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Transfer Learning to Overcome Domain Shift in Football Analytics and Beyond

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Domain shift occurs when the distributions of features, underlying behaviours or operational conditions differ between source (training) and target (test) domains, causing models to struggle when applied to data from a different context than the one used for training. To mitigate this, several transfer learning approaches have been proposed to reuse and adapt knowledge acquired in the source domain, thereby enhancing model performance in the target domain.
In this work we apply transfer learning to the domain of football analytics, where models developed for one league, season or team often degrade when transferred to another due to differences in playing style, data distribution, formation dynamics or sensor setups. By leveraging publicly available event and tracking data in football, we explore how transfer learning techniques can reduce this degradation. Compared to training a model from scratch on the target domain, our approach shows improved robustness and generalisation under domain shift. Using standard machine learning models and targeted transfer learning steps, we present a workflow that is effective in sport and broadly applicable to other scientific fields facing similar domain-shift challenges.

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