# Virtual Companion Samson

## 1 - Goal

Samson is a concept project I introduced to my innovation team while working at Memorial Sloan Kettering, a large oncology center in New York City. As if cancer isn't already enough of a burden, imagine a child with cancer. In pain, fear, and confusion, unable to express themselves to convey what is wrong and what hurts, and alone. Sometimes children might need to be isolated after a bone marrow transplant.

## 2 - Meet Samson

So, meet Samson the cat, a virtual companion that can accompany a child during their journey at the hospital and even after the leave. But unlike an app or a toy, my team and I thought of Samson as an embedded AI, a ghost in the shell brought to life by any available technology. This makes Samson largely device and technology-independent. A phone, a screen, a toy, a creature living in a metaverse, while also capable of taking on a physical form through any IoT technology available. This creates a sense of presence and continuity.

I conceived and designed certain aspects of Samson to offer physical, behavioral, and emotional support, a jack of many trades - providing distraction, guidance, and motivation, providing a voice, and being a guardian to the child. Although a concept, what follows are some actual solutions, I built with the help of my team.

Again, by being technology-independent, interactions between the child and the virtual companion gives the companion a presence, continuity, but also agency. This facilitates bonding and inspires play and meaningful interactions between Samson and our younger patients. But it also helped me rethink how to interact with a technology like it.

## 3 - Traditional Screens

Starting from the more traditional, Samson be rendered to a screen, and voice and gesture commands can be used to interact.

## 4 - Wall based projections

Thinking ever bigger, we can imagine Samson occupying the 2D world of hospital corridors, walls, doors, ceilings, and floors. Well-designed systems of projectors and cameras can capture voice and full-body gestures and actions.

## 5 - Metaverse

Further still, we can invite the child to enter a virtual world. Within this world, voice, gestures, and VR-specific handheld controllers can achieve interaction with Samson. To give you an idea of such a VR experience, here is a short demo of myself in Samson's virtual home world. The Oculus Quest no longer strictly requires users to wear the controllers. Instead, cameras can capture my hands in real-time and translate their movement into gestures on screen. Samson's AI understands a core number of interactions and can play several gesture-based games, such as peek-a-boo or Simon says. Here, I exchange some simple gestures and community my feelings, which evokes an appropriate response from Samson.

## 6 - Physical Rehabilitation

When combined with motion capture, one practical application of this gesture-based interaction is an interactive physical rehabilitation scenario. Samson can provide positive feedback by joining her in exercise, making the physical rehabilitation exercises less daunting, tedious, and fun.

## 7 - Device

Finally, Samson can also be a physical device taken home by the child to monitor their behavioral health as they recover and move forward. I built a prototype, combining IoT hardware and LEGO. Such a device can be situated to observe the child play, study, interact and sleep. Although perhaps somewhat invasive, my conversations with the neuropsychological staff at Memorial Sloan Kettering did reveal a need for such a tool. Children having gone through the process of cancer treatment often show a host of neuropsychological setbacks compared to their healthy peers. Depending on the child's age, these can amplify and create significant behavioral and learning problems down the road. A monitoring system was seen as most welcome, especially if it produced metrics around the child's focus, mood, sleep patterns, and interactions with siblings and parents.

## 8 - Technologies Used