



Soccer Player Tracking

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Project description and goals

- Problem to solve: Getting data on position of all players in a game as they move around in a game of soccer.
- Minimum goal:
 - Identify general areas of players in a still image
- Maximum goal:
 - Identify accurate player portraits throughout an entire game
 - Distinction between teams
 - Keep track of which player is which
 - Able to work on both overhead view and the “broadcast” side view



Approach

- General plan
 - **Data Collection**: Compile a diverse dataset of soccer game images and videos, annotated with player positions, team distinctions.
 - **Model Training**: Custom neural networks model for player area identification, accurate player tracking and team classification.
 - **Player Tracking**: Implement tracking algorithms to maintain player identities across frames, incorporating pose estimation for enhanced accuracy in different views.
 - **Camera Calibration**: Calibrate for different camera views to accurately map player positions from pixel coordinates to real-world field coordinates, ensuring compatibility with both overhead and side views.
 - **Iterative Improvement**: Continuously evaluate and fine-tune the system with new data, refining the model to improve accuracy in player detection, team distinction, and tracking across various game scenarios.



Member roles & group interaction

- Thomas will focus on data collection/preprocessing and implementing player tracking methods.
- Colin will focus on data collection/preprocessing and implementing segmentation methods.
- Olivia will focus on implementing player tracking and segmentation methods
- Try to achieve a fairly even split between group members, all will work on report and presentations.
- Stay in good communication through a group chat and through emails when necessary
- Code collaboration through GitHub repository

Data

<https://www.kaggle.com/datasets/ihelon/football-player-segmentation>

or

<https://www.kaggle.com/datasets/atomscott/soccertrack>

Images (or videos) and annotations to train a segmentation model. Could potentially test on images (or videos) we found online as well.





Computational Resources

- High-Performance GPUs: Essential for training deep learning models, especially for video processing and real-time analysis tasks.
- Could use Google Collab for beginning stages and simple image segmentation, but may need to get access to Case's HPC resources to do video processing



Evaluation

- The first subjective measure we will use is to see if we can accurately point out where the players distinctly are.
- In order to more formally test our model, we can employ a combination of quantitative metrics and validation techniques tailored to the specific challenges of tracking and identifying players in soccer games.
 - Measure the precision and recall of player detection relative to existing annotations. This helps in understanding how well the model identifies players and minimizes false positives.



Thank you!

Questions?