Crunchy- a 'pop'ular 'corn'panion to making your movie experience 'butter' together

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ABSTRACT

What do we want the most of in this COVID-19 social isolation period? - Companionship, entertainment, and popcorn. We present 'Crunchy': a Human-Popcorn Interaction (HPI) based social robotic movie-companion. Crunchy is designed with the intent of minimizing feelings of isolation and loneliness. Crunchy's personality and reactions are imagined to provide popping interactions, making the worst-rated comedies enjoyable or the scariest movies even more intense. We discuss interaction scenarios, initial concepts for Crunchy's design, and future plans to either pursue developing Crunchy or using it to inform development of prospective desktop social robots.

1 INTRODUCTION

Throughout this COVID-19 isolation period, one thing that has made the days more bearable for many of us is television. As the saying goes,'the more the merrier', and concepts like remote movie-watching parties, such as Teleparty [2], have recently emerged to save us from social isolation. Though this method of entertainment may alleviate feelings of loneliness and isolation, there are still interaction issues hindering the social experience; for instance, the chatroom lingers on the side of the display, and the conversing becomes distracting for viewers, potentially decreasing their watching experience. In a similar context, we recently explored solutions for reducing isolation and loneliness during this social distancing period using desktop social robots through an M-Turk-based study [1]. Findings suggested different possibilities of using desktop social robots for companionship and social support. Findings revealed people's desires for companionship with these robots by watching forms of entertainment, such as music, movies, and TV together, like how one would do with friends or family. Based on this and insights gathered from our pilot observations of Human-Popcorn Interaction (HPI), we aimed to design a social robotic movie-companion to provide fun, entertainment, and socialization.

Incorporating the designs of iconic theater popcorn buckets, we conceptualized 'Crunchy' as a companion for watching movies together for varied demographics in a household context. Below, we discuss the methodology that led us to conceptualize Crunchy and imagining interaction scenarios.

2 METHODOLOGY

As an initial step, we conducted observations of Human-Popcorn Interaction (HPI) - interactions between popcorn and human, by using visuals and pictorials from internet as well as recorded videos of family members of authors [1] eating popcorn. The video recordings consisted of two child-popcorn and one adult-popcorn interaction sessions while watching movies. We performed qualitative analysis on this pilot data to understand the potential for using a social robotic popcorn companion.

2.1 Studying Human-Popcorn Interaction

Qualitative analysis using relevant images from online and video recordings illustrated several key modes of interactions of HPI: touch (haptic interaction), varied closeness between the human and popcorn (proximity), and gaze (Figure 1). Individuals touched and held popcorn buckets, and while some would look at the bucket frequently when eating popcorn, others barely looked down at it while watching movies. How they placed popcorn bucket also varied, from on their lap, holding it up with both hands, to putting it on the table, each resulting in different types/frequencies of HPI.

Figure 1: Analysis of HPI using A:images from online & B and C: video recordings of HPI

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[1] We limited the participants to family members for COVID precautions.

2.2 Envisioning HPI for Crunchy

Our team members envisioned different scenarios individually for the use of Crunchy in a household context. We discussed the commonalities in our imaginary and debated the differences to arrive on a set of features and modalities for Crunchy. Below is one such hypothetical scenario for which we envision Crunchy's interactions:

After her online school day had ended, Alice decided to watch a movie. Alice dashed down the stairs to the kitchen, where both of her parents seemed busy, but her new friend, Crunchy, sat on the counter, charged and ready to go. She stood on her tiptoes and grabbed Crunchy, who began making cute sounds, vibrating and lighting up. Delighted to have her friend to watch a movie with, Alice hugged Crunchy and skipped over to the couch where she sat with Crunchy as depicted in Figure 3. Alice turned on the television and scrolled through a list of movies as Crunchy wiggled and made more expressions in anticipation. Alice decided to watch her favorite family-friendly romance comedy, to which Crunchy responds with a red, heart-shaped LED pattern and cute noises. At a point in the movie, Alice sets Crunchy to the side table next to her. This did not stop Crunchy from still responding to Alice's touch (haptic interaction) and gaze with various modalities, including lights, gestures, and sounds. Throughout the movie, Crunchy interpreted and reacted accordingly to the 'vibes' of scenes, causing Alice's feelings to intensify towards certain scenes.
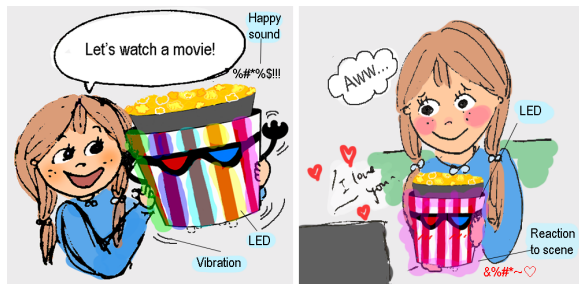

Figure 2: Crunchy usage scenario example

2.3 Ethical Reflection

Our observations presented the vast potential for interactions with a social robotic, popcorn-like companion because of its association with movies and entertainment for all demographics. However, we questioned if our design would persuade people into eating more popcorn or if the design would be less interesting to someone who does not like popcorn. We also pondered how we would deal with messy food around the use of a social robot and what that would mean for Human-Popcorn Interaction.

Our discussions led to many possibilities for Crunchy, including provisions for personalizing, use of different sizes for Crunchy's container or having a filler at its base for portion control, different shapes (such as bowl or bucket) for Crunchy to encourage different proxemic interactions, use of default artificial popcorn to allow for messy interactions (spilling popcorn) or when popcorn is not available, and various robotic accessories for Crunchy, including movie glasses to activate it for movie mode or liners and inserts to keep its insides mess-free.

3 DESIGNING CRUNCHY

Below we summarize major hardware components of Crunchy: for its *body*, we use 3D printed translucent plastic with LED strips with haptic sensors attached. NFC chip and movie glasses act as an on/off *switch*. Arduino components, battery, and motors are placed underneath the plastic cup for placing popcorn. We use haptic, audio, light sensors for input, LED lights, vibrations through motors, rotating/tilting motions through wheels, and a speaker for output modalities including gesture and engagement cues, making a sound, lighting up, to make Crunchy expressive and reciprocal.
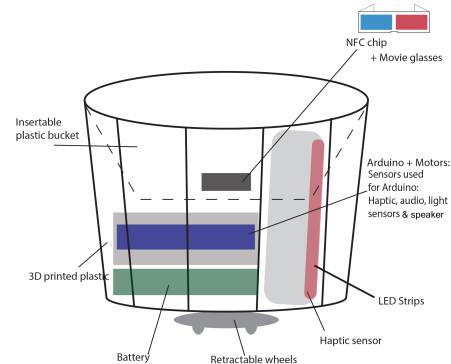

Figure 3: Major hardware components of Crunchy

4 NEXT STEPS

We believe in the huge potential Human-Popcorn Interaction (HPI) brings for Human-Robot Interaction in these sensitive times of social isolation. To understand which design features would be required for Crunchy to support HPI while watching movies, we plan to use puppetry as a method for quickly implementing Crunchy in the envisioned interaction scenarios. Using a puppet version of Crunchy, we plan to observe and study features most desirable by individuals within our research team's families, including children, elders, and young adults. We plan to further develop a robust version of Crunchy for one of our research sites where elders might enjoy having a companion to watch TV and use insights from its interactions to inform design development of other desktop robots in our lab.

5 CONCLUSION

Our observation of HPI highlighted promising potentials and opportunities for intimate interactions (e.g., touch) and companionship in an everyday setting while watching a movie with a popcorn bucket. We are confident that we can build on the premise of HPI and enhance its emotional and intimate qualities through interactivity and reciprocal aspects of Crunchy.

REFERENCES

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