Reindeer & Wolves: Exploring Sensory Deprivation in Multiplayer Digital Bodily Play

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ABSTRACT

Games designed around digital bodily play involve bodily movement and expression to create engaging gameplay experiences. Most feedback in these games takes the form of visual stimuli. To explore the gameplay mechanics afforded by depriving players from these visual cues, we designed Reindeer & Wolves, a role-playing game where blindfolded players capture other players relying on their hearing alone. Based on our design and play testing, we devised four strategies for designing games that incorporate sensory deprivation as an element of the core mechanic.

KEYWORDS

Bodily Play; Sensory Deprivation; Social Play; Experiential Play; Movement-Sensed Play; Sensory Substitution;

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1 INTRODUCTION

For centuries children (and adults) have played games that deprive players of their sight (e.g. Piñata, Blind man's Buff, Marco Polo). Navigating the physical environment without seeing can be a challenging but stimulating experience for players, requiring them to perceive the game world through non-visual stimuli. Recently, digital bodily play research has explored novel interaction design such as open-ended play [5], blurring movement and its digital representation [2] and most recently remote, creative play [3].

An established domain of research in HCI is that of sensory substitution, defined as "...the use of one human sense to receive information normally received by another sense" [4]. Sensory substitution has been explored predominately in rehabilitation [1], but has been applied to make *single* player motion based video games accessible [6].

To better inform the design of sensory substitution in multiplayer digital bodily play, we contribute an initial exploration of designing for sensory deprivation (SD) in this context. Through observing and evaluating Reindeer & Wolves, we also provide a set of design strategies for incorporating SD in multiplayer digital bodily play.

2 HOW TO PLAY

In Reindeer & Wolves, five players break into two groups; three players assume the roles of reindeer while the remaining two assume the roles of wolves (see Figure 1). The reindeer are equipped with PlayStation Move controllers; these sensors detect movement and are coupled with RGB LEDs. Wolves are blindfolded throughout the game with opaque scarf ribbons. In our prototype, the sensors each have a small box of nails attached so that when shook, a 'rattle' noise is made. The goal of the reindeer is to gain points by shaking their sensor; the more vigorously they shake, the more points they accumulate. While reindeer aren't shaking the sensor, their points reduce gradually. Reindeer are restricted to only shaking in designated 'feeding zones' of the game area. The goal of the wolves is to capture the reindeer, aided by the rattle sound made as the reindeer shake their sensor.

During the course of the game, the sensor's LED will change colour. When blue, the reindeer must freeze in place. As they accumulate points, their sensor will gradually become a brighter red colour. Upon accumulating enough points, the sensor's LED flashes green to signify victory for the reindeer. If the wolves capture (come in contact with) all reindeer

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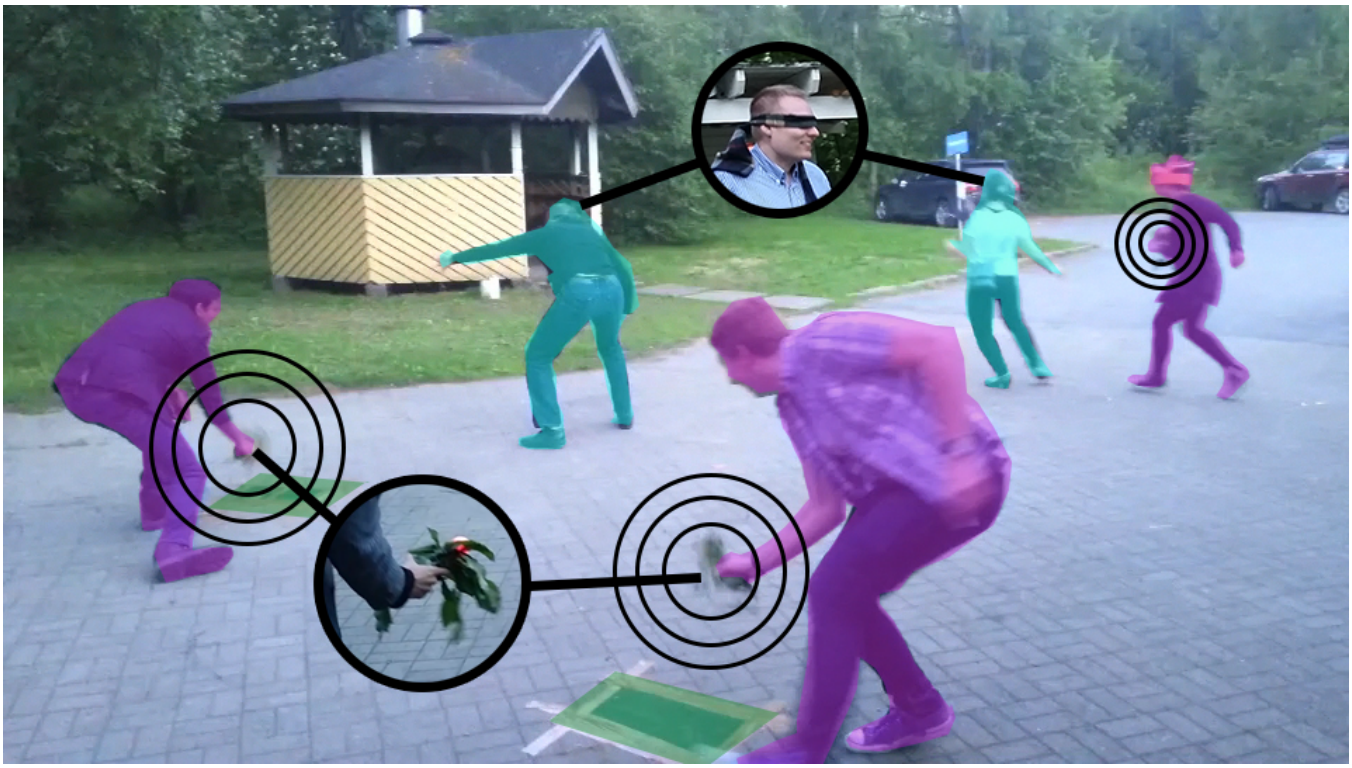

Figure 1: A game consisting of 2 Wolves (blindfolded, in cyan) pursuing 3 Reindeer (holding a PlayStation Move controller each, in magenta). Taped markers (in green) indicate feeding grounds.

before this, the wolves win the game. The source code for the game is available at https://github.com/Ps2Fino/psmovetest.

3 EVALUATION

The game was designed as part of a one week workshop on designing bodily play, held at the UBI Summer School in Oulu, Finland. Over 30 people played the game for a total of 12 rounds of play testing, each lasting 3-5 minutes. Almost all participants experienced playing as both a wolf and a reindeer. We conducted unstructured open-ended interviews with each player after each round and we derived four strategies for incorporating sensory deprivation into the design of multiplayer digital bodily play, based on them.

4 DESIGN STRATEGIES FOR DIGITAL BODILY PLAY

Challenge players through sensory deprivation

We observed an amusing challenge for the coordination between wolves. Sometimes they would bump into each other and become entangled, thinking they had caught a reindeer, when they had in fact caught another wolf.] Using this observation as a strategy, it is possible to design a game mechanic involving SD (e.g a physical game that challenges players to cooperate to achieve a goal, where all five human senses are distributed (via SD) among the players).

Sense simple gestures for greater freedom of movement

Our technology only senses a vigorous shake of the reindeer sensor. This gives the reindeer great autonomy in terms of choosing how, when and where they might run, walk, jump,or crawl etc. Games involving sensory deprivation can be cognitively demanding. Thus we suggest that designing for simple gestures as game input can lead to games which give players an enjoyable feeling of agency in the game's digitally enhanced physical environment.

Sensory deprivation provokes expressive ludic activity

Reindeer frequently used the blindness of the wolves as an opportunity for playful activities outside the intended scope of the game. For instance, pulling irreverent faces at a wolf and performing mocking gestures. The intended audience for such acts was varied; sometimes it seemed to be a shared joke between reindeer whilst at other times these actions were either more for the benefit of spectators or the personal amusement of the individual reindeer. This leads us to

suggest that designers utilizing sensory deprivation should support bodily expression with minimal digital intervention.

Juxtapose frantic movement with tense stillness

Reindeer reported feeling exerted not only from the shaking action required by the game, but also from the interaction with other players, namely avoiding capture from wolves. Wolves grew tired from frantically chasing reindeer. Such frenetic activities were also interspersed with some very quiet moments when a wolf became so close to a reindeer that their only hope of escape seemed to be remaining still and thus silent and undetectable. We suggest that designers should consider how combining sensory deprivation with motion detectors can facilitate and exploit different exertive rhythms in gameplay. In our game, the blue state of the LED signalling that a reindeer must freeze offers an example of how digital feedback can enforce stillness in a movement based game.

5 CONCLUSION

The positive feedback from players encourages us to pursue the topic of sensory deprivation in games further. Future work will include a formal user study to test the validity of our design strategies by applying them in additional SD-based games and novel multiplayer experiences.

In this game, we assigned the deprivation to some players only (namely, the wolves). We hope to explore how SD can be used in games where more players are deprived. Moreover, we have only explored the deprivation of sight, but other senses, as well as dynamic manipulations of such senses, can also be explored in the future.

Digital technologies' ability to transform perceptual information seems to give great potential for developers to further exploit the engagement of sensory deprivation in games. Finally, in future work we hope to relate our findings about sensory deprivation to understand how sensory substitution can be incorporated into digital bodily play.

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