

4 passes

A. Search for N frame  
tight proximity ✓  $N = \underline{\underline{24}}$   
tight characteristics

- B. N frames,  $\frac{N}{3}$  frames  
✓ lots of noise  
> proximity  
0 characteristics
- C. 0 proximity  
✓ some noise  
> char buffer  $\frac{N}{2}$   
N/4 frames
- D. > prox  
> char buffer.
- 

as we move further down  
proximity need to either

- ① increase  
↑ Noise  
② same & be inaccurate

A.  $N=25$  to give us time for ball to reappear in frame

- C. ↑ proximity search area to give us  
D. ↑ threshold if ball shape, characteristics change

## SEARCH FOR BALL

① Check around last found location  $N=25$

expand search area each time to account for moving ball

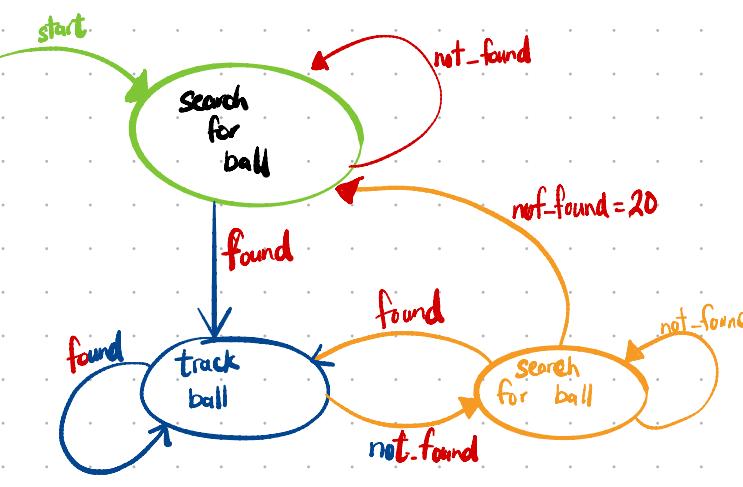
② If trajectory, check along it

③ Relax matching characteristics and search again

④ If found, back to could be matching with noise

Track-Ball with old characteristics

⑤ Otherwise, back to Search for ball



## Track Ball

- ① Save ball characteristics  
- age  
- distance  
- area  
- perimeter  
- shape  
- contour, x, y, etc

1, next frame

② Find all contours within proximity

③ Does any contour match characteristics?

④ No, it means we've lost the ball

just 1  
yes, next frame

> 1 match  
⑦ a. ignore 1, least helpful  
b. check ball trajectory, filter out

c. take average of contour

## Reasons

1. Ball not visible in frame
2. Ball too close to player (threshold merges)
3. Ball hidden behind player
4. Ball not picked up by contour
5. Ball picked up but outside matching characteristics

## Calculate ball trajectory

① Could filter based on it

$$g + s = \text{estimate both way}$$

② Move up & down

frames to calculate

final  
③ every frame  
needs to have  
ball loaded