

ICC NIUM

NEXT IN



A <Global Hackathon> challenging you to enhance the digital cricket fan experience



Powered by H2S

Generation VR

Putting the fan in the game !

A hybrid ‘Watch-and-Play’ experience in VR. Connect with new fans through innovative, interactive experiences

Through **VR**, fans could watch a bowler bowl any delivery in a match, and then see if they could **play** that delivery better than the actual batter. This is done through our **motion tracking system** which acts as a data source for VR. It creates **life-like accurate 3D representations of the bowler and ball**, which are uploaded to our **VR game for fans to play** against.

Two aspects to our system:

- The player tracking and capture system
- And the VR game/app itself

Skeletal tracking capture system

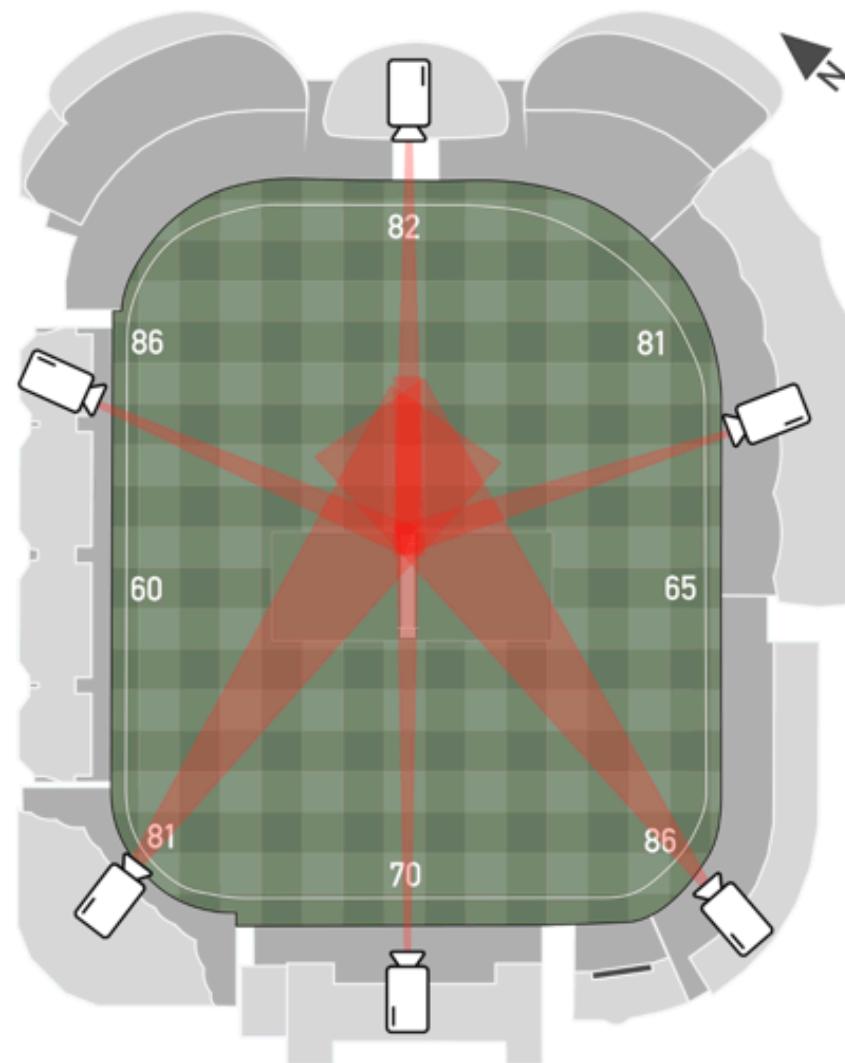
Through the use of a multi-camera system and our own computer vision algorithms we can create accurate 3D models of players



This test was shot with 3 cameras and there are some discrepancies in tracking. This is due to not enough cameras seeing each joint at every frame. As a rule of thumb three cameras need to see each joint for accurate triangulation.

So this is the type of setup and placement of cameras that is required.

Even coverage all around.



We have also
experimented with
Neural Radiance
Fields to create free
viewpoint videos
from the same 6-
camera setup.



There are two options for the camera setup.

Option 1:

Dedicated 12-camera multi-camera system – setup at stadiums with cameras all focused on the pitch (6 cameras at either end – capturing full bowler run-ups as well).

Cameras are all time-synced and have a minimum framerate requirement of 120 frames/second to meet VR standards, otherwise playback in VR looks like sequence of still images rather than video.

This setup is designed to be moved from stadium to stadium very easily (<1 hour setup & calibration). As such, multiple camera systems wouldn't be needed for each stadium.

Option 2:

Skeletal tracking via existing Broadcast cameras – there are a number of pre-requisites (in order of importance):

- **A minimum of 3 cameras** are needed to see the target object (in this case, each joint) at every frame.
- Cameras **fixed in position** and not rotating to follow the ball/play - this would throw off tracking algorithms.
- **Time synchronisation** of camera feeds – this could be done using an audio spike such as bat/ball collision, or via a visual cue – ball release, front foot contact
- Frame-rates – Most broadcast cameras shoot at 24-30fps which is below VR's minimum playback standard of 90fps, so additional frames would need to be “created”. This can be done via **frame interpolation**. We would process the 30fps footage to produce a 3D skeleton, then interpolate the joint positions to add additional frames in between.

Then it's possible to integrate an accurate skeletal tracking solution and combine it with Hawk-eye trajectory data for use in VR, without a loss in quality or accuracy to the end-user.

The advantage of this method is, if there are multiple feeds of historical footage in storage, then these could be used to recreate classic deliveries for fans to play against as well. An obvious example would be recreating the Super Over from the 2019 final.

Once player capture is complete, it is then uploaded to VR for fans to play against.

This could either be used as in-stadium entertainment experiences, at fan parks, or at home through someone's personal VR headset

Data capture on fan's/user's performance could present **new competitions and engagement opportunities** as a full scoring system is in place

Competitions throughout the World Cup – fantasy competitions with prize rewards – most runs scored throughout, most 6s hit, biggest 6, highest score before a dismissal, most runs in an over

Upload videos to social media to win **Fans 'Play of the day'** – vote for best shot



Multiple play options within VR:

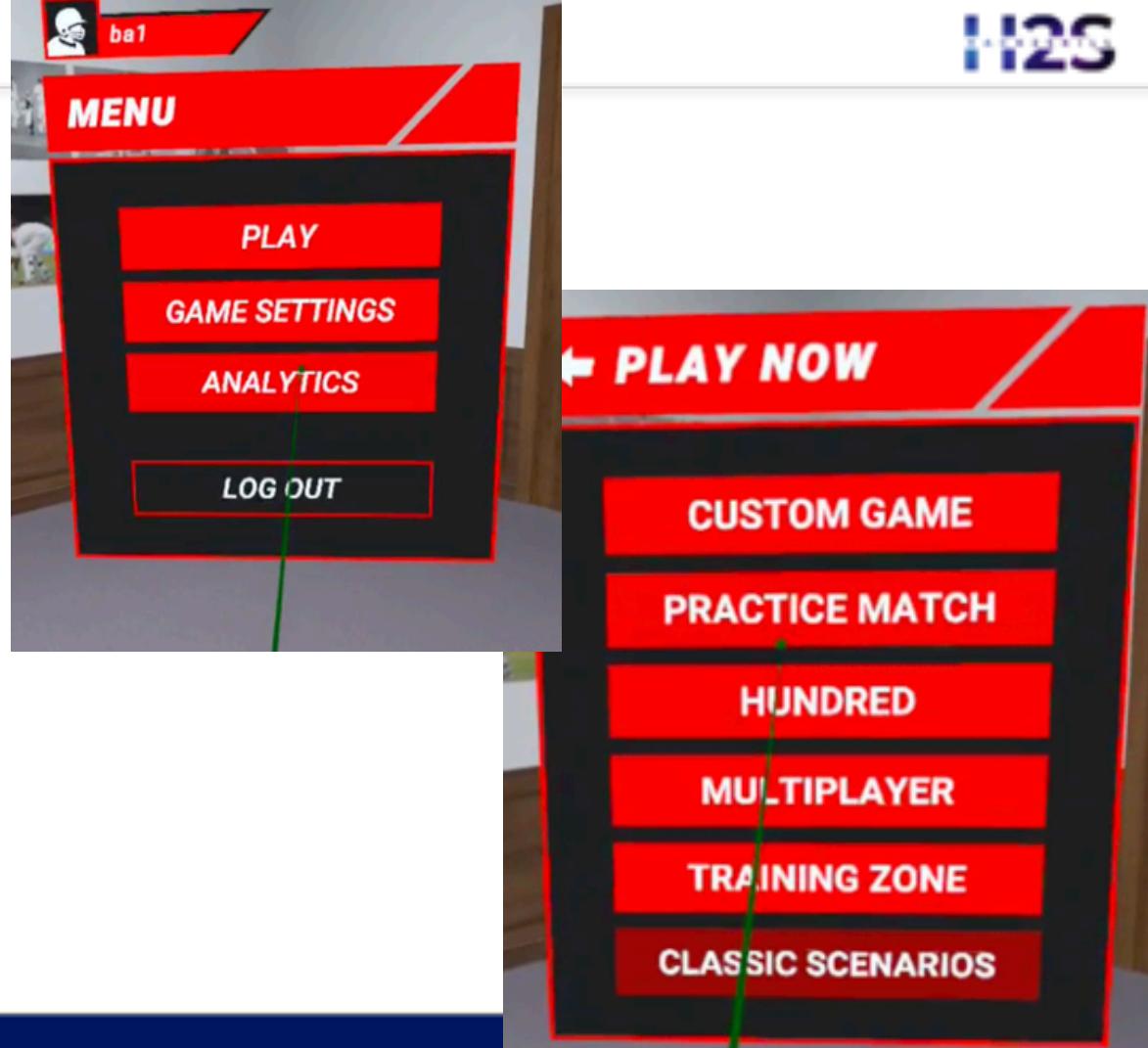
Create a new tournament to play and play it on your own.

Social play & multi-player –

Create leagues and challenge friends to see who can score the most runs against a particular bowler or team! Or even **build a team of bowlers** from around the world to play with.

Adjust difficulty levels to suit younger ages by slowing down ball speeds and add bat boosts to allow them to **hit the ball easier** and further.

AI field setting logic – based off where you most often hit the ball





Player

← **HUNDRED**

+ NEW TOURNAMENT

YOUR TOURNAMENTS





OVERS NUMBER

5 10 20

CHOOSE YOUR TEAM

Not Selected

PLAY

Not Selected



Manchester Originals

Northern Superchargers



London Spirit

Oval Invincibles

Southern Brave

TC

Welsh Fire

Birmingham Phoenix

CF

Trent Rockets

Not Selected

NEXT

← TOURNAMENTS

STANDINGS

BRACKET

YOUR STATS

POS	TEAM	P	W	D	L	Points
0	Manchester Originals	0	0	0	0	0
0	Northern Superchargers	0	0	0	0	0
0	London Spirit	0	0	0	0	0
0	Oval Invincibles	0	0	0	0	0
0	Southern Brave	0	0	0	0	0
0	Welsh Fire	0	0	0	0	0
0	Birmingham Phoenix	0	0	0	0	0
0	Trent Rockets	0	0	0	0	0

DIFFICULTY

HARD

NUMBER OF OVERS

10



DELETE

PLAY



ba1

← **MULTIPLAYER**

ONLINE GAME

PLAY AGAINST FRIENDS

ONLINE LEAGUE



ba1

← ONLINE GAME

NAME

ba1

SELECT DIFFICULTY

Easy

BATTER TYPE

Right-handed

PLAY

Expert difficulty has no adjustments from real-life, whereas the others do:

- **Easy** – max ball speed 65mph, no spin
- **Medium** – max ball speed 75mph, no variation in spin
- **Hard** – max speed 85mph, reduced amount of spin





ba1

Searching for players

player found 1/2



vs



ba1

...

EXIT

← ANALYTICS

PLAYS

PLAYLISTS

COACHING DRILLS

CLIPS

All Plays

PLAYS

All Plays

DATE RANGE

2023-02-24

2023-03-02

PLAY DATA

Clip Id	All
Playlist name	N/A
Balls played	0
Outs	0
Missed balls	0
Hit ball	0
Left ball alone	0
Left stands	0
Right stands	0
Average	0.0
Strike rate	0%
Runs	00



BALL DATA

Velocity X MPS

Velocity X MPS
(After Collision)

Spin

x-Axis y-Axis z-Axis Resultant

0 0 0 0



3D VIEW



ba1

SCOREBOARD
RUNS WICKETS OVERS
0 0 0
Unlocked Unlocked Unlocked

PAUSE

RESUME

GAME SETTINGS

BACK TO LOBBY

← SETTINGS

- GAME
- BAT & BALL
- LOCATION
- PLAYER KIT
- CONTROLLER
- BOWLING
- DRILLS

CONTROLLER TYPE

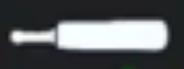
Oculus Touch



CONTROLLER SETTINGS



DEFAULT



FULLBAT



BATHANDLE



CONTROLLER INFO

GAME

BAT & BALL

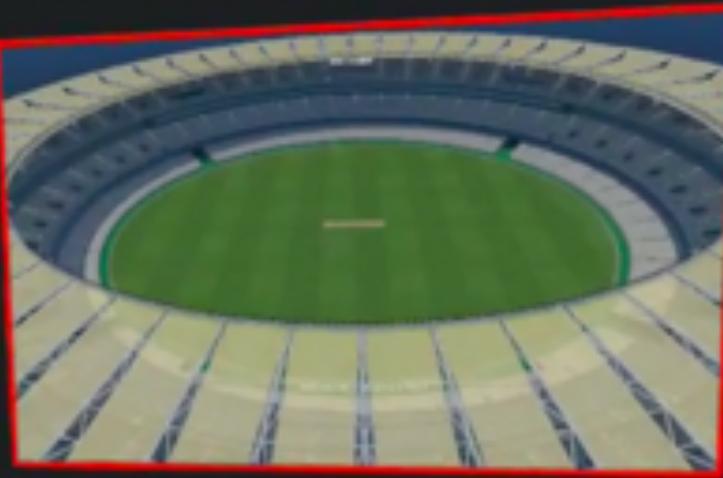
LOCATION

PLAYER KIT

CONTROLLER

BOWLING

DRILLS



Optus



GAME

BAT & BALL

LOCATION

PLAYER KIT

CONTROLLER

BOWLING

DRILLS



Lords Cricket Ground



SCOREBOARD

RUNS

0
Unlimited

WICKETS

0
Unlimited

OVERS

0
Unlimited





← SETTINGS

GAME

BAT & BALL

LOCATION

PLAYER KIT

CONTROLLER

BOWLING

DRILLS

CHOOSE YOUR OPPONENT TEAM

Trent Rockets

Manchester Originals

Northern Superchargers

London Spirit

Oval Invincibles

Southern Brave

Welsh Fire

Birmingham Phoenix

Trent Rockets



Our interactive ‘Watch-and-Play’ experience brings fans into the game either as it takes place or after the match has finished.

- Engages the younger generation who are moving away from the TV viewing experience and towards more interactive media formats.
- Connect with new audiences by immersing them in competitive sport as it happens.

This could either be used as in-stadium entertainment experiences, at fan parks, or at home through someone’s personal VR headset:

- In-stadium and fan park experiences could be enhanced through features enabling multiple players to play together – so more complex aspects of the game, such as running between the wickets, could be incorporated
 - or through the use of haptic technology within a 3D printed cricket bat
- Personal VR system would use either just the motion controller or a motion controller integrated into a 3D printed cricket bat – both options are supported already



Thank you



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