
AWS
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Improving NFL player safety with machine learning on AWS

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AWS Sports solution areas



Fan engagement



Smart Venues



IT transformation



Next-gen broadcast

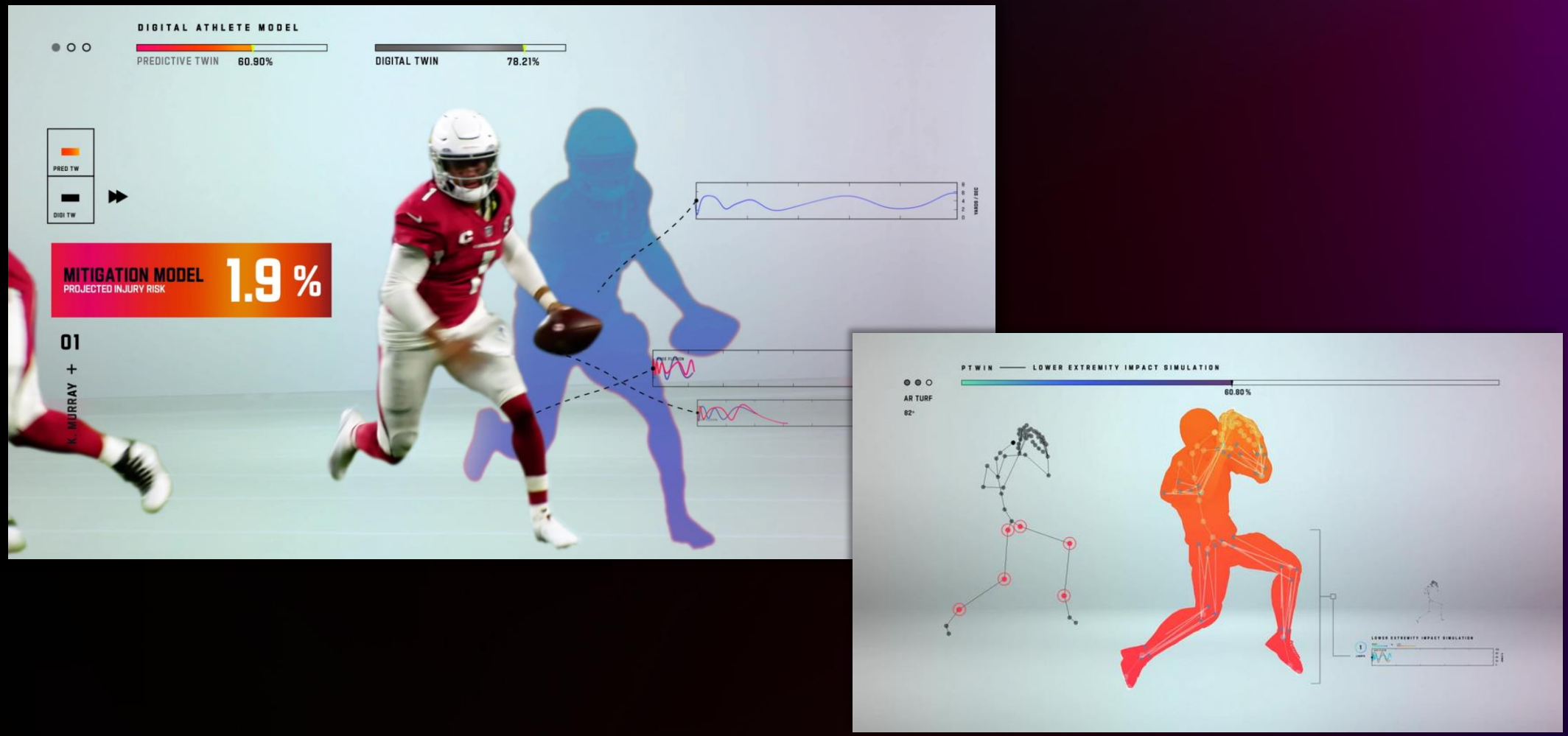


Performance analytics

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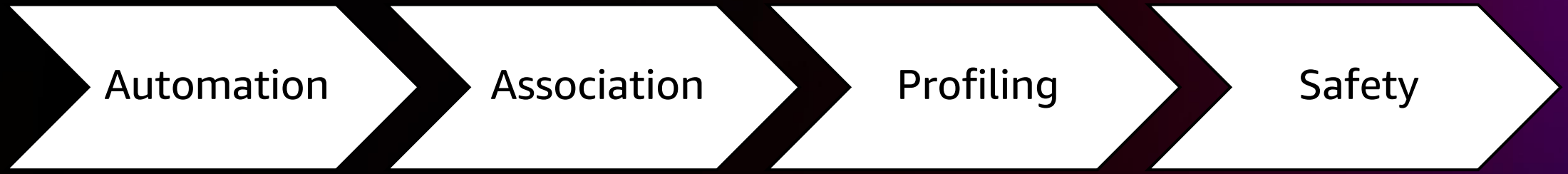
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NFL: Digital athlete initiative



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Helmet impact detection use cases



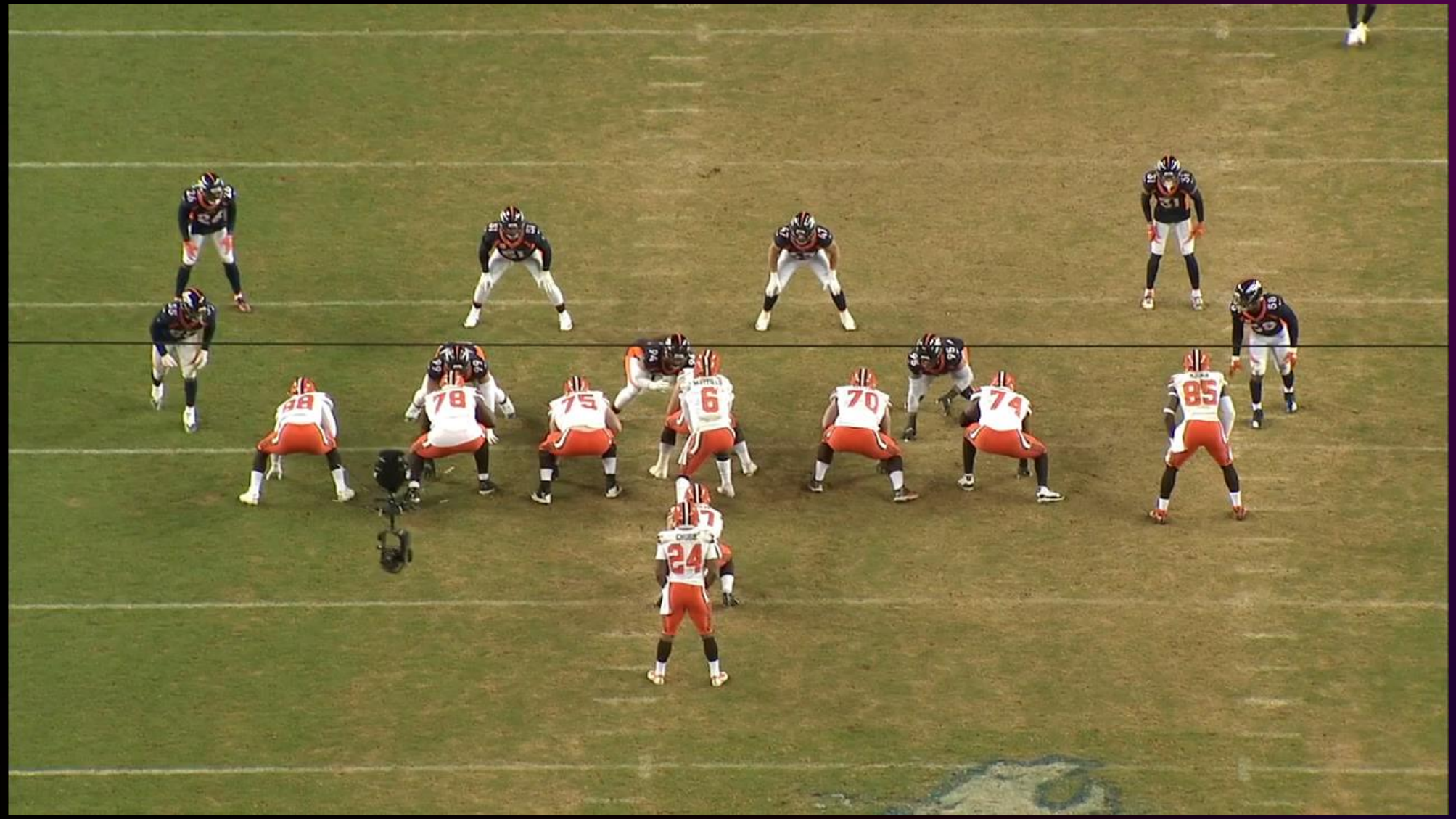
- Automate impact identification
- Player impact association
- Multi-season player profiling
- Improve game and player safety

Long-term goal: Build the leading sports injury surveillance and mitigation program

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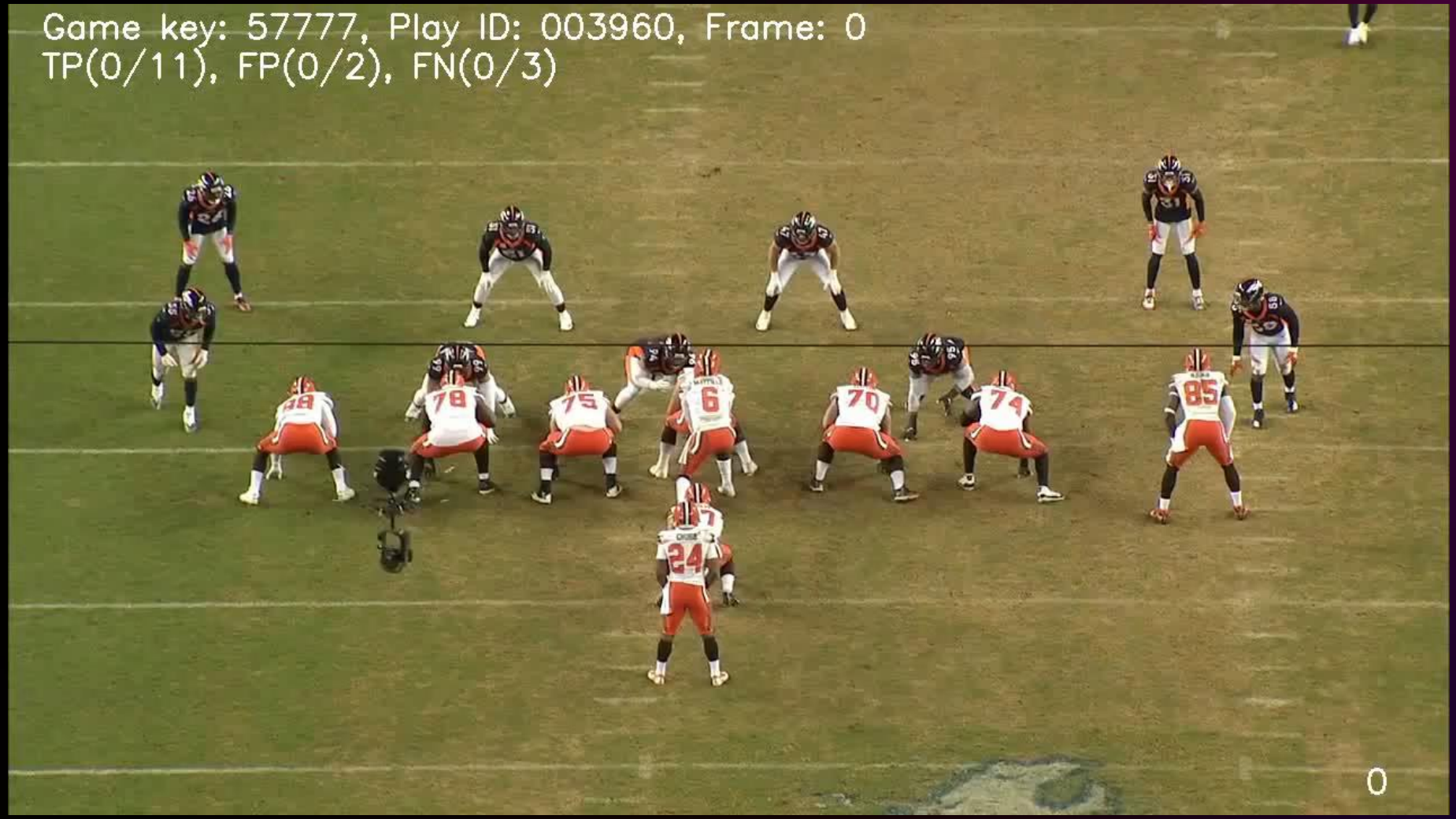
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How many helmet impacts can you identify?



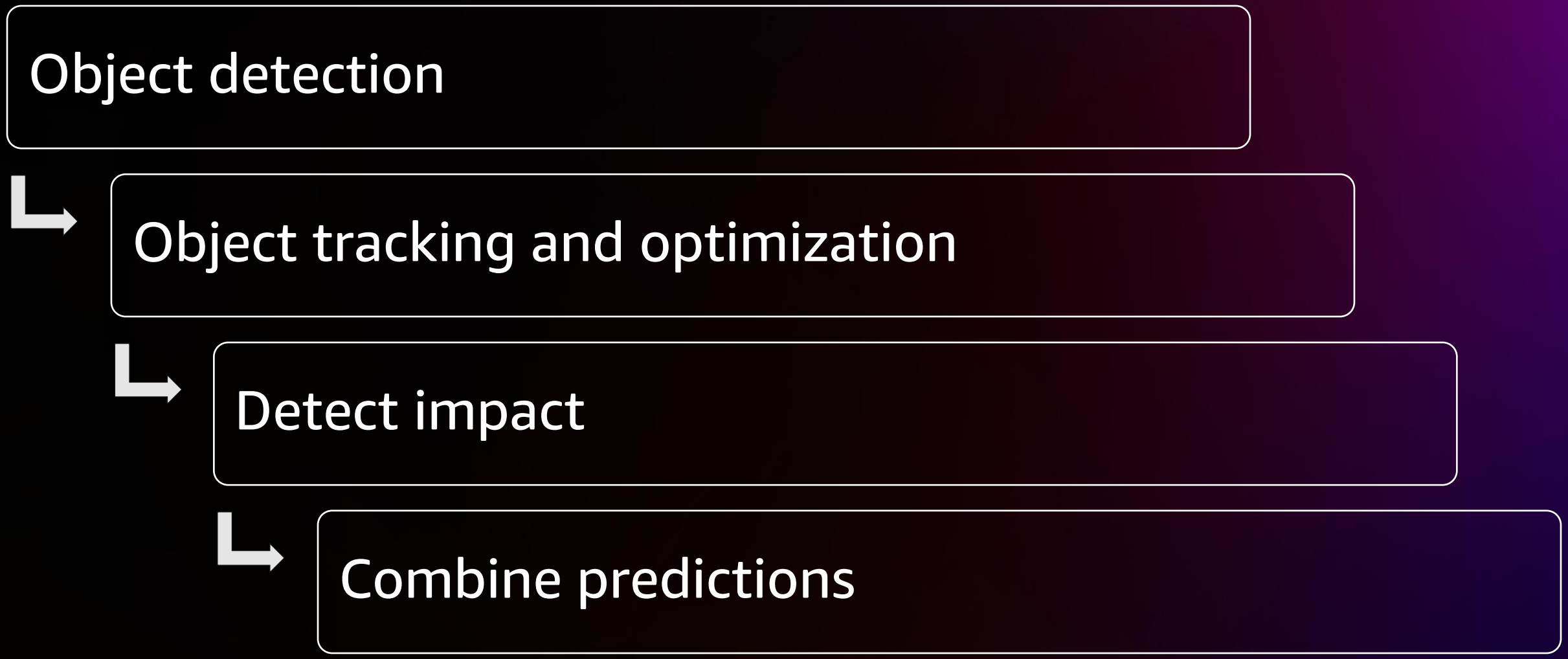
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How many helmet impacts does NFL's solution identify?



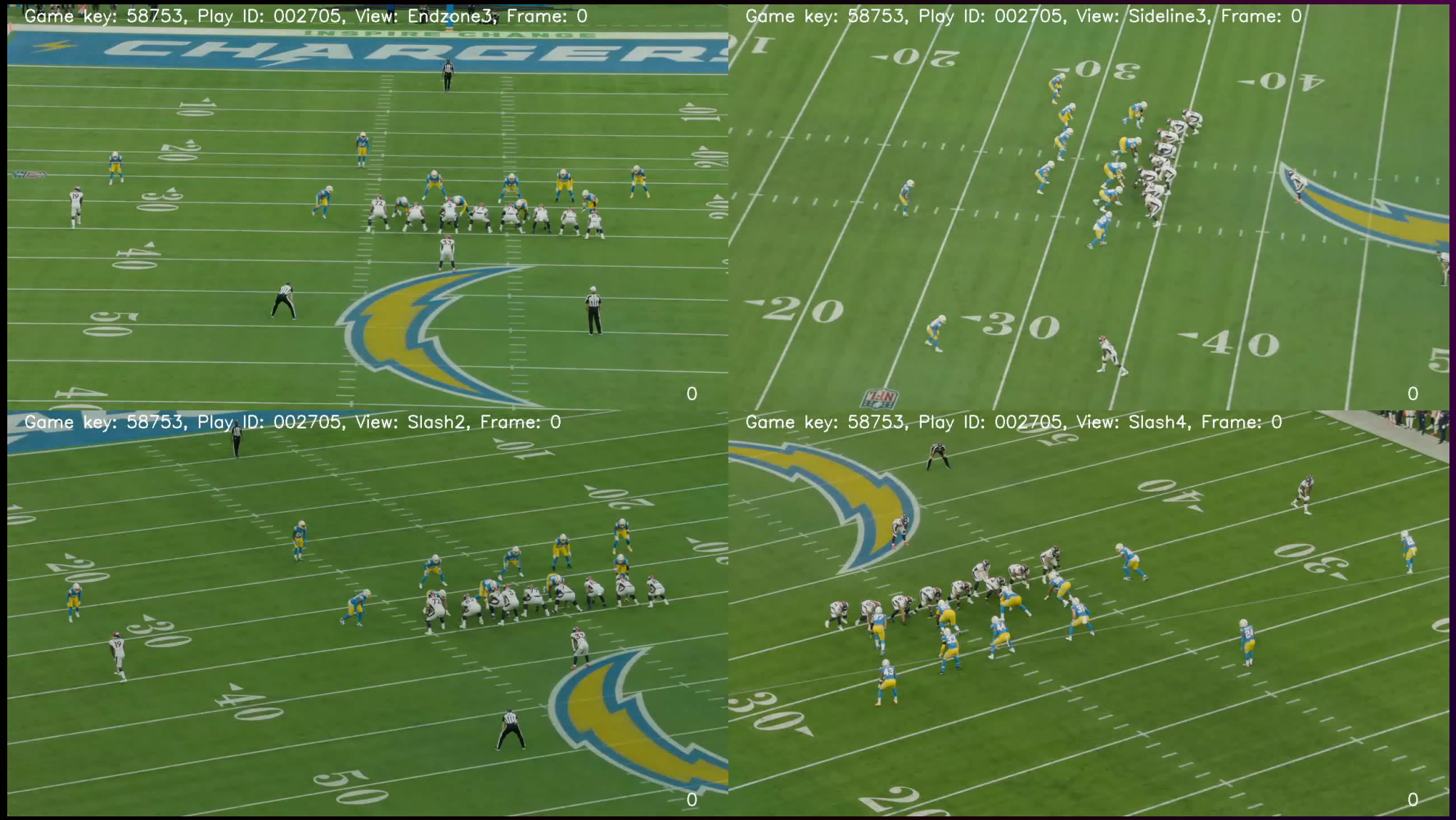
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Complex computer vision pipeline



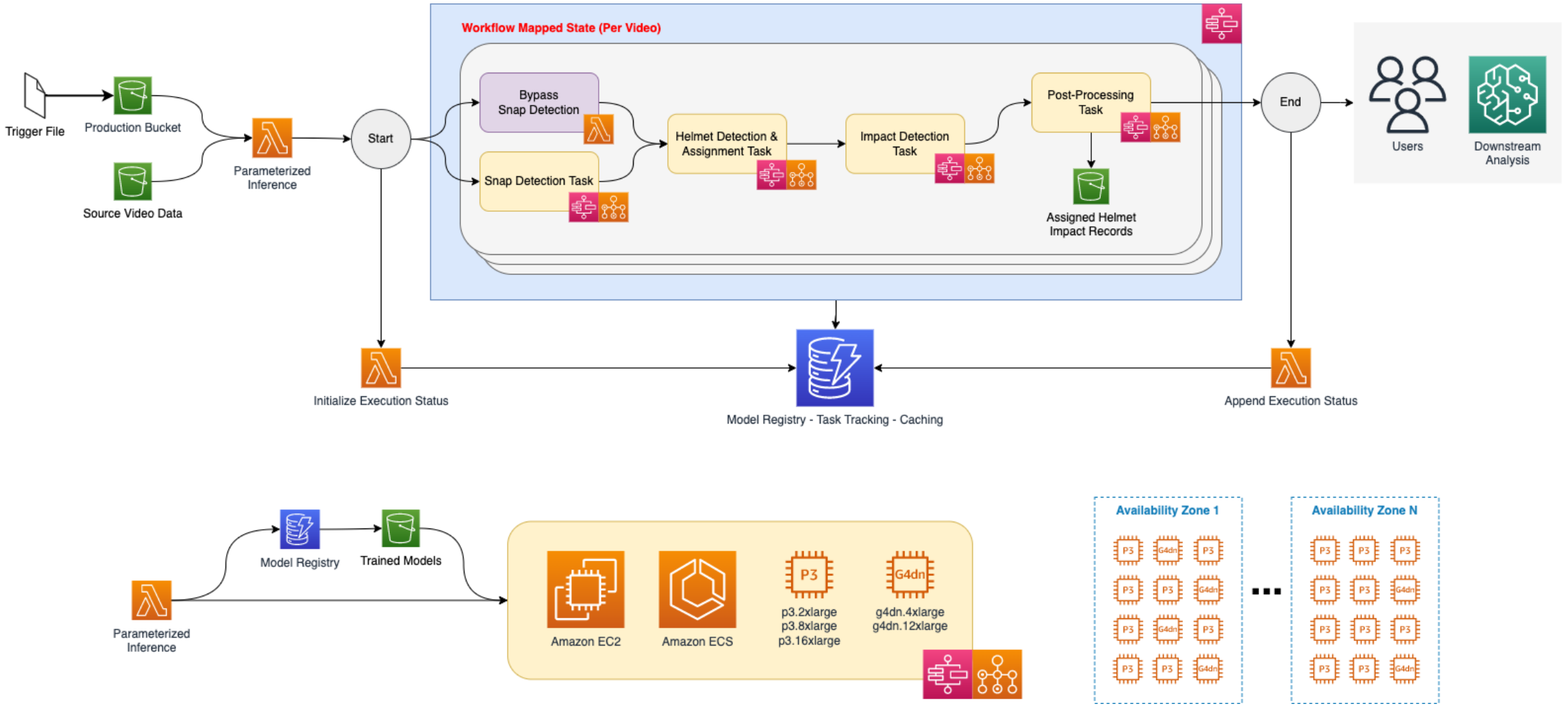
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Highly contextual detection criteria



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Scaled workflow on AWS



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Running at Scale: 6 NFL Seasons

>216k hours of GPU computation condensed to **<6 weeks observed processing time** using various AWS services

Concurrent computation across >500 GPUs

~642k hours of video

>1.7M inference jobs in total

>384M video frames

>5.1B helmets processed

Infrastructure as Code + CI/CD using native AWS services

Highly modular design to accelerate development and scale operation

MLOps supporting mechanisms such as model registry, job tracking, and caching automation

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Player health and safety – pose estimation

- Historical challenge: Manual injury reconstructions are qualitative and time-consuming
- Target solution: Automated injury reconstructions using quantitative data

"Knee Hyperextension" → "Knee Hyperextended 10°"

- Will lead to proactive injury prevention before they occur

Changes to playing surfaces

Individual risk profile

Improved coaching techniques



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Additional resources

AWS Sports E-book

AWS Sports

NFL Explained: Innovation in Player Health & Safety

NFL Player Health and Safety

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Thank you!

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