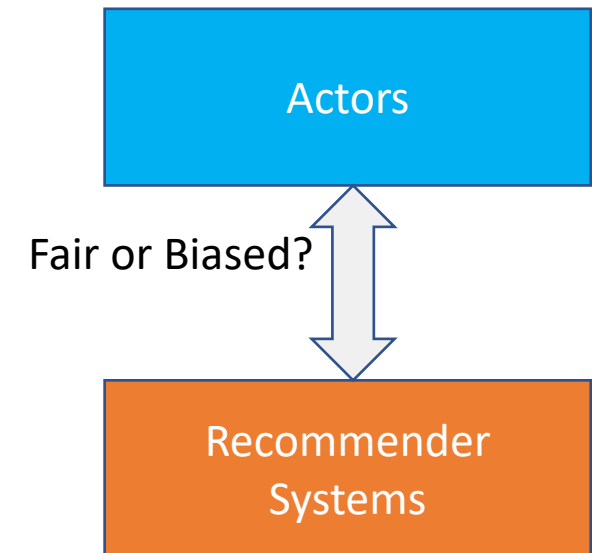
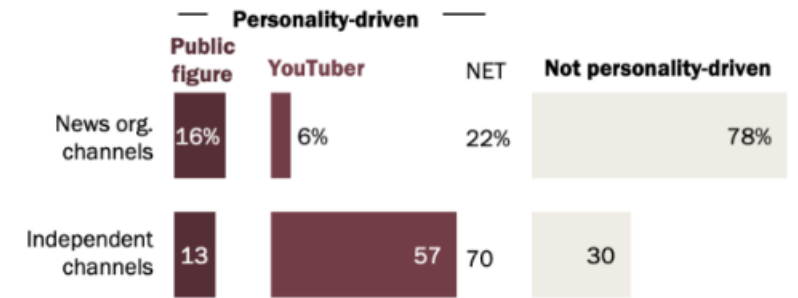
# Social media has transformed the patient – physician relationship

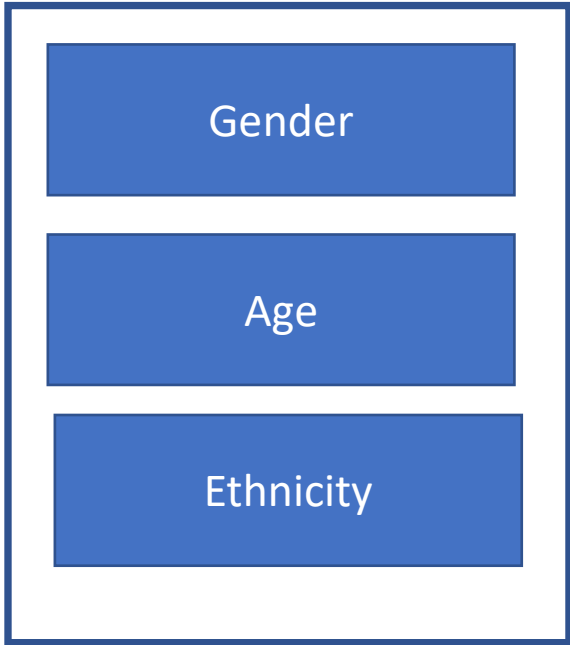


# Motivation

- Fairer and bias – resistant method that ensures recommendations are not skewed against a particular demographic group
- Recommendations drive a significant amount of the overall viewership on YouTube, even more than channel subscriptions or search (Bureau 2021)
  - Highly driven through user clicks, watch time, survey responses, sharing, and likes
  - Most visited website in the year 2020 with over 500 hours of video uploaded per minute, based on study conducted by Broadbandsearch (2022)
- Fairness in recommender systems is highly focused from the user perspective
- Face recognition will continue to play a big role as short video platforms develop methodologies to appeal to new target groups (Synced 2019)

*% of popular YouTube news channels in each affiliation type that are oriented around a ...*



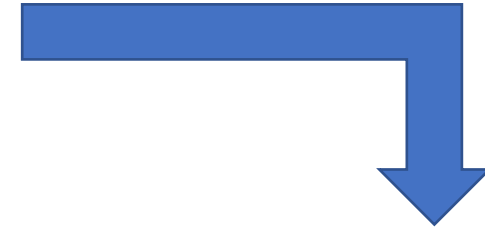


HIGHLY INCLUSIVE

RESULTS SORTED BASED ON:

- Popularity
- Content Understandability
- Medical Information
- User Needs

USER SEARCH VIDEOS



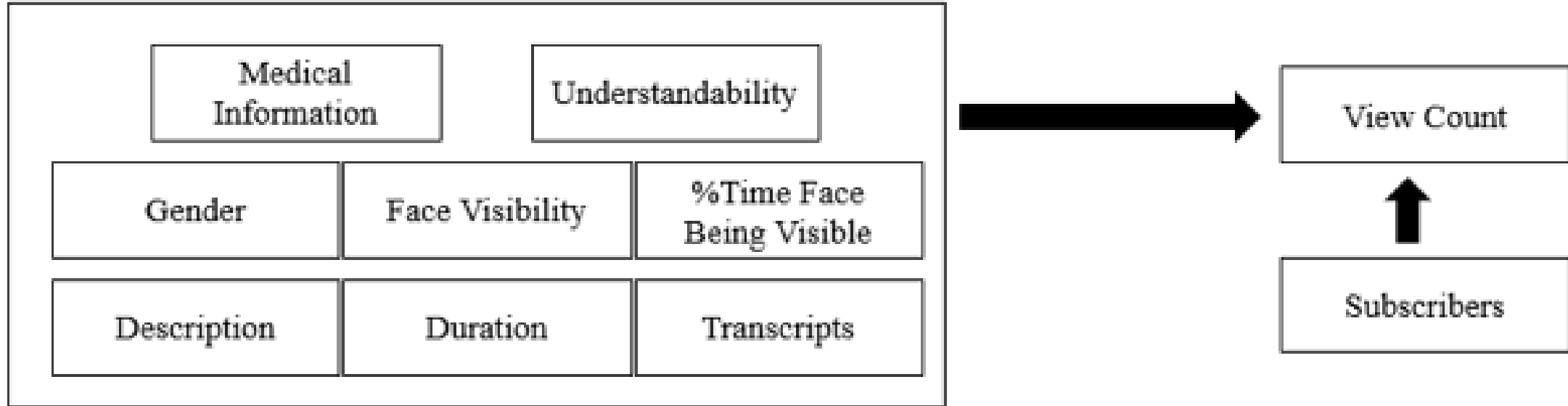
BIAS

UNDER-REPRESENTATION OF PARTICULAR GROUP

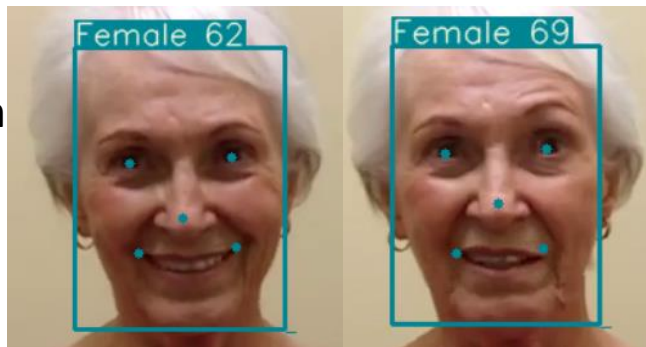


ACTORS / PRESENTERS

# RESEARCH FRAMEWORK

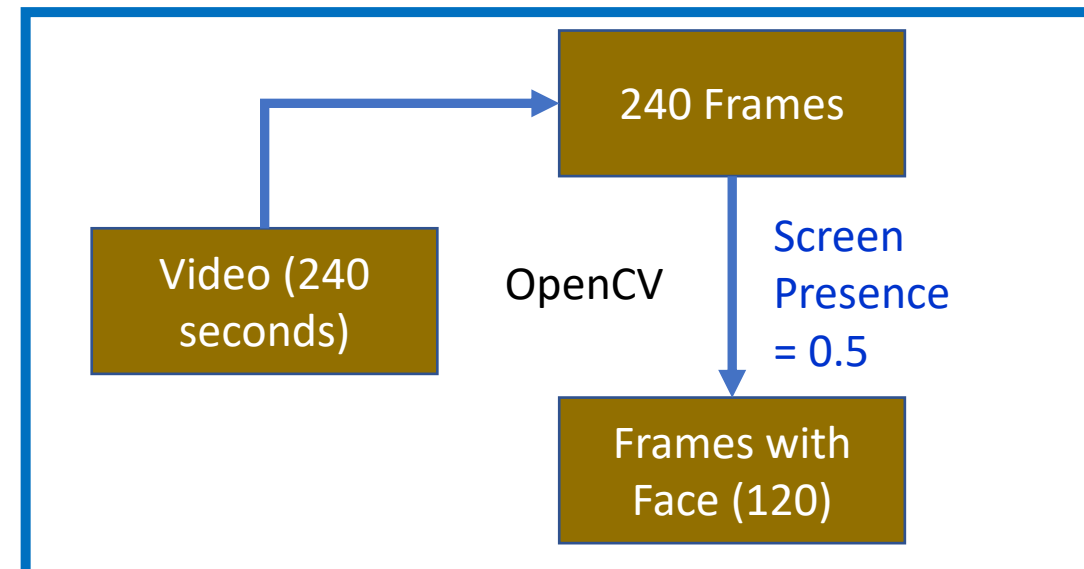


Face Detection  
– Sample  
Video file



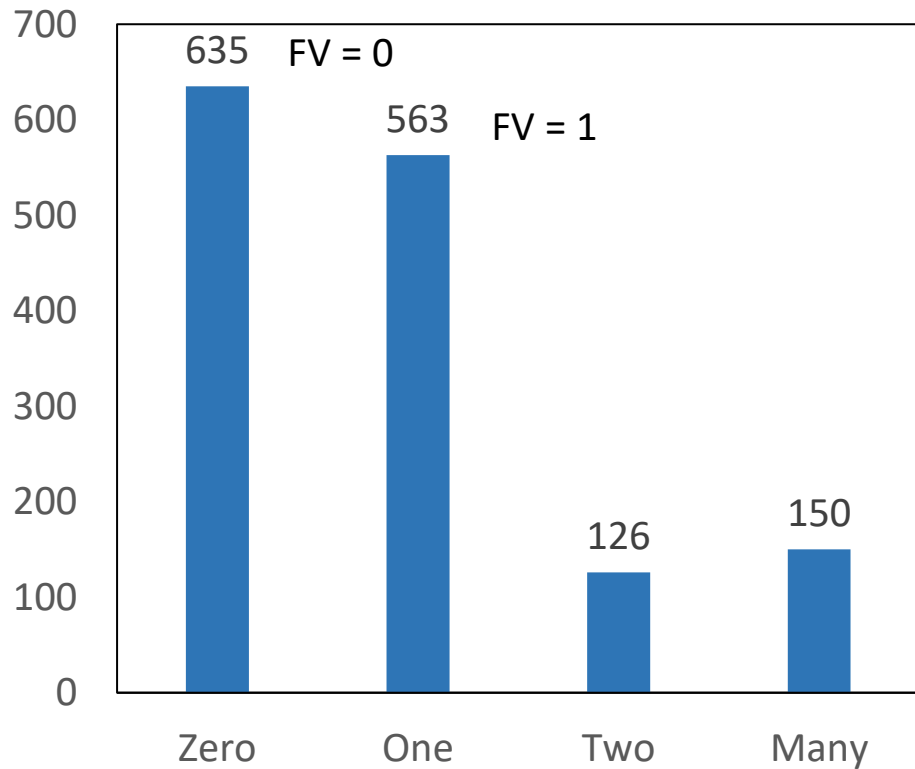
FACELIB

Face Visibility (FV) =  
1  
Gender = F



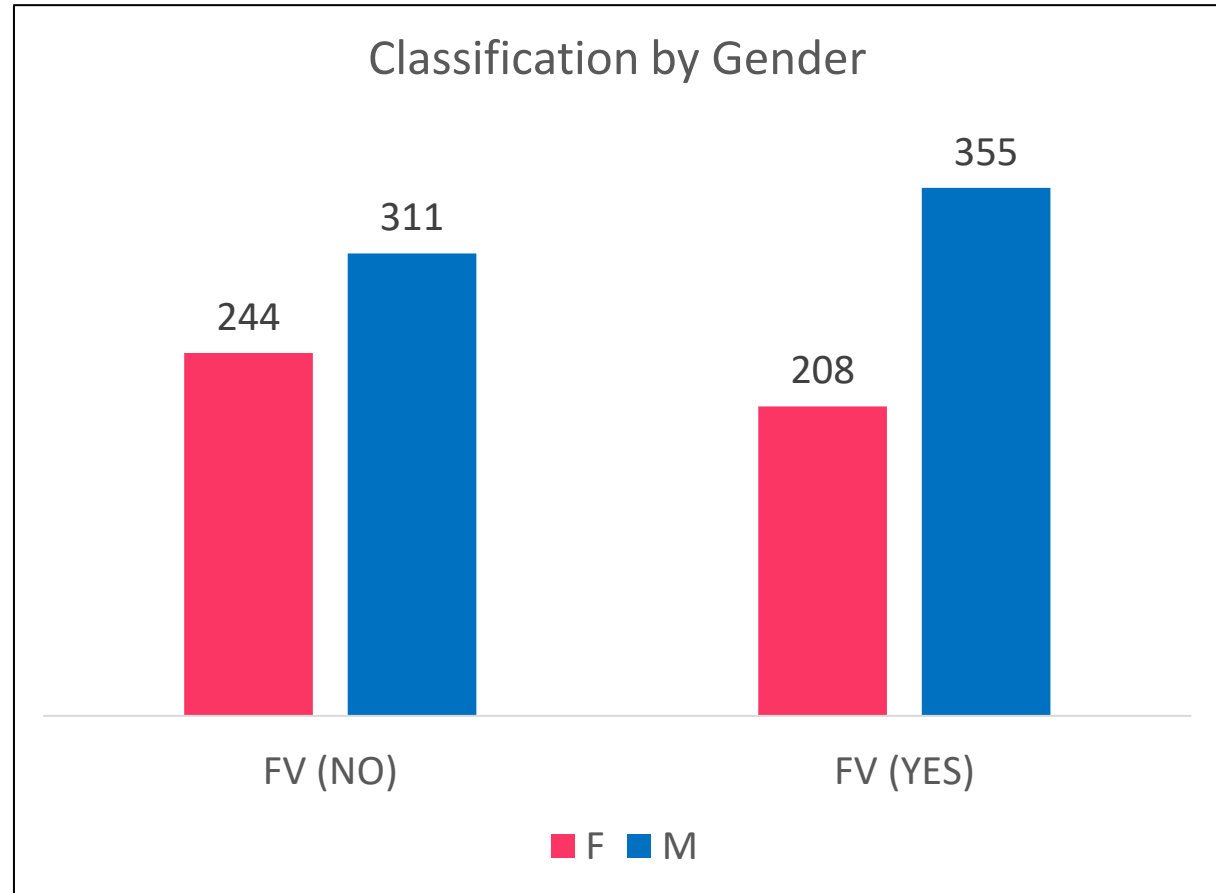
# Videos presented by female group of actors likely to have less face visibility

Video Segregation - Diabetes



\*FV = Face Visibility; N = 1474

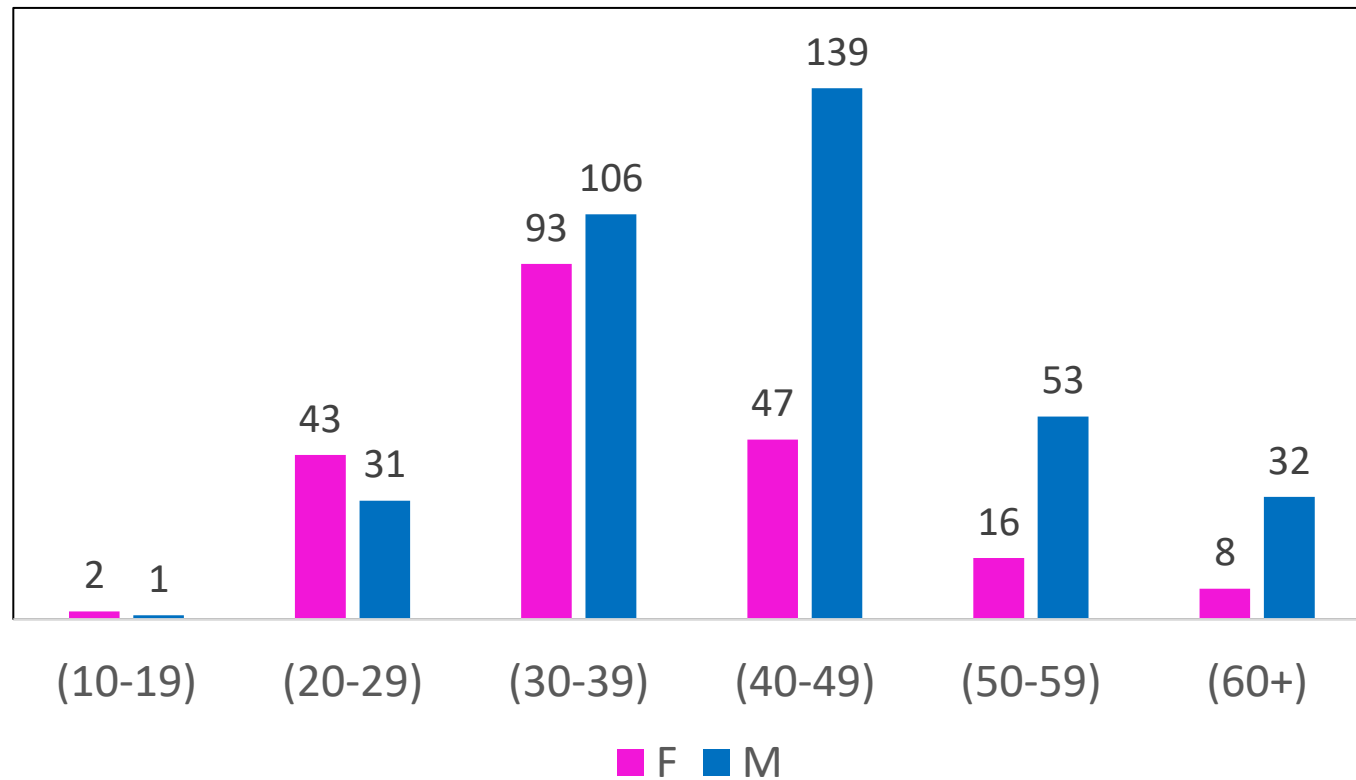
Classification by Gender



F = 452; M = 666

# Female actors are predominantly from younger group

Single Actor Videos - Age and Gender



- Unavailability of advanced models in age detection through speech
- Further improvements can be made in age detection through face

# Fairness Measures

- Advantaged users who only account for a small proportion in data enjoy much higher recommendation quality than those disadvantaged users (Li et al. 2021)
- Deldjoo et al. (2021) highlighted that reasons to explain the variation in performance is difficult in case of using fairness measures, and their study was based on user – item distribution
- Yao et al. (2017) focused their work on improving fairness among users, however, proposed that further research can be done to reduce bias among content creators also (i.e., videos are created from people with different demographics)
- Lohia et al. (2019) implemented an individual plus group debiased measure to tackle both individual and group bias and compared the results with Equalized Odds Post-processing (EOP) and Reject Option Classification (ROC) measures

# Face Detection

- ▶ Matilla and Cavallaro (2021) provided a benchmark for anonymous video analytics to estimate the age and gender of person using FaceLib (videos) and DEX (images)
- ▶ Choudary et al.(2021) proposed a combination of OpenCV (image) and deep learning techniques to improve the age and gender detection in videos



# Representativeness of Videos and Content Popularity

- User generated content such as comments, ratings and likes tend to be more for popular videos on the social media platforms (Chatzopoulou et al. 2010)
- The number of comments might also reflect the level of engagement between viewers and videos (Park et al. 2016)
- People prefer sharing information that can entertain, surprise or inform others about the recent happenings to improve their mood or provide new ideas (Rubenking 2019, Aytar et al. 2018)
- Features such as video length along with likes, comments (Foster 2020), and time of the day posted have a enormous influence on the views (Zohourian et al. 2018)
- NW et al. (2019) mentioned that certain video title keywords were associated with increased view counts
- Current study is focused on the using features highly focused on the video
  - Actors present in the video
  - Description and transcripts