

TENNIS CHAMP

The best tennis training app :D :D D:
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Table of Contents

01

Motivations

02

03

Demo

04

Future improvements

Our Motivation

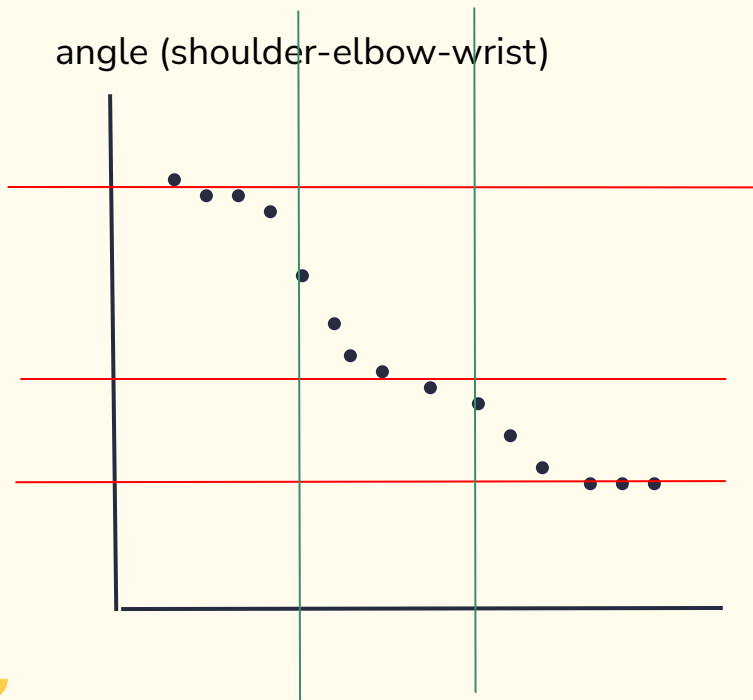
- Tennis is one of the hardest sports to learn
- Technique and hand eye coordination is extremely important, especially compared to other sports
- Many player cannot afford tennis coaches and commit to hours of tennis training
- This app aims to make learning tennis fun and inexpensive
- Aimed at beginners



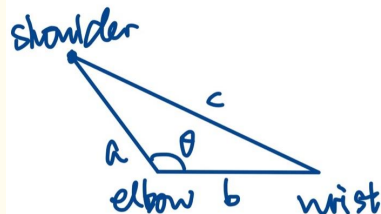
“Tennis is Hard”

—Ashwin Pande

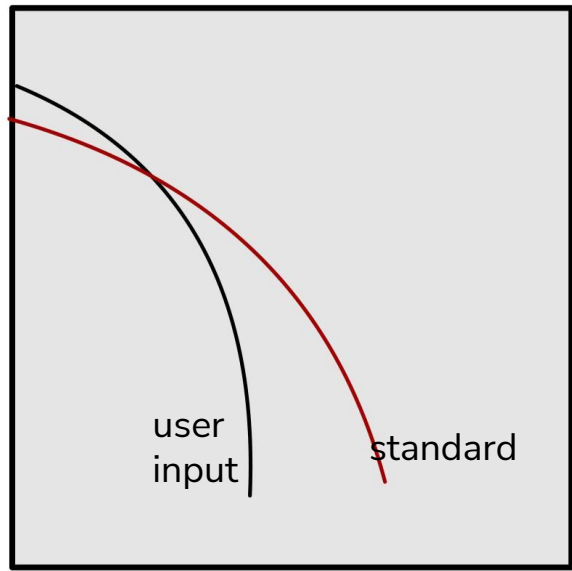
angle (shoulder-elbow-wrist)



angle calculation: cosine rule



$$c^2 = a^2 + b^2 - 2ab \cos \theta$$
$$\cos \theta = \left(\frac{a^2 + b^2 - c^2}{2ab} \right)$$
$$\theta = \cos^{-1} \left(\frac{a^2 + b^2 - c^2}{2ab} \right)$$



1. Pre-process each lesson video and generate the corresponding function relating the height and width coordinates of each body component (polynomial and exponential regression)
2. Using all the width and height coordinates output from the camera class to do a PolyFit or fit it to exponential function for user input (the degree of polynomial function can be fetched from the pre-processed lesson data)
3. Compare the coefficient of each term with variable, ignore the constant term due to height difference

Demo





Future improvements

Future improvements

2D

**Model fine-tuned
for tennis motion**

- data collection: tennis matches online
- data labeling: human body landmarks + racket
- training

3D

3D pose estimation

- better accuracy
- motion in space

Thanks

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