MotiHomeT (Motivate Home Training)

Middle Presentation Slides

Team 2
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Problems

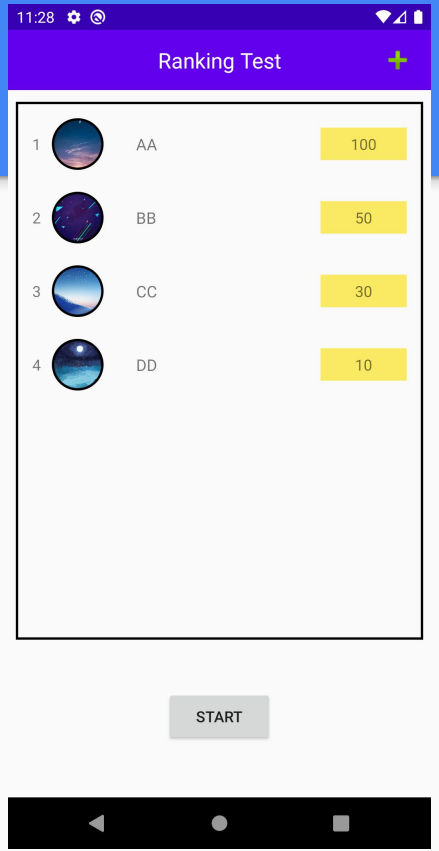
- Lack of motivation to workout from home
  - ⇒ Connect with your friends to keep each other responsible
- However this requires to track the exercises manually, which can be exhausting
  - ⇒ Our app offers a solution

Approach

- Mobile (smartphone) application.
- Home training competition with friends.
- Count push-ups with vision-based 2D pose tracking.
- Show training logs.

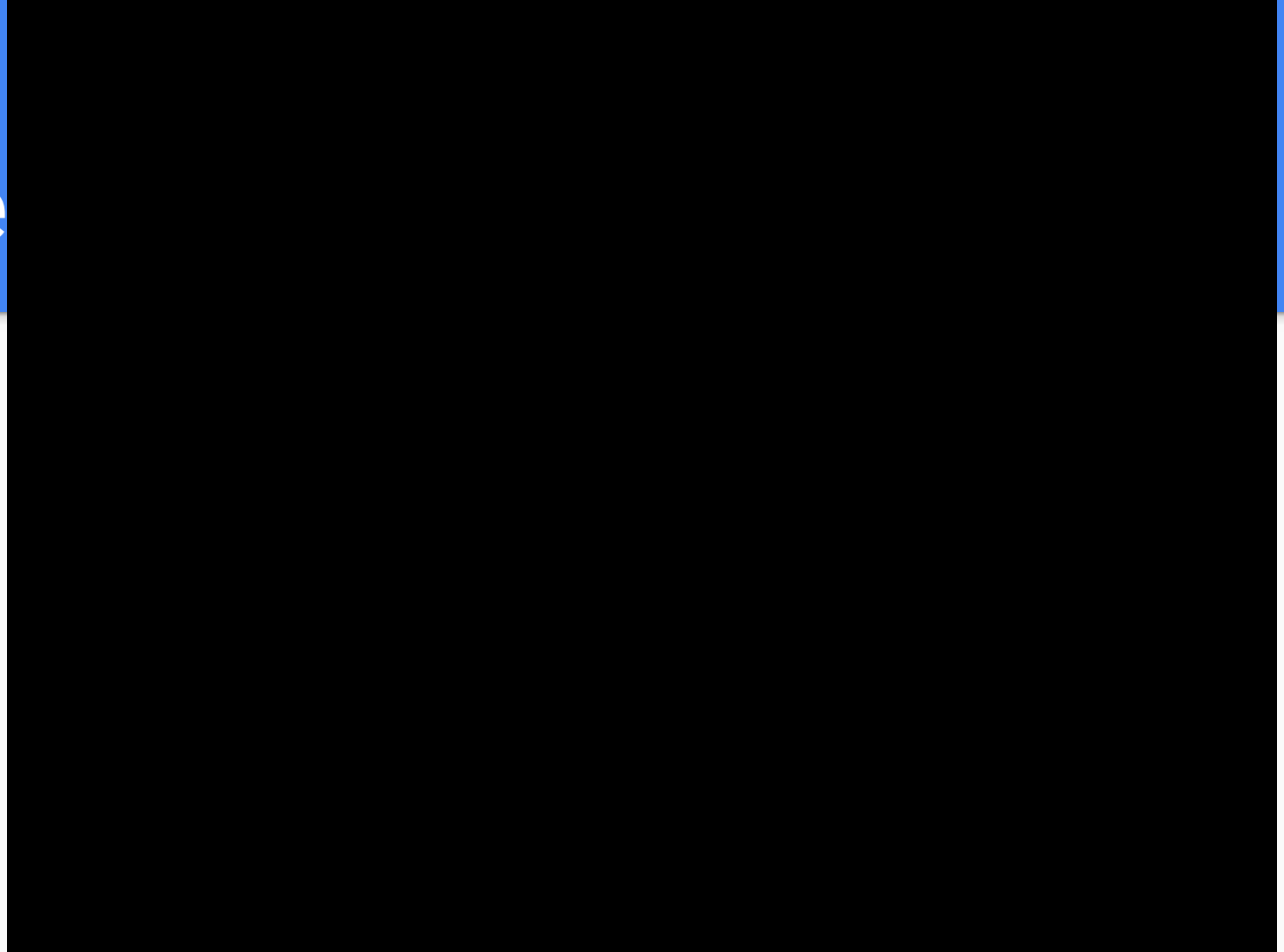
Demo

Competition



Pushup Count

De



Challenges (1/2)

- How much accurate existing real-time 2D pose estimation techniques are?
  - ⇒ solved by using a tensorflow light example
- How to determine the user finished “a push-up”?
  - ⇒ solved by calculating the angle between the elbows
- See if there are any better ways to determine the user finished “a push-up”

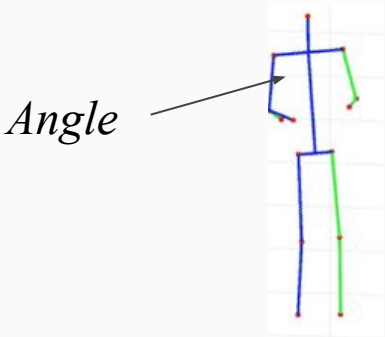
Pose Tracking

- Using 2d deep-learning based pose tracking techniques.
- Tensorflow-Lite PoseNet
- Real time on mobile
- Object detection with drawn lines

Push-up Classification/Counting

Demo model

1. Predefined what change of elbow angle counts as a pushup
2. Find most distinct elbow
3. Calculate angle around elbow
4. Calculate amount of pushups from the sequence of angles



Challenges (2/2)

- How to handle cheating scenarios?
  - More metrics
- How to support users of different body shapes, and distance from camera?
  - Normalized model/personalized model

- Support other exercises?
  - Generalized model

Competition

- Create a friend system and leaderboard UI to compare your daily/monthly push-ups.

Evaluation strategy

- Calculate accuracy of our model
  - Using existing push-up videos.
    - UCF50 datasets have 106 push-up short videos
  - Recording push-up videos by ourselves…(Really healthy project)
- User study
  - How much are you motivated?
  - Want to use more?

Final Deliverable and Success Criteria

- A working app
  - With better performance
- Users are motivated

Overall Timeline

Done | In progress

DN: Dennis, NL: Nils, CM: Changmin, JS: Jisoo, HW: Hyunwoo

	April - 2	April - 3	April - 4	April - 5	May - 2	May - 3	May - 4	May - 5	June - 1
Searching for Pose Tracking Techniques	DN, CM, JS								
Searching for Gamification Papers	NL, HW								
Implement Pose Tracking		DN, NL, CM	DN, NL, CM						
Designing the Application Interface		JS, HW	JS, HW						
Implement Push-up Classifier				DN, CM	DN, CM				
Collect Data for Push-up Counter				ALL	ALL				
Implement the Basic Application Interface				JS, HW	JS, HW				
Extension Plan				NL	NL				
Evaluation for Push-up Counter						DN, NL, CM	DN, NL, CM		
Implement Competition Board						JS, HW	JS, HW		
User Study								HW, CM	HW, CM
Extension								DN, NL, JS	DN, NL, JS

Extension Plan

- Collect/search for push-up dataset.
- Collect cheating push-up data.
- Come up ideas of models safe from the cheatings.

Possible Extension

- Other kind of exercise (Sit-up, pull-up....)
  - Customized exercise
- Pose correction tool

Thank You!