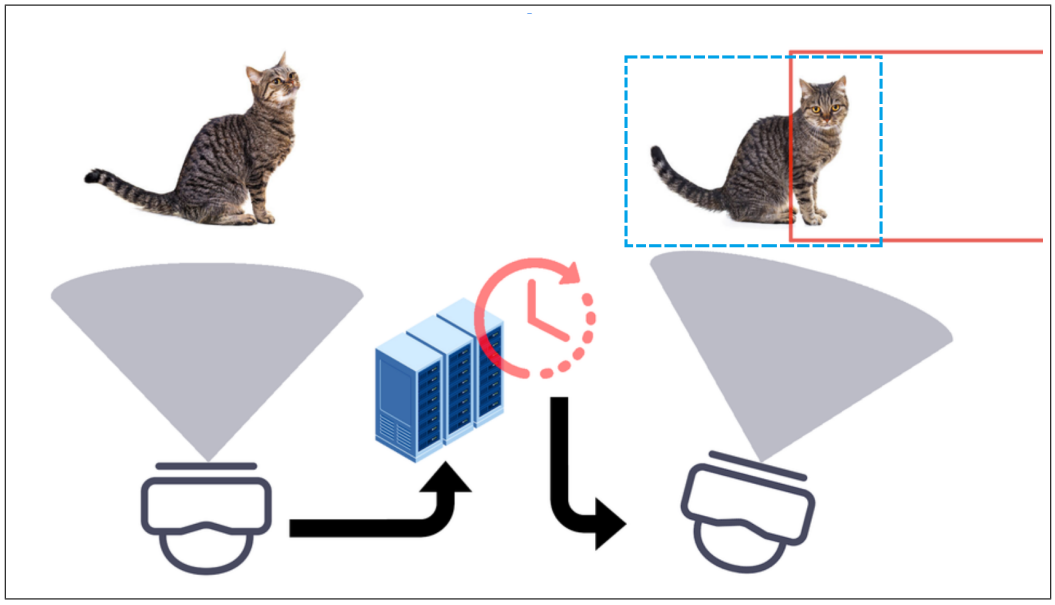
Keeping Augmented Reality in Sync: Reducing Latency with Pose Prediction



A popular science summary of the master thesis by Yas Yazdanian and Bálint Péter

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Imagine wearing smart glasses and spotting a cute cat. Your glasses recognize the cat and draw a box around it, but there's a catch: your glasses don't handle the heavy computation themselves, instead they send images to another computer far away, called a remote server, that performs these tasks.

However, there's a problem: by the time your glasses get the data back from the server, you might have moved your head, and now the box is no longer around the cat.

This delay, known as latency, often disrupts the seamless integration of virtual content with the real world.

Our thesis addresses the issue of latency in augmented reality (AR) applications, which is the technology behind smart glasses, integrating virtual objects into the real world. We worked on reducing perceived latency by keeping virtual elements, like the box around a cat, in sync with real-world movements. By tracking head movement, we discovered that we could predict where virtual content will be by the time the data gets back from the server. This significantly reduces perceived latency, ensuring that virtual elements remain aligned with the real world.

The main problem we tackled is the disruptive delay caused by offloading tasks to remote servers. This delay can break the illusion of augmented reality and cause discomfort. By reducing the perceived latency, we make AR applications more enjoyable and effective.

Our results were promising. By tracking the user's head movements, our algorithm kept virtual elements aligned with the real world, even with the inherent delays of offloading. This improvement greatly enhances the user experience.

Our work contributes to an area that has broad applications, from gaming to professional training, where real-time interaction is crucial. By reducing latency, we support the development of lighter and more comfortable AR devices, potentially leading to wider adoption and new opportunities in various fields.

In conclusion, we developed a method to reduce latency in AR applications by using head movements to keep virtual elements aligned with the real world. This approach improves the overall user experience and contributes to more efficient and user-friendly AR devices.