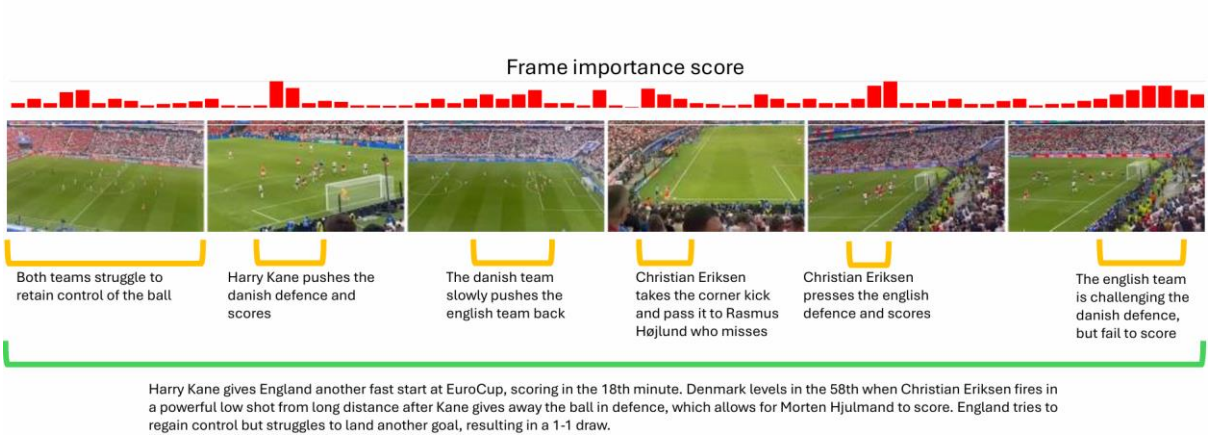
Context dependent video summarization



In contexts where you generate vast amounts of video data daily, manually inspecting every data stream is incredibly costly. This is further exacerbated by these data streams typically containing periods of redundant or irrelevant information.

Naively processing each frame of these video streams, thus becoming incredibly inefficient and very prohibitive. Video summarization is a key component for managing, sorting and searching the data; by identifying key events in the data stream and condensing the information into a more digestible size, human inspectors can much more efficiently assess the context and desired response (if any).

In long duration data streams, key events tend to be grouped together, thus naively indicating importance of elements based on changes is not sufficient for accurate understanding and summarization of long-term data streams. Furthermore, the context of the scene and the expertise of the human inspector can greatly change which events are important.

Examples of this could be:

- **In-home elder care through assisted living technologies:**
  Elderly citizens typically have a routine visit from a healthcare professional at regular intervals where they can get help and ask for assistance.
  However, for reasons of pride or degradation of memory, they sometimes omit or forget valuable information that could help improve the quality of their care or prevent future accidents. Here an in-home video summarization solution could help alert the healthcare professional and help prevent accidents.
- **Summarization of sport:**
  News media tend to cover important live-matches with moment-to-moment commentary or written post-match summarizations which indicate the general key events of the match. However, if a coach or athlete were to research their own performance on the performance of an opponent, both general and moment to moment summarization could be vital. Particularly for sports where a matchup has varied pace and structure, the use of context driven video summarization could be vital

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These problems raise many interesting questions, such as;

- How can video sequences be efficiently sorted and summarized?
- How can the summarization be formatted depending on the context?
- How do you represent the importance of an event?
- How do you disseminate the summarization to the end-user are all interesting problems for video summarization?
- How can you alter the importance of key elements to summarize based on the user providing the query

The primary focus will be to take video/images as an input and extract the information from the visual domain. This can be done by leveraging computer-vision to identify important/key events that are necessary for accurate summarization. Typical solutions leverage Image-processing or Deep-Learning methods, to identify salient components of the video sequence and then subsequently leverage those components to summarize local or global events. The structure of your solution will depend on the data and context you decide to work on.

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