Analysing football plots with LLMs

Introducing the problem

In modern football, the game is recorded not only by cameras but also through data, such as event, tracking, and hybrid datasets. These provide insights into actions, formations, and strategies. Using this data, we can create pitch visualizations of shots, goals, passes, assists, and more. The challenge is making these plots meaningful to a random observer. That's why I decided, with Gemini AI's help, to add context to these visualizations, explaining the significance behind simple actions like shots, goals, and assists.

Building the bot

I'm using the Hudl StatsBomb free data for this project. Since there are differences between datasets across competitions, the application won't work for all datasets. In Streamlit, I created a simple app where you can select the competition, season, home team, and away team, then choose between two visualizations. The first visualization shows Passes and Assists into the Box, highlighting all successful passes and the ones that resulted in assists for both teams. The second visualization focuses on Shots and Goals, highlighting all shots and which ones resulted in goals for both teams. These visualizations are simple but represent basic football elements. To add more context, I'm using Gemini AI to explain the plots within the broader context of the game. The AI provides additional insights and information not found in the plots itself. I created a helpers.py file, where I inserted a special prompt for both plots. This prompt includes the data the AI needs to interpret and basic instructions on how to approach the analysis like a football analyst, keeping it simple and educational. There's still a lot of work to be done, but as a demo it works alright.

Setup

To set up the bot, follow these steps:

1. **Place the Files**: Put all necessary files in one folder.
   config.toml and secrets.toml put in a subfolder with the name .streamlit
   Match_Analysis.py put in a subfolder with the name pages
   helpers.py put in a subfolder with the name utils
2. **Add Gemini API Key**: Insert your Gemini API key into the secrets.toml file located in the .streamlit folder. You can get the key for free from here.
3. **Create Virtual Environment**: conda create --name streamlit-env
4. **Activate the Environment**: conda activate streamlit-env
5. **Install Dependencies**: pip install -r requirements.txt
6. **Run the App**: streamlit run Home.py

If everything is done properly the application should start in your browser. If you find any issues or you need help you can contact me (denisdervishi@gmail.com). Instructions about using the app are pretty simple and are contained in the app itself. Enjoy!