2021年全大運創新科技應用之賽事案例

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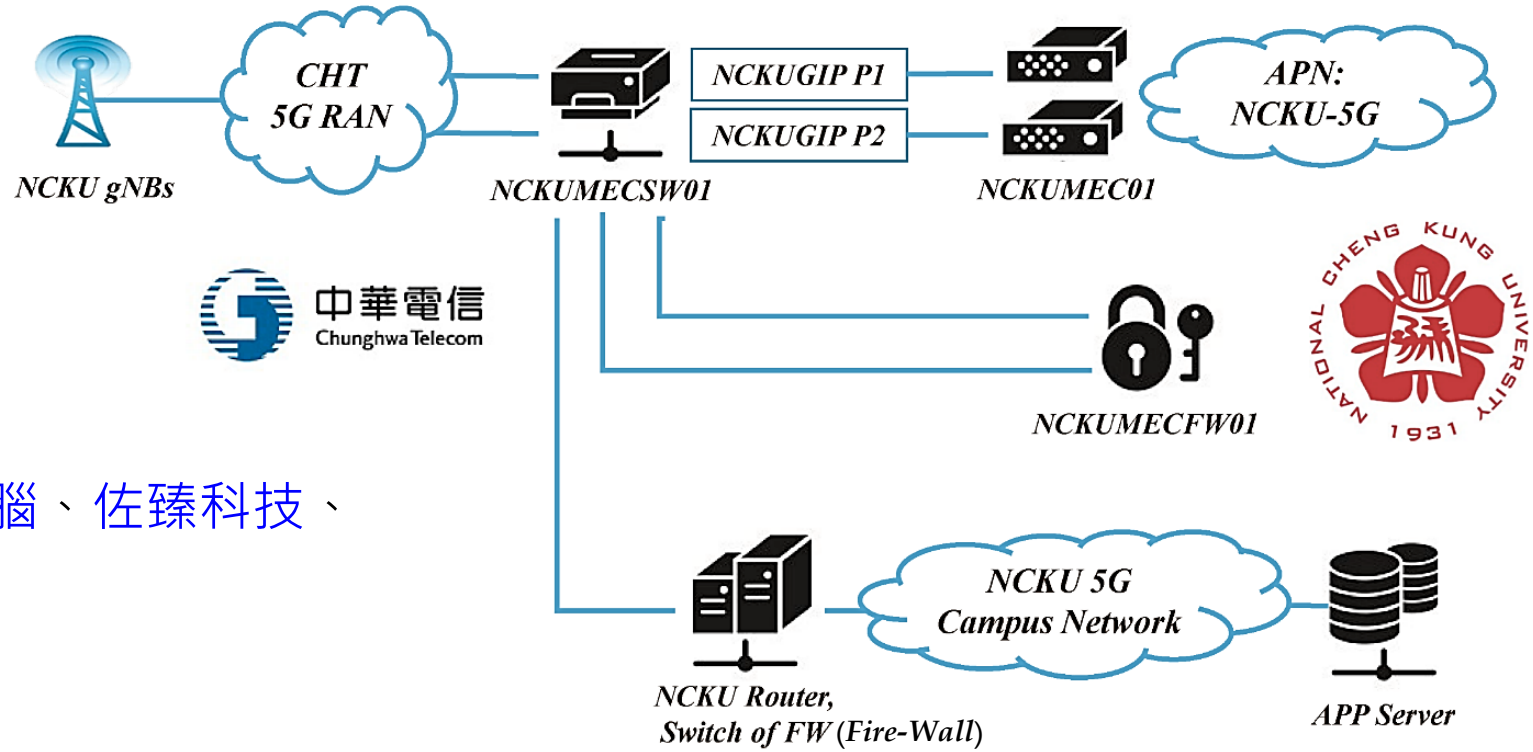
Miin Wu School of Computing

ITRI
Industrial Technology Research Institute

NCKU 5G Smart Stadium (體育館、游泳池)

- 2021年3月建置完成
- **中華電信**與**成大**合作
- **工研院**協助系統整合

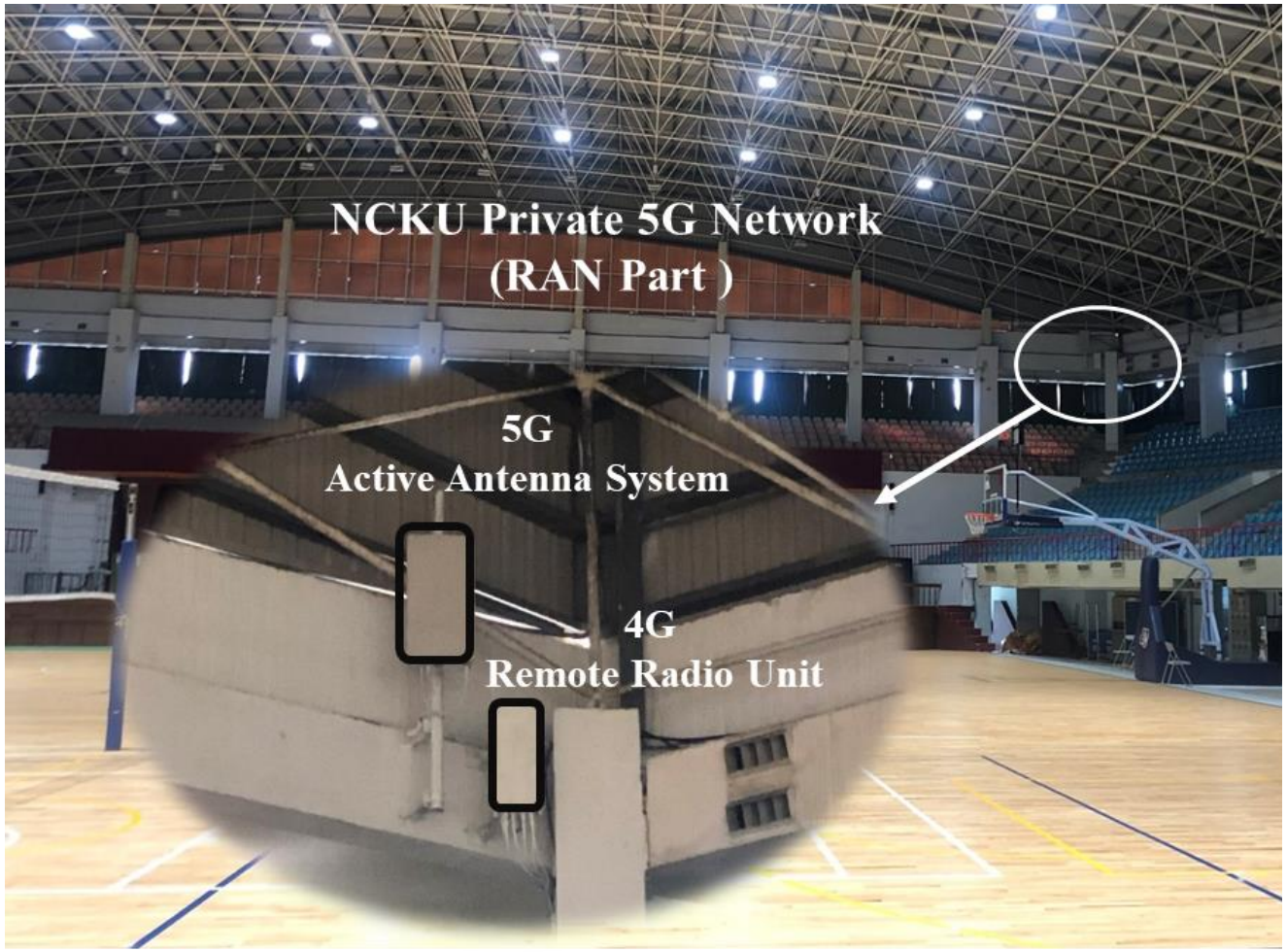


- 光陣三維、飛競鬥士、仁寶電腦、佐臻科技、中華系統整合
  - 完全台灣團隊使用台灣技術
- 高難度的系統整合(TEBS)
  - 5G專網
  - AI桌球落點分析及桌羽球軌跡追蹤
  - 全視野多視角高畫質的影像融合與3D隨意回放
  - 社群網路AR即時賽事直播
  - 邊緣運算即時推播
  - AI運動數據分析

- A set of *next generation NodeB* (gNB) base stations
  - Connected to the MEC servers and routers via the CHT *Radio Access Network* (RAN) and on-campus backhaul fibers

RAN of the NCKU Private 5G Network

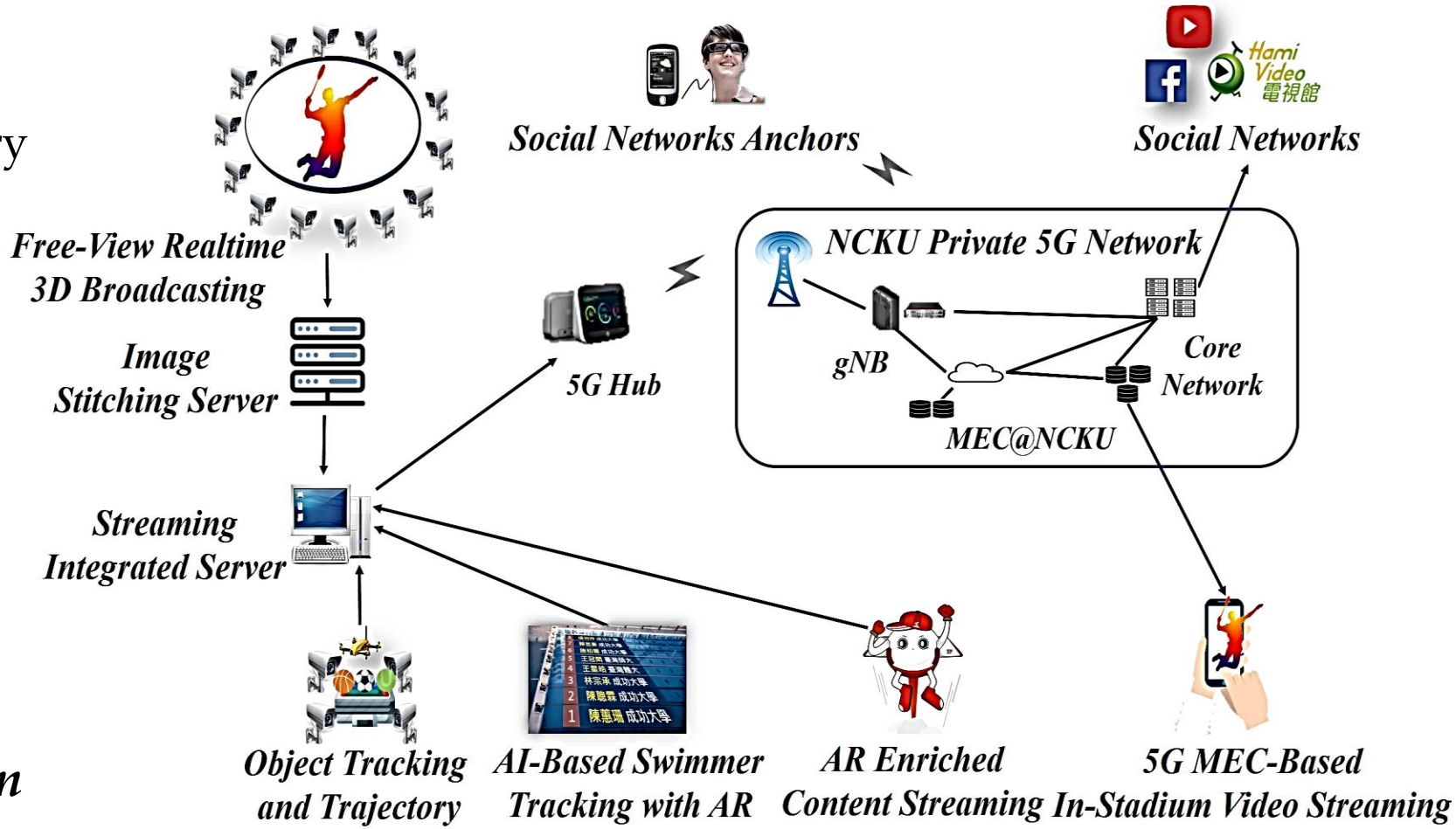
- RAN: 5G Active Antenna System & 4G Remote Radio Unit
- Compliant with the 3GPP 5G NR Release-15 Non-Stand-Alone (NSA) specifications



- Frequency: 3.5GHz (N78), 1.8GHz, 2.6GHz
- Throughput: downlink > 1.35Gbps; uplink > 153Mbps
- Latency: E2E < 30ms

Technology-Enhanced Broadcasting System (TEBS)

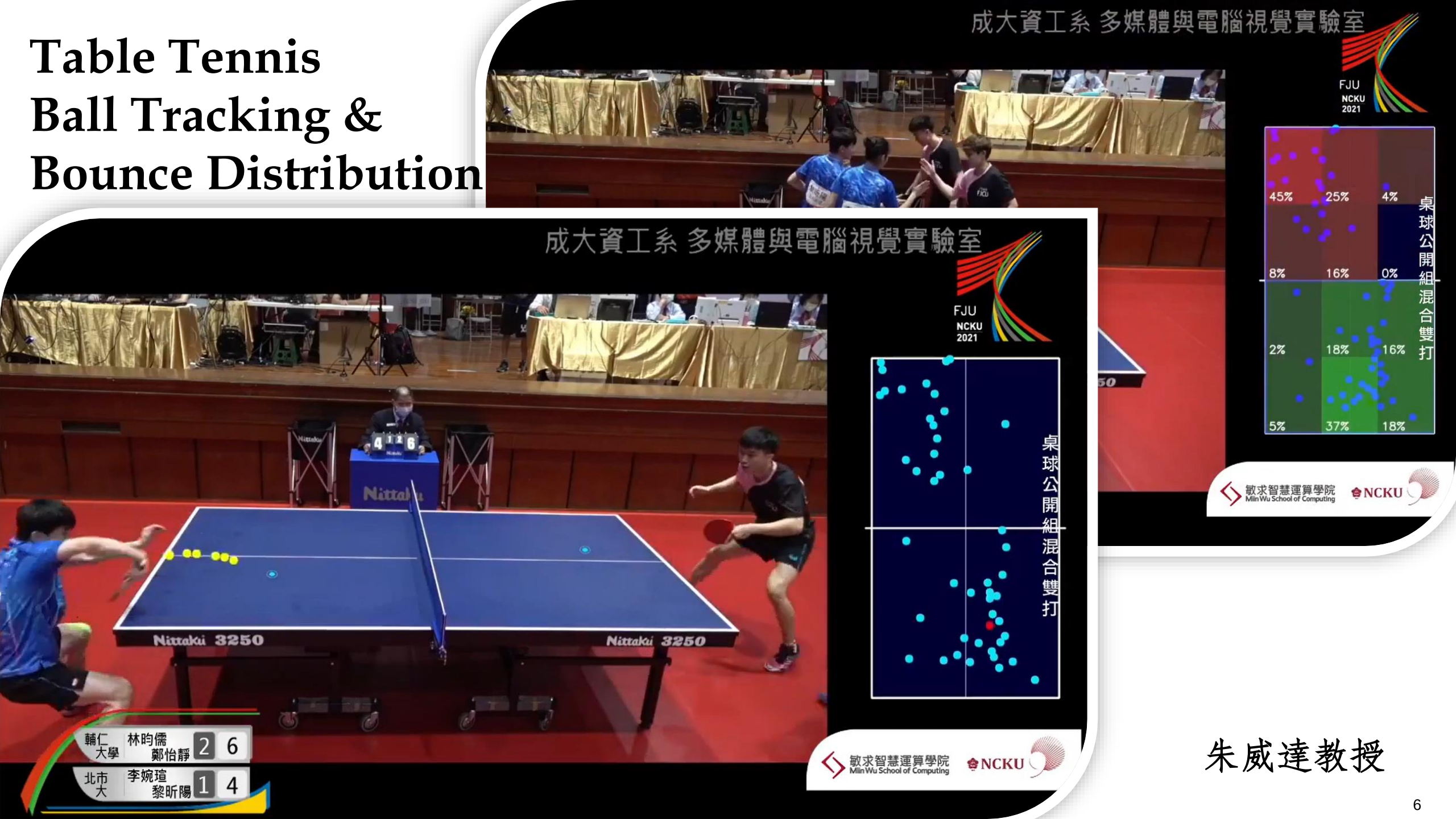
- *Object Tracking and Trajectory*
  - Table tennis ball trajectory and bounce distribution
  - Badminton shuttlecock tracking and trajectory
- *AI-Based Swimmer Tracking with AR*
- *AR Enriched Content Streaming*
- *Free-View Realtime 3D Broadcasting*
- *5G MEC-Based In-Stadium Video Streaming*



羽球技術展示舉例


TAI T.Y. 4
OHORI 0
YONEX
HSBC
HSBC
YONEX
TOTAL QUARTZ
188BET
YONEX
SEARCH TO UNLOCK
#BADMINTONBENEFITS
YONEX
HSBC
BIRMINGHAM
YONEX

Table Tennis Ball Tracking & Bounce Distribution



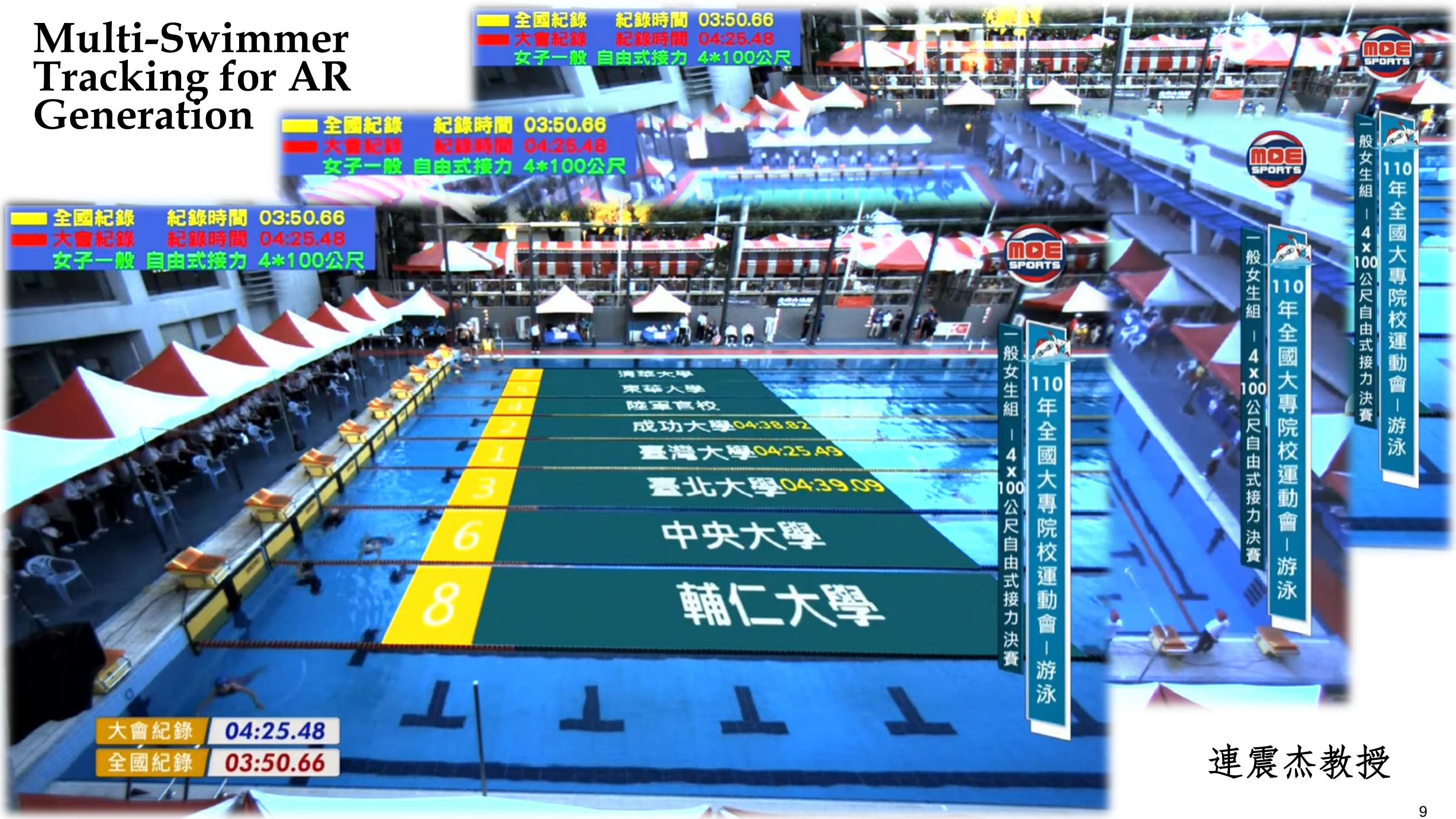
朱威達教授

乒乓球技術展示舉例


Replay
LightMatrix
NCKU 2021
桌球公開組混合雙打
輔仁大學 林昀儒 鄭怡靜 2 0
清華大學 許柏宣 林湘庭 0 0
敏求智慧運算學院 Min Wu School of Computing
NCKU

邊緣運算AR技術展示舉例

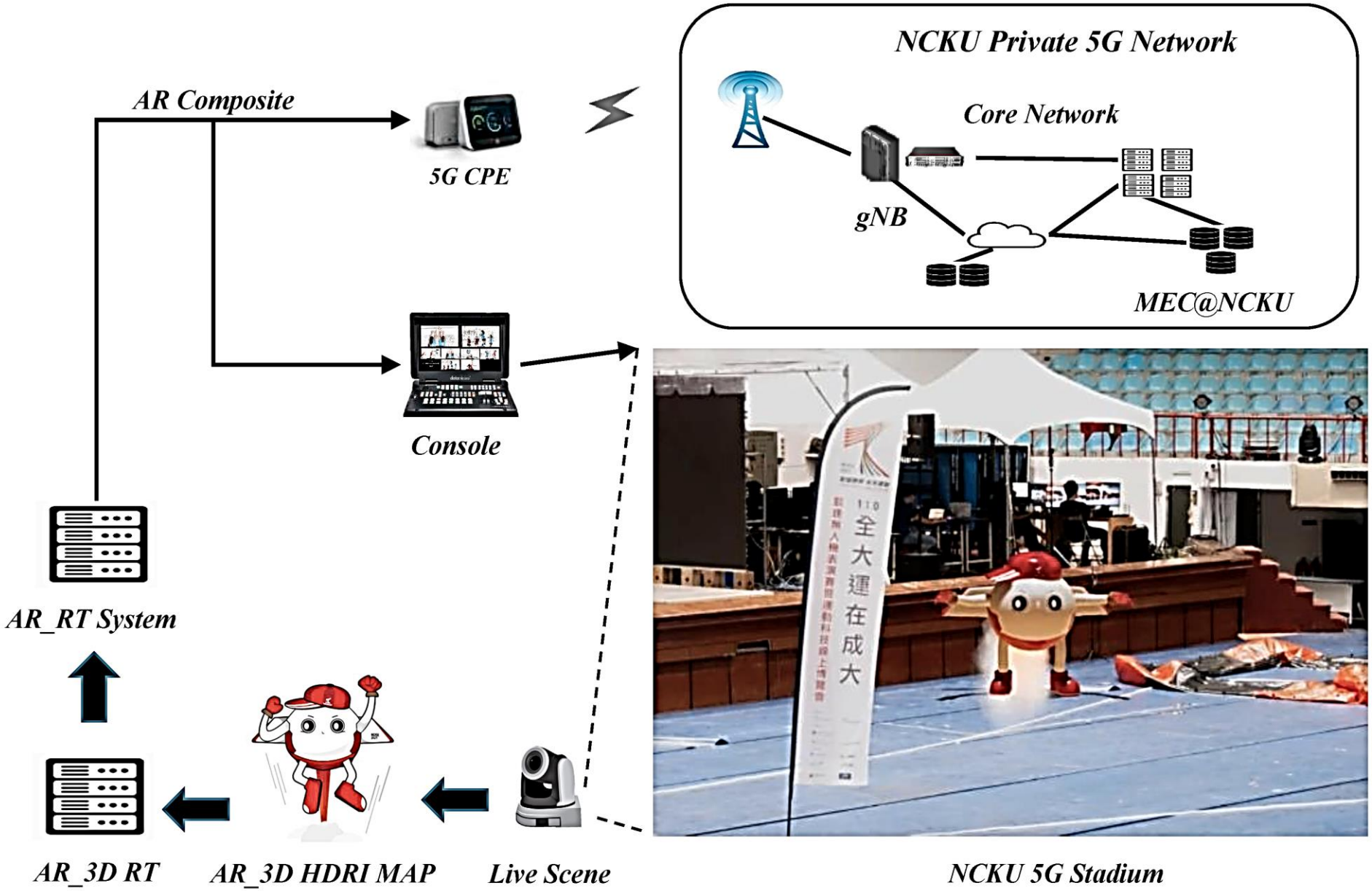
Multi-Swimmer Tracking for AR Generation



連震杰教授

游泳技術展示舉例

AR-Enriched Content Platform in 5G Stadium



競速無人機技術展示舉例

5G AR技術展示舉例


國立成功大學
「科技臺灣 邁向未來運動」啟動典禮
智慧熱情
未來運動
吳誠文 執行長
110全國大專校院運動會
National Intercollegiate Athletic Games 2021

Acknowledgment

Enhancing Fan Engagement in a 5G Stadium With AI-Based Technologies and Live Streaming

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And: 敏求智慧運算學院、中華電信、工研院、光陣三維、飛競鬥士、仁寶電腦、佐臻科技、中華系統整合

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結語

台灣科技產業基礎

ICT

運動科技
創新系統

高粘度觀賽
體驗與互動

運動 科技
X
新創

生態正循環

粉絲經營、電子商務