



key visualizations & variable summaries

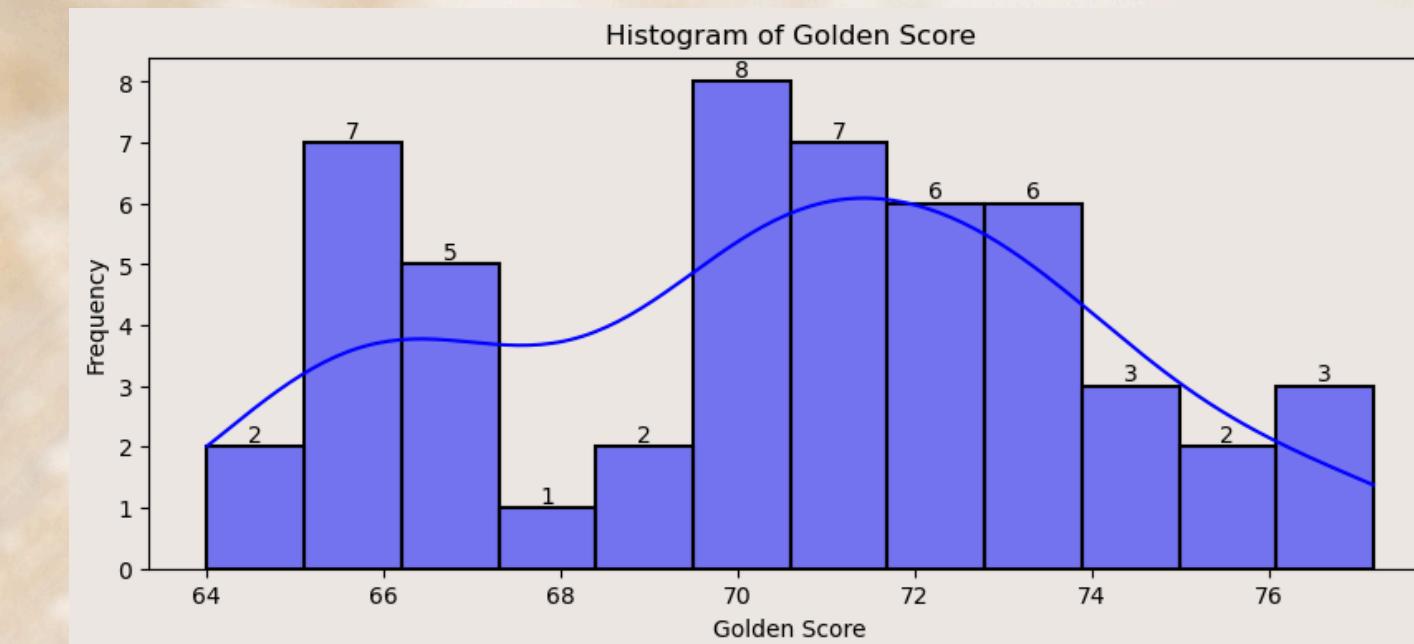
Name: Sophie Kim

Email: sek2dcs@virginia.edu

Score: 74.4%

Face Ratio: 1.20

Mouth/Nose: 1.21



MediaPipe

- Google's AI image analysis package

Notable Variables:

- gender
- race
- face width
- face height
- nose width
- mouth width
- face ratio
 - height by width
- mouth-to-nose ratio
 - mouth by nose
- eye distance ratio
 - pupil distance by average eye width

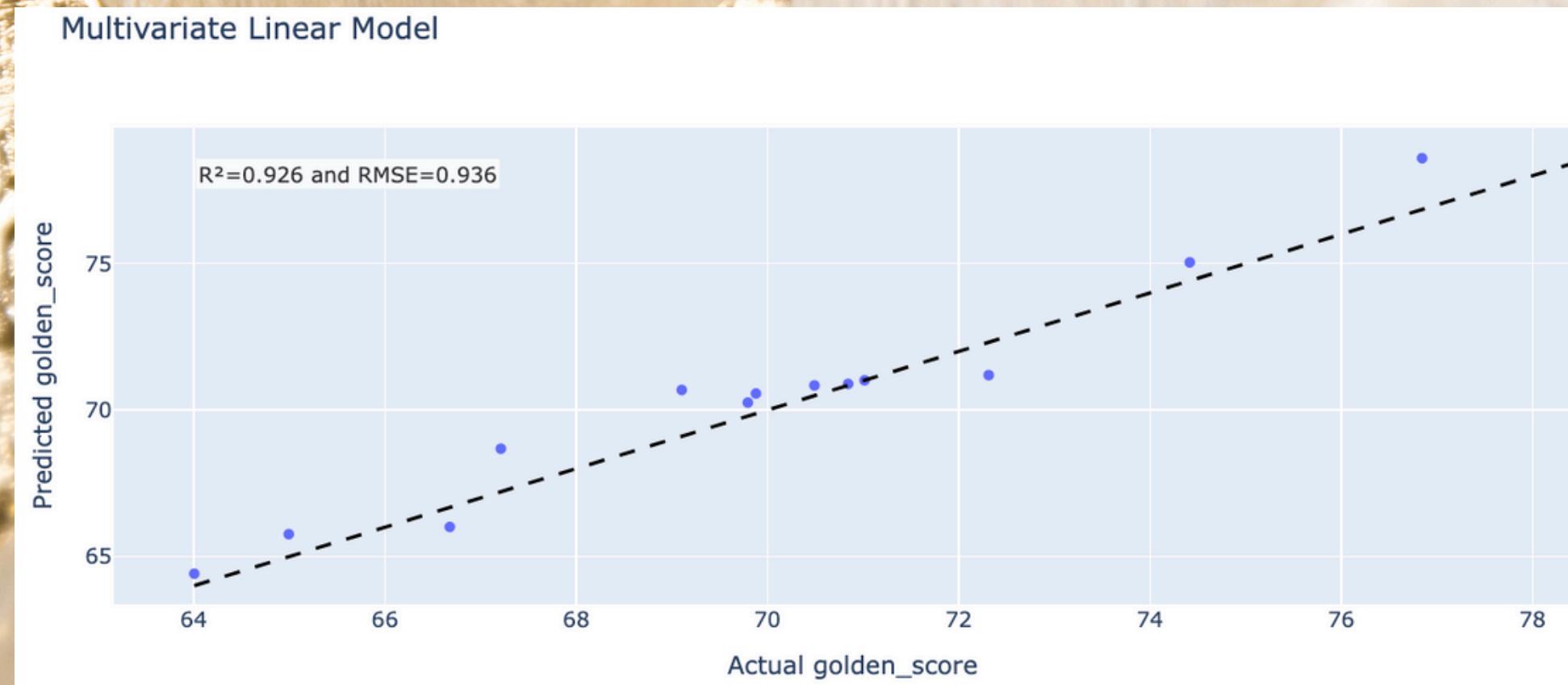
golden score!

linear regression

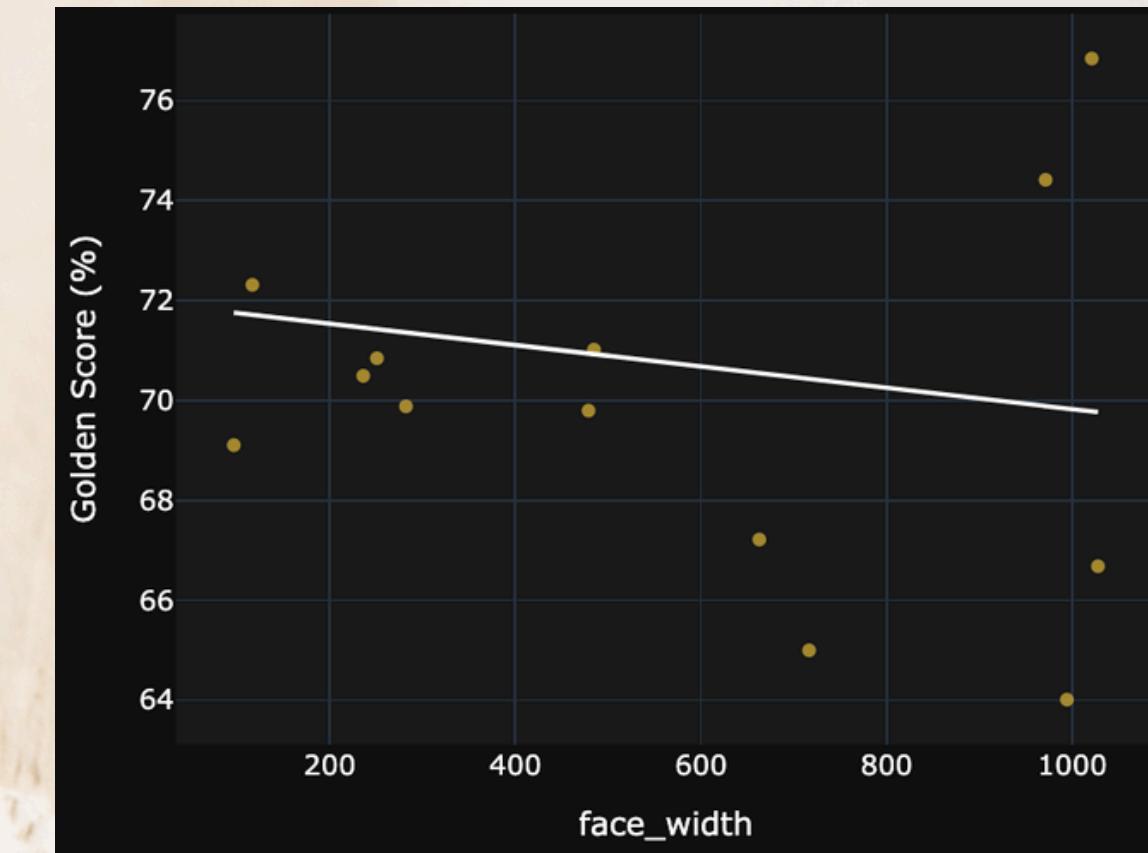
Research Question:

Do raw facial dimensions contain enough information to find golden ratio without using ratio based features?

Multivariate model



Single feature model using face_width

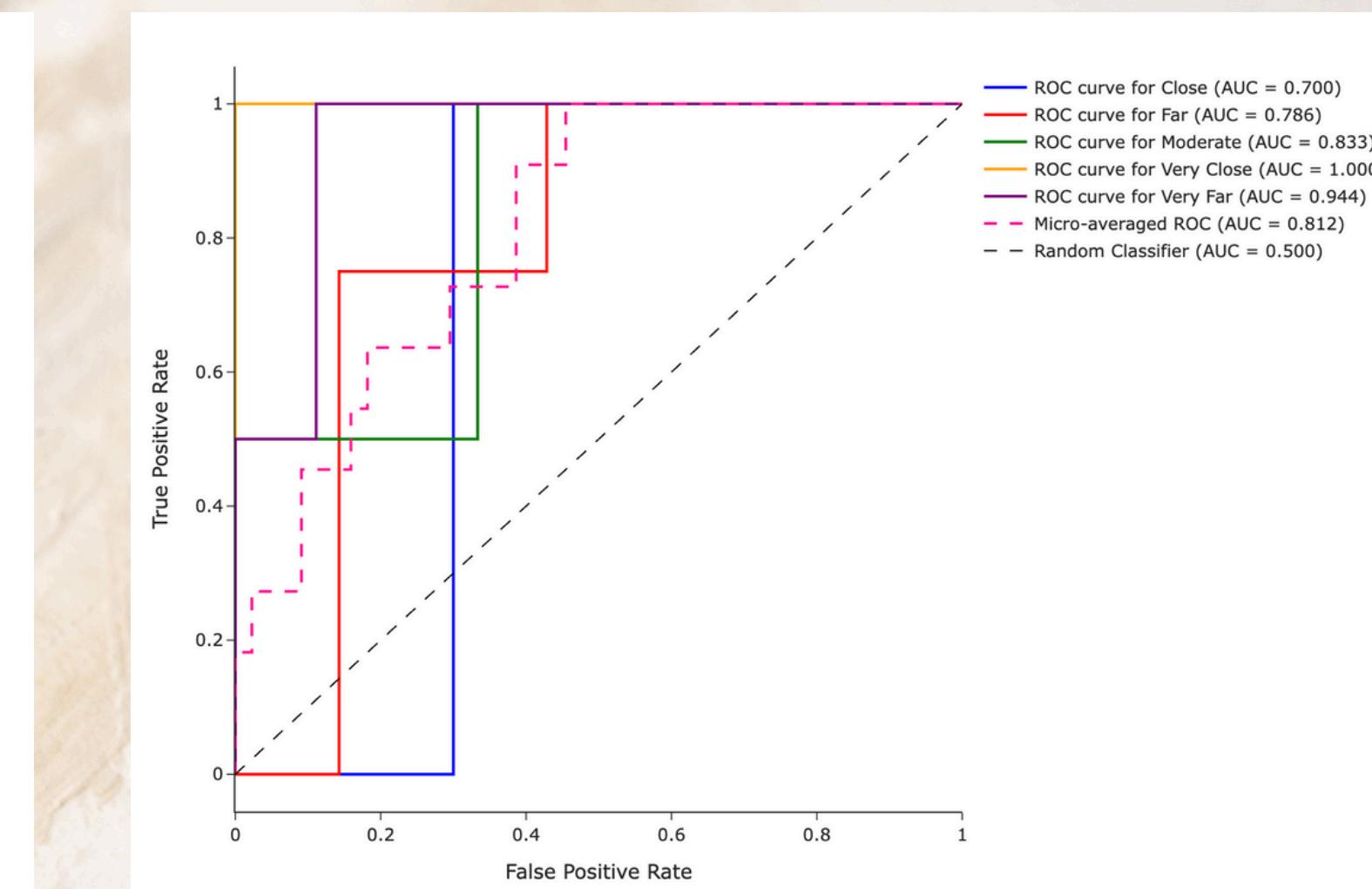


logistic regression

How accurately can a logistic regression model classify individuals into golden ratio categories based on their features, and how does the number of bins affect model performance?

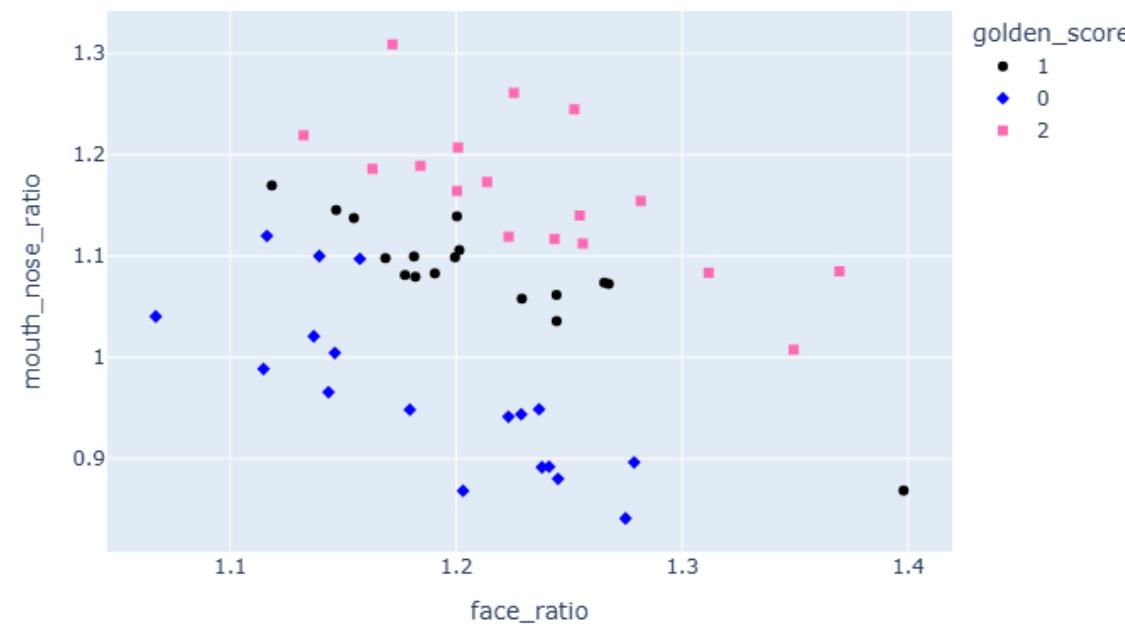
Model Coefficients & Intercepts

Class	face_ratio	mouth_nose_ratio	eye_ratio	nose_to_face_ratio	mouth_to_face_ratio	nose_to_mouth_ratio	gender_female	gender_male	Intercept
Close	0.3081027880259761	0.561427442064789	-0.5341855943694316	0.012283213364169335	0.49259641316422903	-0.53644026741997	-0.010121070139396693	0.010121070139396648	0.48606975167015803
Far	-0.1361660447635271	-0.5712549261200075	0.43600035830135914	0.2628047635244196	-0.3998521302572372	0.5792894378925556	0.09152777079280389	-0.09152777079280389	0.2741576661578996
Moderate	-0.36760475449770663	-0.11295748716707524	0.10488457875064221	0.1928336121887616	0.05100832723665053	-0.12568699806022343	0.16597067353383155	-0.16597067353383152	0.7601447453575625
Very Close	1.5612549779014164	1.123917889458397	0.36747134536059	-0.38144672851349054	0.7194802776369903	-0.9531619599017174	0.010619068909270906	-0.010619068909270946	-0.62803394109478
Very Far	-1.3655869666661589	-1.0011329182361042	-0.37417068804315945	-0.08647486056385924	-0.8632328877806326	1.0359997874893552	-0.25799644309650943	0.2579964430965094	-0.8923382220908387



KNN

Face Ratio vs Mouth Nose Ratio



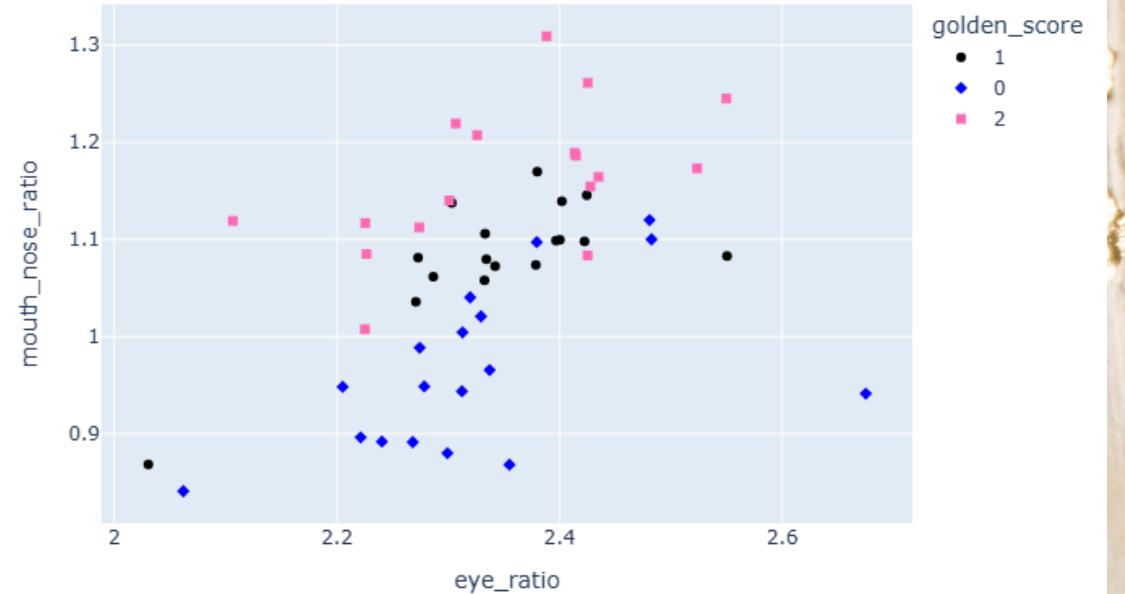
Cross-Validated Balanced Accuracy vs. K (best k = 5)



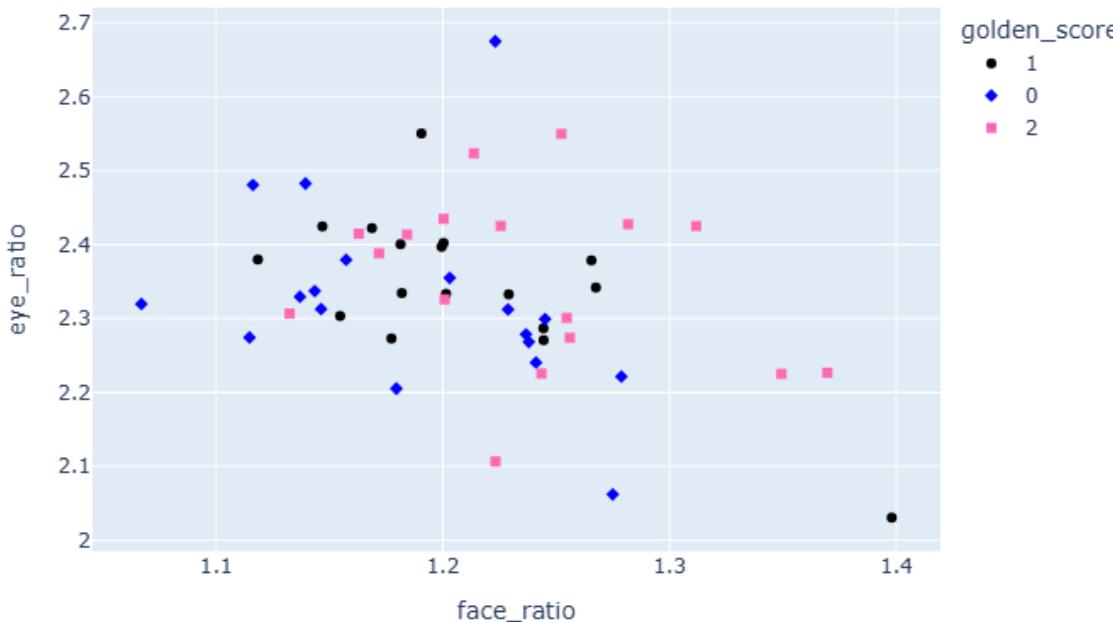
- Predictors
- Gender
 - Race
 - Mouth/Nose Ratio
 - Eye Ratio
 - Face Ratio



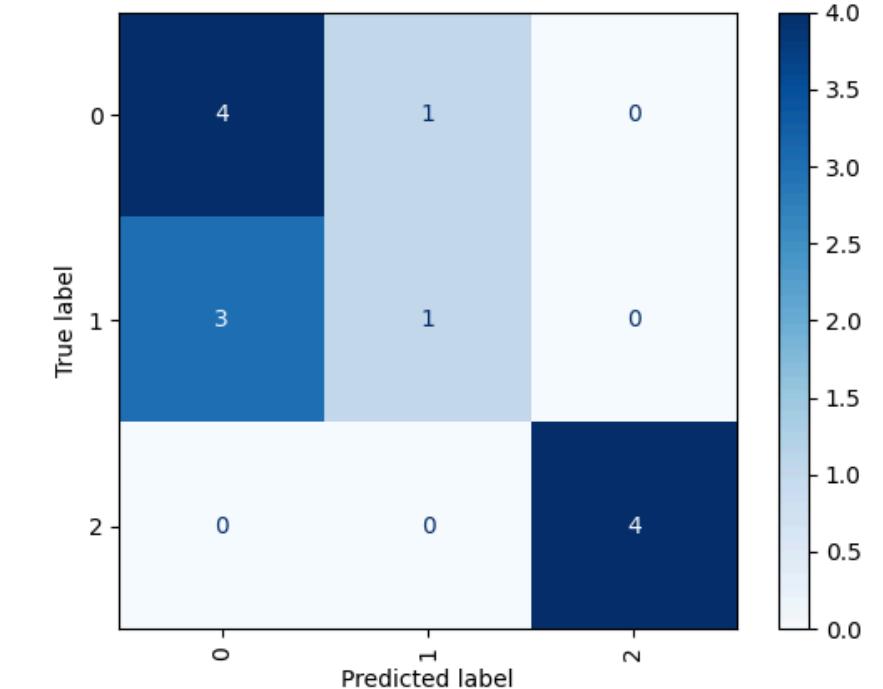
Eye Ratio vs Mouth Nose Ratio



Face Ratio vs Eye Ratio

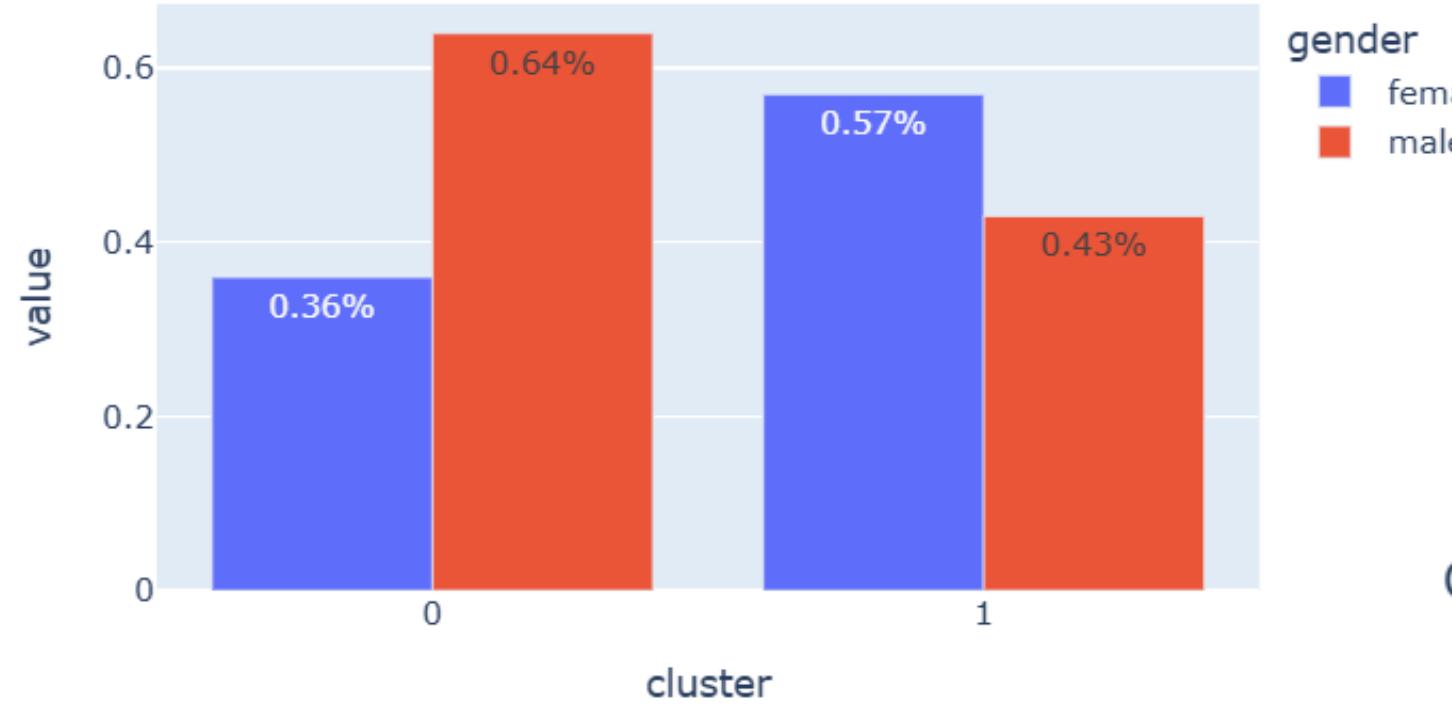


Confusion Matrix: True vs Predicted



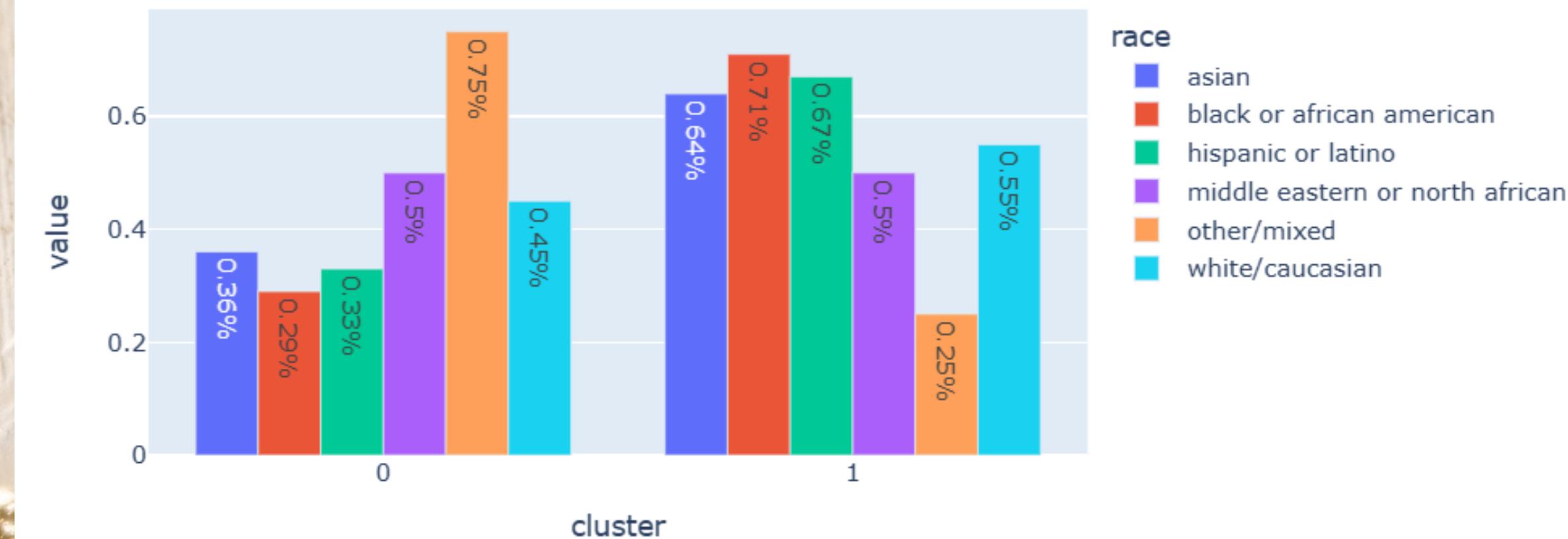
k-means

Clusters by Gender



Using K-means clustering to identify natural patterns in the data. Seeing if there is a correlation between the clusters and the demographics of our sample.

Clusters by Race

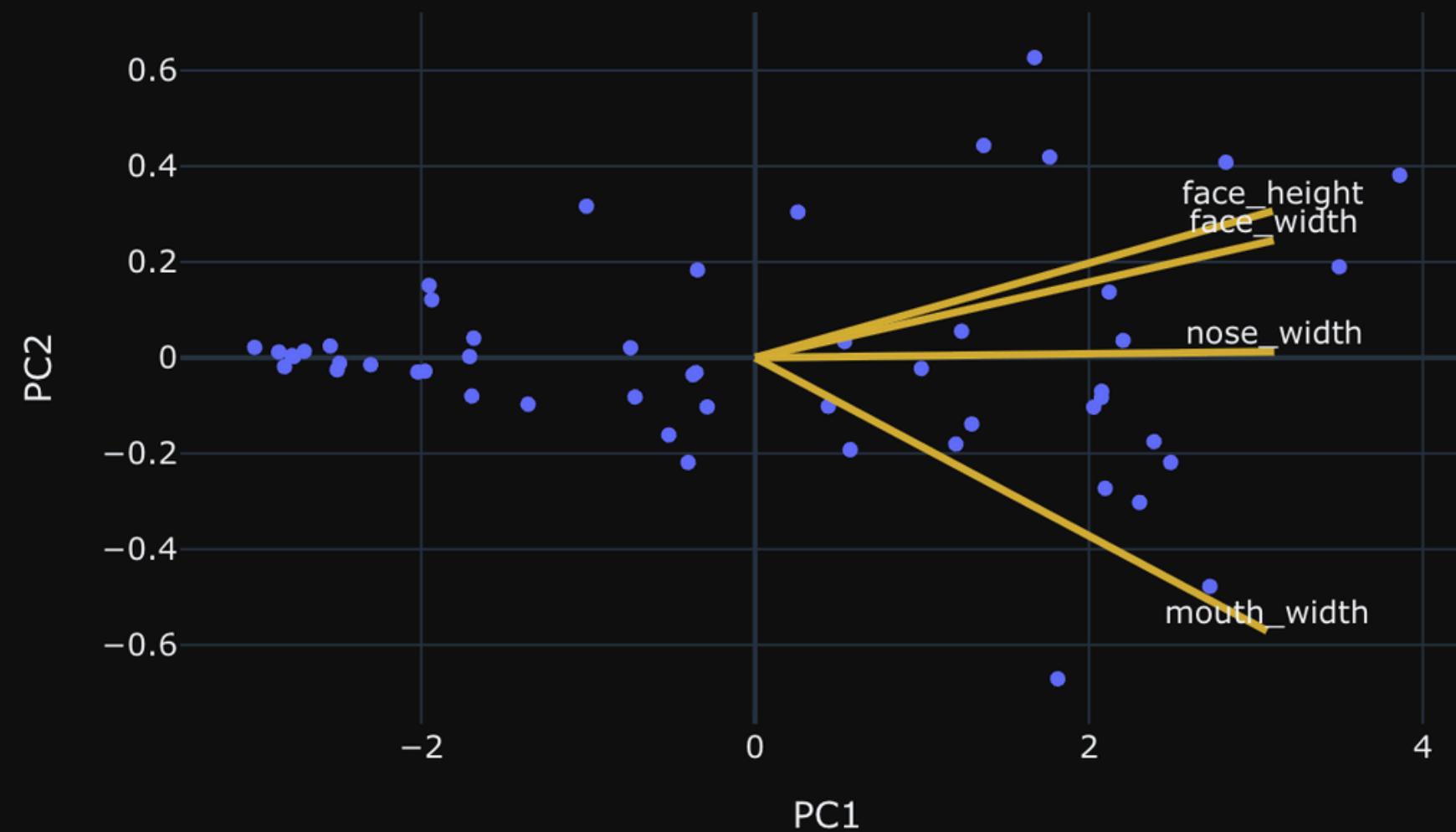


PCA

PC1: largeness of one's face

PC2: proportion of mouth width to face
the closer to (0,0), the more proportional the face is

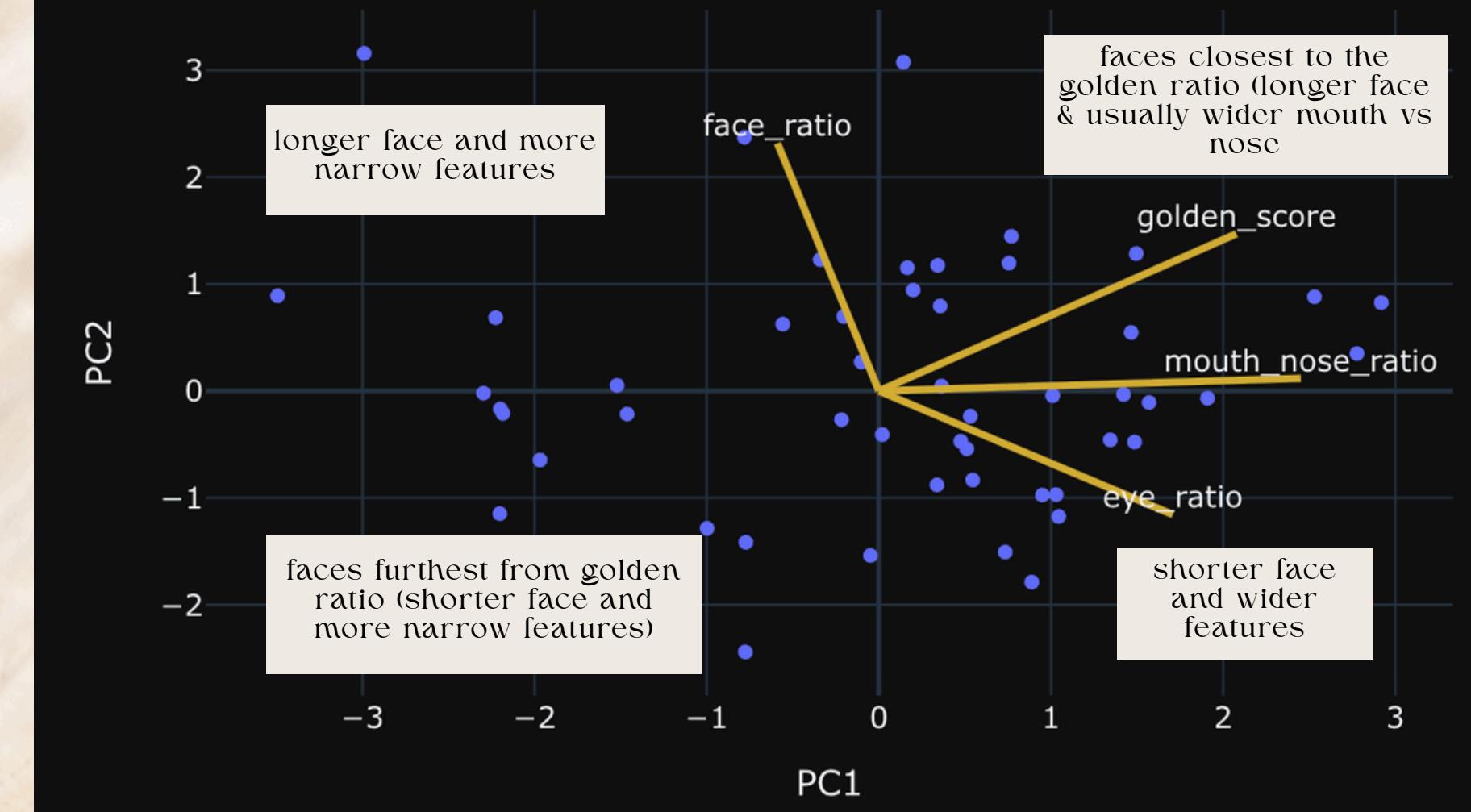
PCA Biplot: Size



PC1: golden score based on mouth/nose ratio

PC2: driven by largely face ratio with contribution of eye ratio

PCA Biplot: Ratios



HOT!



thank you!