#1 Collect data

#2 Analyse them

SPORTS ANALYTICS

5BN/year market
#1 Collect data
#2 Analyse them
#3 Automatically

SPORTS ANALYTICS

5BN/year market
MAIN SPORT-TECH CLUSTERS

- Athletic Performance
- Smart Arena
- Immersive Media
- Fan Experience
- Club Management
- E-Sports
MAIN SPORT-TECH CLUSTERS

- Athletic Performance
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- Fan Experience
- Club Management
- E-Sports
PlayeRank data-driven performance evaluation
Injury Forecasting

**Done:** AI-based Injury Forecaster (IF) for soccer players

**Ongoing:** Explainable AI tool to help staff interpret predictions the IF

**Future work:** Generator of injury-free training plans, based on Adversarial Learning and Generative Adversarial Networks (GANs)

**Collaborations**

- **FC Barcelona**
  - Spain
- **Ferencvárosi TC**
  - Hungary
- **Philadelphia 76ers**
  - USA
- **Univ of Connecticut**
  - USA
Tactical Analysis

Done: AI-based evaluators for teams and players

Ongoing: Explainable AI tools for forecasting career evolution of players and performance of teams

Future work:
- Match simulators based on GANs
- Optimal team formation
- Automatic commentator
L'intelligenza artificiale aiuta i calciatori evitare gli infortuni

Un algoritmo calcolato con una precisione del 50% il rischio per il singolo calciatore di far male nell'allenamento successivo. Le stime virtuali hanno una precisione solo del 1%. Alla ricerca partecipano Università di Pisa, Cor e Università di Milano, nonché alcuni calciatori.

Stop agli infortuni e mercato al top
Con due algoritmi cambia il futuro

Cor e Università di Pisa hanno creato due sistemi di intelligenza artificiale.

Infortuni previsti con precisione: arriva la manutenzione predittiva dei calciatori

Football teams secretly using AI to predict injuries before they occur

Los especialistas afirman que las soluciones tecnológicas para evitar daños en los altos profesionales están todavía en fase embrionaria.
Live Stroke analysis & Heatmap
Live AI data interpretation
Social network

Video analysis
Problem 1: position tracking

Video processing, with object detection + projection on the court, using keypoints to calibrate

Problem 2: tracking arm's movements with smartwatch

Classification with supervised learning of the gesture (data from accelerometer and gyroscope)

Problem 3: coaching

Profile of the player and adaptive expert system for real-time strategic support
Ongoing & Future work:

• Effective position tracking for double
• Automatic calibration
• Pose estimation and ML to track arm’s movements through video
• Energy issues
• Tackle other sports
Colpi nello smartwatch l'app prototipo è italiana
Dall'Università di Pisa un nuovo passo avanti nel tennis connesso

Every tennis player’s pet peeve is underperforming during a game, for no apparent reason, has this ever happened to you?

Tennis, sarà uno smartwatch ad allenarti per il colpo perfetto

REGISTRA
References:

- **PlayeRank: data-driven performance evaluation and player ranking in soccer via a machine learning approach.** L. Pappalardo et al. ACM TIST, 2019
- **Explainable Injury Forecasting in Soccer via Multivariate Time Series and Convolutional Neural Networks.** L. Pappalardo et al. BARÇA Sports Analytics Summit, 2019
- **Who is going to get hurt? Predicting injuries in professional soccer.** A. Rossi et al. In Proceedings of MLSA'17