

A large group photo of the Denver Nuggets basketball team and staff from their 2023 NBA Finals victory. The team is posed in three rows on a basketball court. In the front row, players like Nikola Jokić and Michael Porter Jr. are seated, holding the Larry O'Brien Trophy. The middle row consists of coaches and staff members, many wearing "NBA CHAMPIONS" t-shirts. The back row shows more staff and a young child on someone's shoulders. The background is a packed basketball arena with "Finals" and "CHAMPIONS" signs.

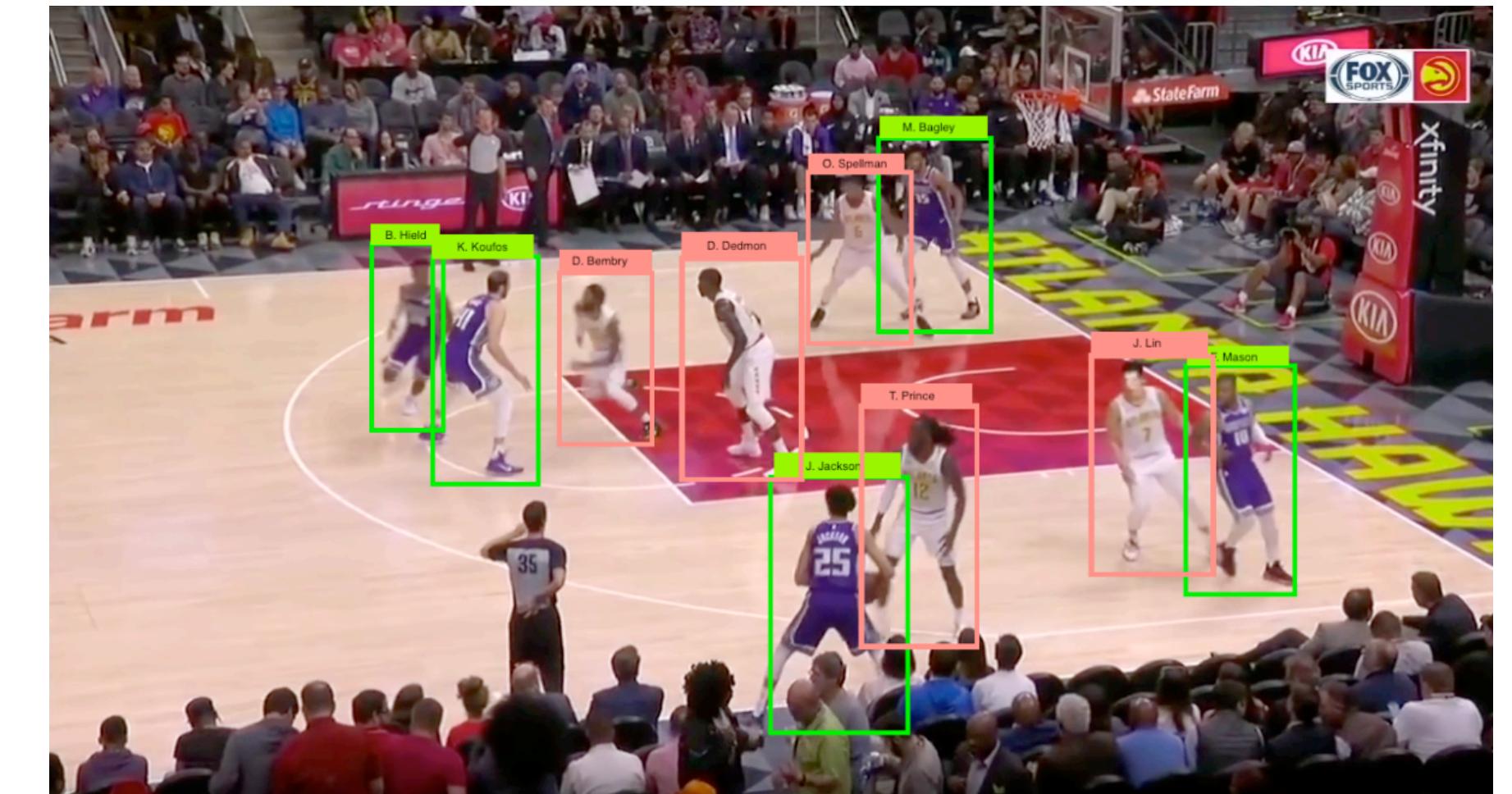
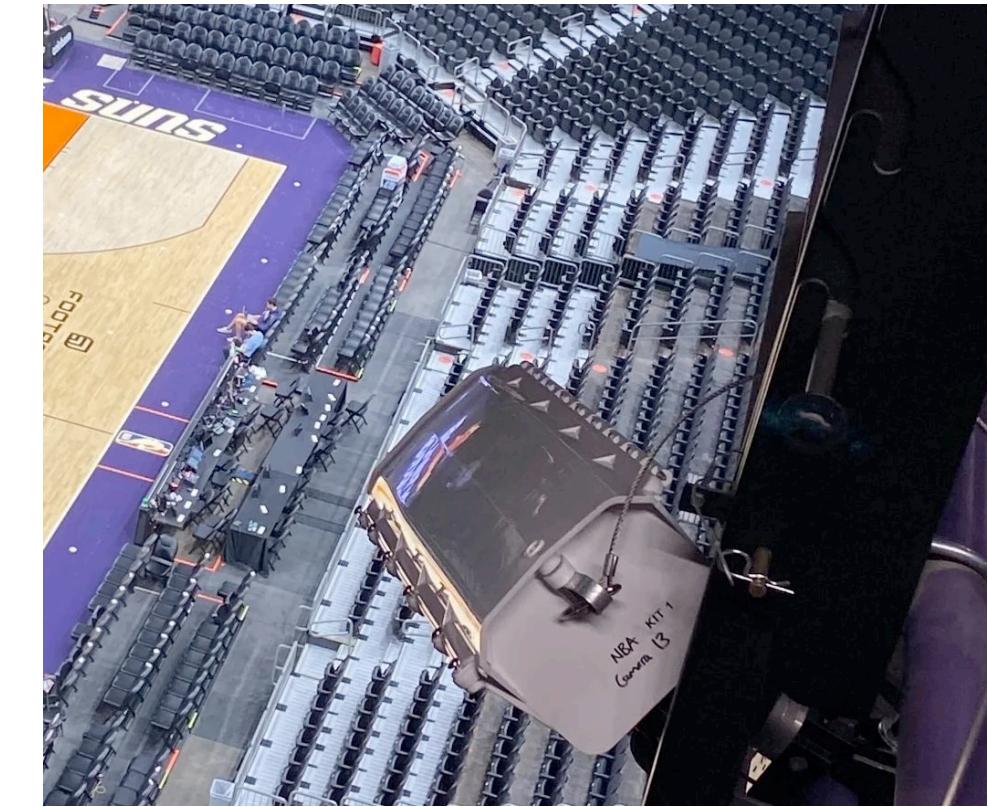
# Intro to NBA Tracking Data

## 2023 WISD Hackathon

# NBA Tracking Data

## What is it?

- Second Spectrum was the Official Optical Tracking Provider of the NBA
- Use an optical tracking system that leverages multiple cameras placed around the arena
- The cameras receive and update data at 25 frames per second
- These data are fed through a propriety software that uses computer vision algorithms to extract positional data for all the players on the court and the ball



# NBA Tracking Data

## What does it look like?

### Events Data

```
{  
  "gameId": "c17d96b7-4f14-4c4a-9f8b-e96cb63de9ac",  
  "eventType": "SHOT",  
  "shotClock": 9.9,  
  "gameClock": 664.6,  
  "wallClock": 1652834835059,  
  "period": 1,  
  "homePlayers": [  
    "82a7f31c-e3b4-4105-8d3e-0e4dcde0f73b",  
    "267de25c-42a5-403a-9fde-0be582ac053b",  
    "ff41f5c7-89ef-11e6-8f93-a45e60e298d3",  
    "ff41362b-89ef-11e6-babd-a45e60e298d3",  
    "61fc6b15-5ce2-4613-a67b-f15bada3aa57"  
,  
  "awayPlayers": [  
    "297a0fda-0a03-4003-bf39-aa92b7a730ff",  
    "986b713a-b20b-4eb0-919e-c859d0508af7",  
    "a6904c1c-0dc5-41c8-a618-b3a276131726",  
    "561048bb-c412-4d8b-a0bc-27d250a1a431",  
    "79b83f96-5723-4219-b521-57de611ee97"  
,  
  "playerId": "986b713a-b20b-4eb0-919e-c859d0508af7",  
  "pbpId": 11  
}
```

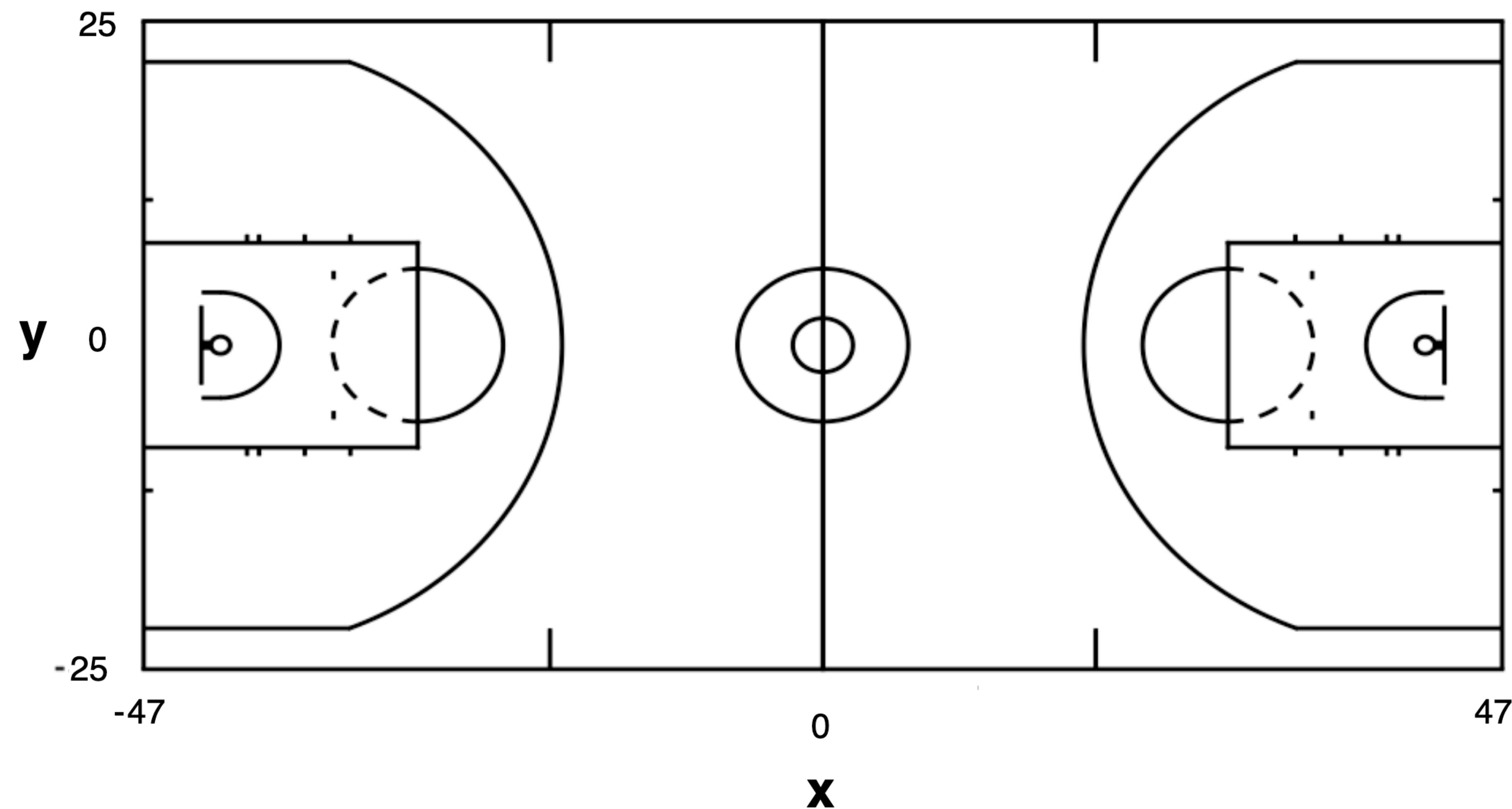
### Tracking Data

```
{'frameIdx': 113340,  
 'homePlayers': [{  
   'xyz': [25.55, -1.56, 0],  
   'jersey': '13',  
   'playerId': '61fc6b15-5ce2-4613-a67b-f15bada3aa57'},  

```

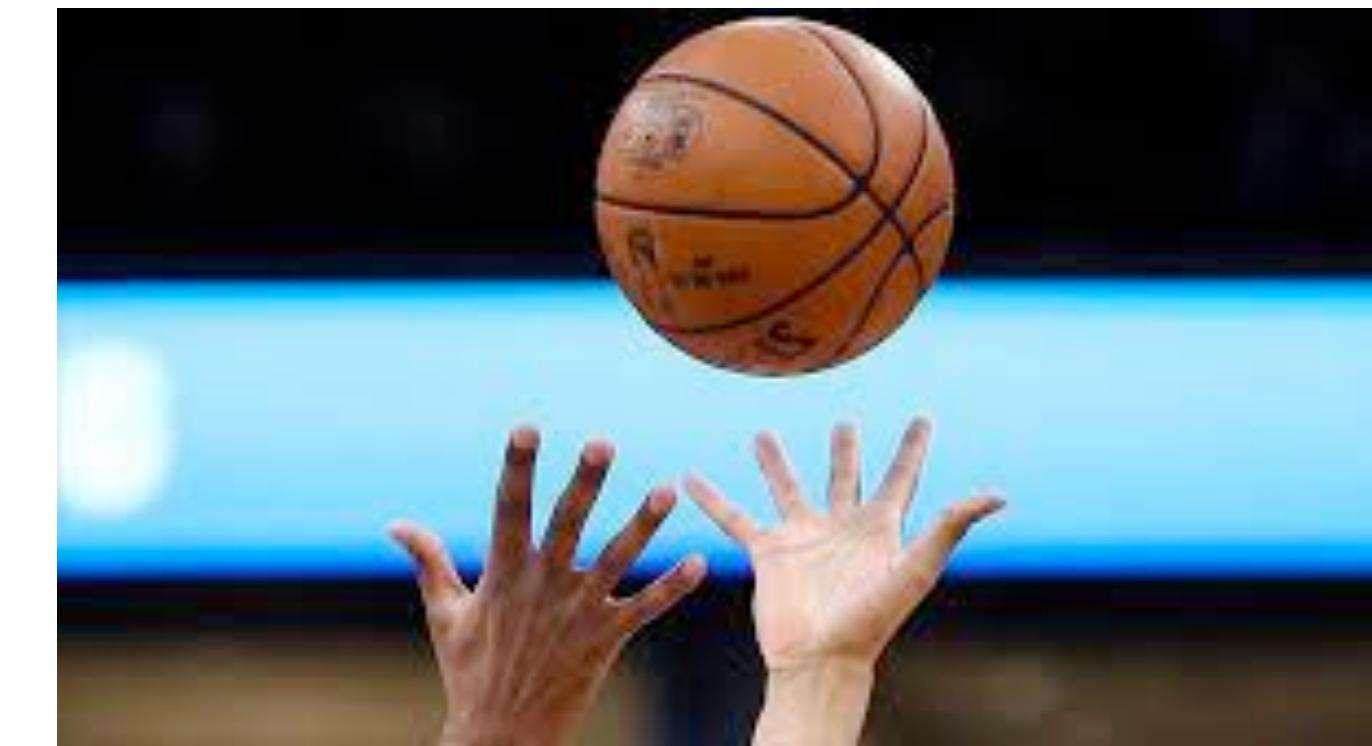
# NBA Tracking Data

## Second Spectrum Coordinate System



# NBA Tracking Data

## General Tips



- Joining publicly available play-by-play data can not only enrich your dataset but also provide additional player/team identifiers
- Consider using the event data to inform which direction a team is attacking or defending
- Decide whether you want to work off of one big integrated table (events + tracking) or join the tables when necessary for your project
- NBA website provides videos for every play based on the NBA play and game IDs
  - [https://www.nba.com/stats/events?  
CFID=&CFPARAMS=&GameEventID=198&GameID=0042100311&Season=2021-22  
&flag=1&sct=plot](https://www.nba.com/stats/events?CFID=&CFPARAMS=&GameEventID=198&GameID=0042100311&Season=2021-22&flag=1&sct=plot)