Kin Recognition and Ancestry **Fracing on Facial Images**

Overview

Over the past few years, personal photo collection applications like **Picasa** and genealogy softwares like **MyHeritage** have become pervasive through the web. Efficient and effective analysis of family lineage and ancestry history present in the facial images on these services could prove very valuable in personal image collection organization, social data mining, and web search.

We have performed a comparative analysis of multiple machine learning techniques to assess their applicability to **recognize kinship** on facial images. Due to the variance in age, gender, heredity etc., kin verification is much more difficult than the conventional face recognition task. Using workers provided by Amazon Mechanical Turk to provide control groups of human evaluation, our kinship recognition application has comparable accuracy to human performance.

Background

While the modern biological measures such as DNA testing is widely utilized in paternity identification, the tedious process and high cost make it unapt for large-scale pairing. We found that the merging of computer vision and machine learning techniques could add another dimension to the search of family linkage in a fast and economical way.

Machine Face Recognition Genealogy Learning Objective

- Identify expressive facial features for kin recognition
- Aid searching in missing children
- Personal photo album orgnization
- Historic family lineage research
- Human v.s. computer kin recognition comparison

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Data

• Our data consisted of 150 pairs of parents and children facial images collected from **Google Image** and Flicker, Picasa, etc.

• We experimented with preprocessing (filter out profile or dim illumination, and crop to 100x100 pixels) and different feature representations.

Training Data Example









Representative Facial Featrures

Classification:







Unrelated

A. Forward selection for representative features

Feature

Right eye RGB color Skin gray level Left eye RGB color Nose to mouth distant Eye to nose distance Left eye gray level

B. Kin Verification Accuracy Human vs. Computer



Conclusion & Future Work

Simplied Pictorial Structure Model for facial features extraction works well for kin recognition - Using feature templates to locate fiducial points on faces.

• Forward selection of expressive facial features reduces dimension - Final feature vector is 10-dimensional. Mechanical Turk users can provide valuable human judgement for evaluation - Untrained users have provided high quality human judgement on kin recognition via Amazon that are more accurate than those provided by Cornell students.

Future Work: from MTurker.





Results

	Classification	Std Deviation	Feature
	Accuracy		Length
	64%	0.0128	3
	63.33%	0.0127	1
	65%	0.0203	3
nce	65.67%	0.0115	1
)	66.67%	0.0136	1
	70.67%	0.0125	1

Experiment with Mechanical Turk task types and

worker payments -Examine the effect of different price points have on the quality and volume of work obtained

Build a search engine that ranks kin similarity