COMP3603 A1

LITERATURE REVIEWS

BY

USABILIBEES

"PIKACHU WOULD ELECTROCUTE PEOPLE WHO ARE MISBEHAVING"

EXPERT, GUARDIAN AND CHILD PERSPECTIVES ON AUTOMATED EMBODIED MODERATORS FOR SAFEGUARDING CHILDREN IN SOCIAL VIRTUAL REALITY

A LITERATURE REVIEW

Presented by: Jalene Armstrong

BACKGROUND

Authors

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University of Glasgow,
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Collectively

200 Publications
183 Published by ACM

Conference

CHI '24: Proceedings of the CHI Conference on Human Factors in Computing Systems

Published

11th May, 2024

Publisher

Association for Computing Machinery

ABSTRACT

Provokes new design-led directions for developing AEMs for children in social VR by incorporating insights from children, guardians, and experts. It explores perceived concerns, benefits, and preferences across stakeholder groups, gathering unique recommendations and reflections on AEM design.

The findings suggests that AEMs could improve child safety in social VR by offering timely support. Children prefer minimal intervention, while adults favor a more active approach. Balancing approachability with authority is a challenge, and more research is needed despite AEMs being seen as an improvement over current moderation tools.

Contribution of a comprehensive overview of how AEMs can safeguard children in social VR.

Interviews with 16 experts in online child safety and psychology.

Workshops with 8 guardians and 13 children.

METHODOLOGY

COLLECTING MULTI-STAKEHOLDER PERSPECTIVES ON AUTOMATED EMBODIED MODERATORS FOR CHILD SAFETY IN SOCIAL VR

The research comprised two studies: one involving 16 expert interviews via Zoom to evaluate “Big Buddy,” a social VR agent, and another with 21 participants (8 guardians and 13 children) in workshops to gather feedback on AEMs.

The interviews focused on assessing the effectiveness and potential improvements of “Big Buddy” in preventing harassment. The workshops included VR demos, brainstorming, and design activities where children created their own AEMs, revealing their preferences and concerns about automated moderation in social VR.

01. EXPERIMENTAL DESIGN

16 expert interviews and five workshops with guardians and children. The interviews assessed opinions on the "Big Buddy" safety system in VR, while the workshops collected feedback through brainstorming, recordings, and design activities on the effectiveness of Automated Enforcement Moderators (AEMs) in VR settings.

02. DATA COLLECTION TECHNIQUES

Data was collected through 45-60 minute Zoom interviews, transcribed and analyzed thematically, and in-person workshops where feedback was gathered via audio recordings, brainstorming, and drawings. The focus was on evaluating the design and functionality of Automated Enforcement Moderators (AEMs) in social VR.

03. USABILITY STUDIES

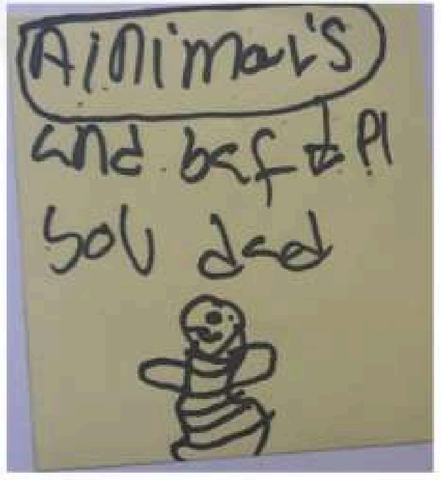
The usability study evaluated "Big Buddy," an automated VR agent, for its ability to protect children from harassment. Experts provided feedback on its effectiveness and possible improvements, while guardians and children designed their own Automated Enforcement Moderators (AEMs) to test their functionality and preferences for real-world application.

Workshop 0 Appearance Ideas:

from scary to friendly

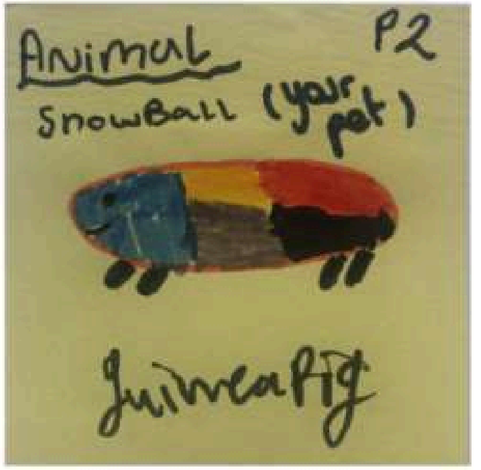
P1

Snakes, rocket launches, assassin, animals



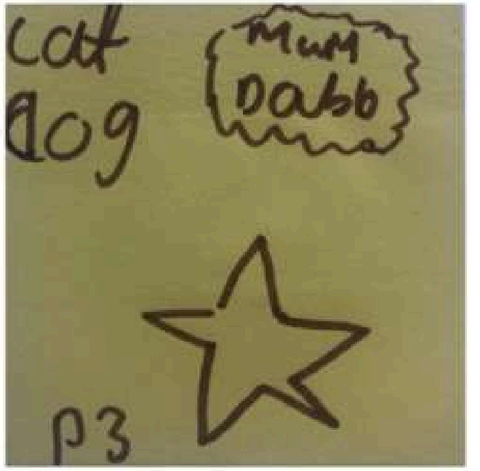
P2

My pet "Snowball" guinea pig



P3

Happy in home staff member, mom, dad, cat



(a) Physical Appearance Post-its Workshop 0.

(b) Combined Design from Children in workshop 0 (cat, snake, assassin)

PERCEPTIONS TOWARDS AUTOMATED MODERATION

BENEFITS & CONCERNS

Automated Enforcement Moderators (AEMs) are praised for their effectiveness in guiding VR social norms, managing harassment, and assisting new users, while also helping parents with screen time and oversight. They are valued for their prompt responses and rule enforcement. However, there are concerns about their technical feasibility, accuracy, transparency, potential misuse, emotional impact on children, and privacy issues.

Technical Feasibility and Contextual Understanding

Privacy

Immediacy of Response

Transparency and Trust

An Intermediary Between Parents and Children

Fair Moderators

Impact on Children

AEMS as a Guide and Exemplar

Taking the Wrong Actions and Fallible AI

Sense of Protection, Comfort and Authority

Credibility Issues

Modelling Good Behaviour

Effectiveness of Embodiment Would Vary With Age

Embodiment of the AEM has Notable Strengths

PERCEPTIONS TOWARDS EMBODIMENT

BENEFITS & CONCERNS

Experts and guardians see potential benefits in an embodied AI moderator like "Big Buddy" for social VR, such as modeling positive behavior and enhancing user interactions. However, concerns include systemic bias, the risk of children feeling overly monitored, and issues with the AEM's robotic voice and appearance. There is also worry that the "Panopticon Effect" might reduce enjoyment, and the moderator may be more effective for younger children but less so for teenagers.

DISCUSSION

01

Conducting the studies in English in the UK may limit their generalizability to other cultures, affecting global applicability.

02

The workshops captured children's initial, imaginative responses to AEMs in a single session, without iterative refinement, which limits the practicality of the proposed designs.

03

Experts provided more detailed insights compared to children, but online interviews, using videos instead of immersive VR experiences, may have limited some observations.

04

Participants' experience with AEMs was solely through the "Big Buddy" example, which could influence results, though it provided a practical demonstration of AEM potential.

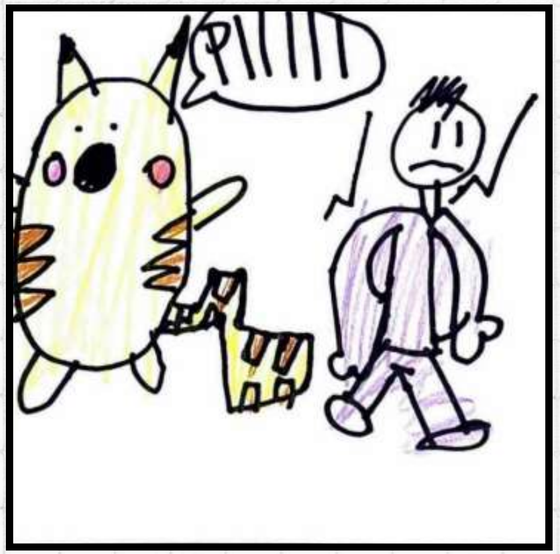
CONCLUSION

ENHANCING CHILD SAFETY IN SOCIAL VR

The research emphasizes the development of Automated Enforcement Mechanisms (AEMs) to protect children in social VR. Key findings include the need for clear communication, adaptive responses to harassment, emotional support for victims, and offender accountability.

The study highlights the importance of tailoring AEMs to individual needs and suggests future interdisciplinary research to address design and psychological challenges.

01



02

03

RESEARCH PAPER REFERENCES

The paper referenced a wide range of sources (71), including YouTube videos, community guidelines, safety systems, and expert studies, all focused on child safety within social VR environments. These references cover various aspects of the topic, such as the risks children face in VR spaces, parental control tools, and community enforcement measures in popular social VR platforms like VRChat and Rec Room.

LITERATURE REVIEW REFERENCES

01 Cristina Fiani, Robin Bretin, Shaun Alexander Macdonald, Mohamed Khamis and Mark Mcgill. 2024. 'Pikachu would electrocute people who are misbehaving': Expert, Guardian and child perspectives on automated embodied moderators for safeguarding children in Social Virtual reality. Proc. ACM Hum.-Comput. Interact. Article 113, 23 pages. https://dl.acm.org/doi/10.1145/3613904.3642144

02 ACM SIGCHI. 2023. Big Buddy: A Simulated Embodied Moderating System to Mitigate Children's Reaction to Provocative. Video. (18 April 2023). Retrieved September 07, 2024 from https://youtu.be/0WthLQsK8II?si=U5vVOvr7dCguRKy5

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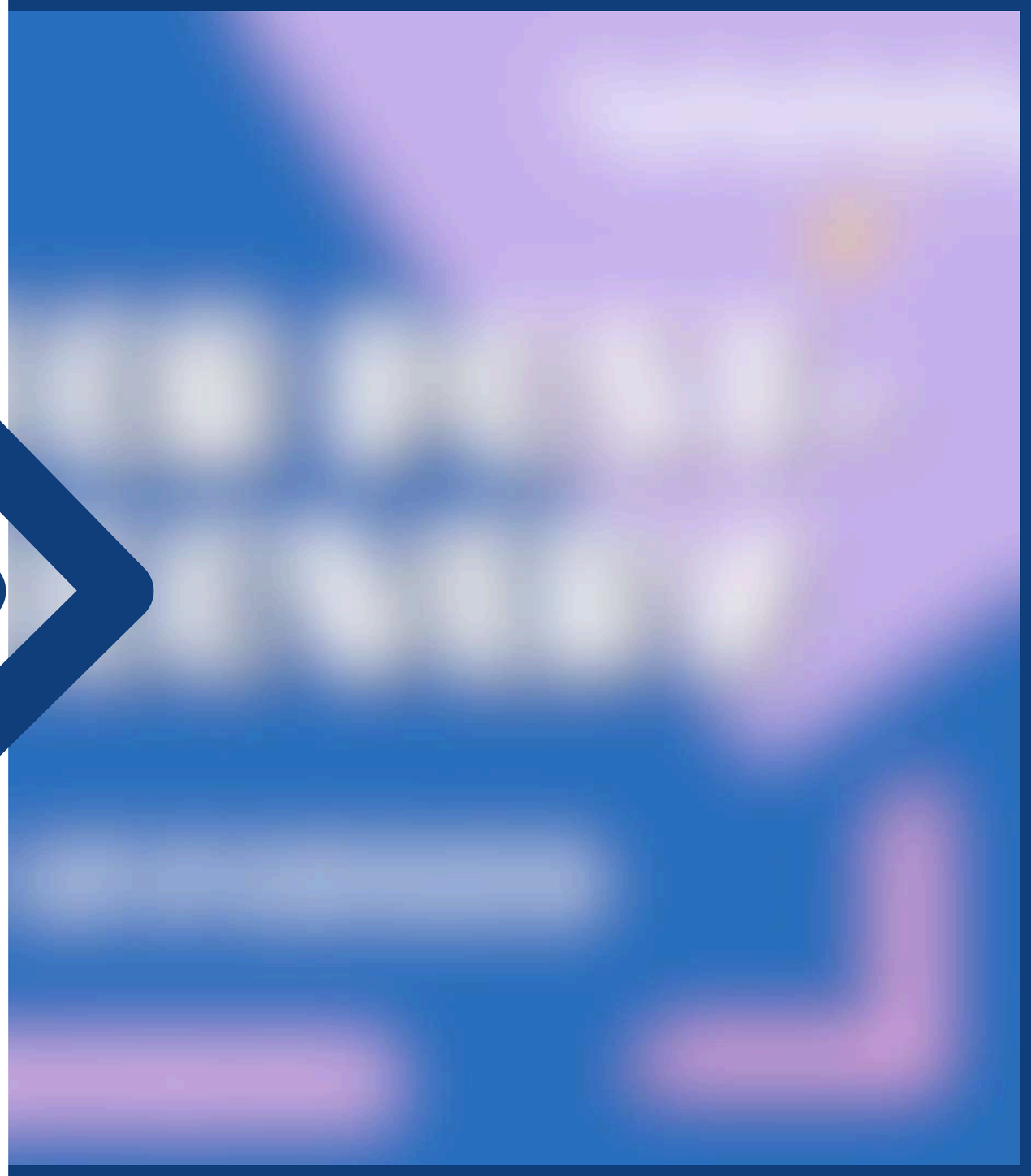
Presented by: J



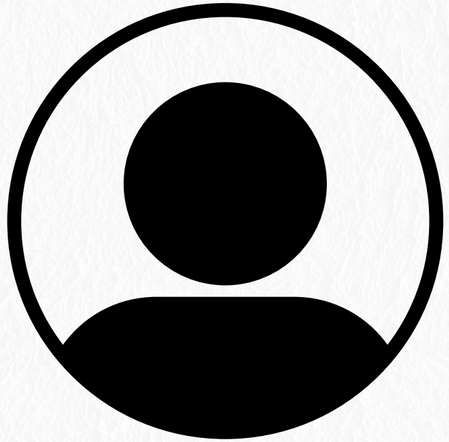
GAMING FOR POST-WORK RECOVERY

THE ROLE OF IMMERSION

Presented by : Shanice Maundy

BACKGROUND

Jon Mella



Ioanna Iacovides

Anna L Cox

Published By: Association for Computing Machinery

ABSTRACT

The paper investigates how digital games can help persons recover from work-related stress, focusing on the role of immersion–a key player experience. Through a mixed-methods survey, the study found that certain aspects of immersion, like cognitive involvement, align with specific recovery needs after work.

Participants not only passively benefited from immersion but also actively adjusted their gaming experience to enhance recovery. This research deepens the understanding of how digital games aid in post-work recovery, highlighting immersion as crucial for the restorative effects of gaming.

RESEARCH QUESTIONS

• QUESTION 1

How does the player experience of immersion shape the post-work recovery potential of digital games?

• QUESTION 2

Which components of immersion when gaming after work are predictive of the four recovery experiences?

• QUESTION 3

Which components of immersion are predictive of overall post-work recovery experience?

• QUESTION 4

Which components of immersion are predictive of post-work energetic arousal

HYPOTHESES

Which components of immersion when gaming after work are predictive of the four recovery experiences?

• HYPOTHESIS 1

Psychological detachment will be positively predicted by (a) cognitive involvement, (b) emotional involvement and (c) real-world dissociation, but not (d) challenge or (e) control.

• HYPOTHESIS 2

Relaxation will be positively predicted by (a) cognitive involvement, (b) real-world dissociation (c) and control, and negatively predicted by (d) emotional involvement and (e) challenge.

• HYPOTHESIS 3

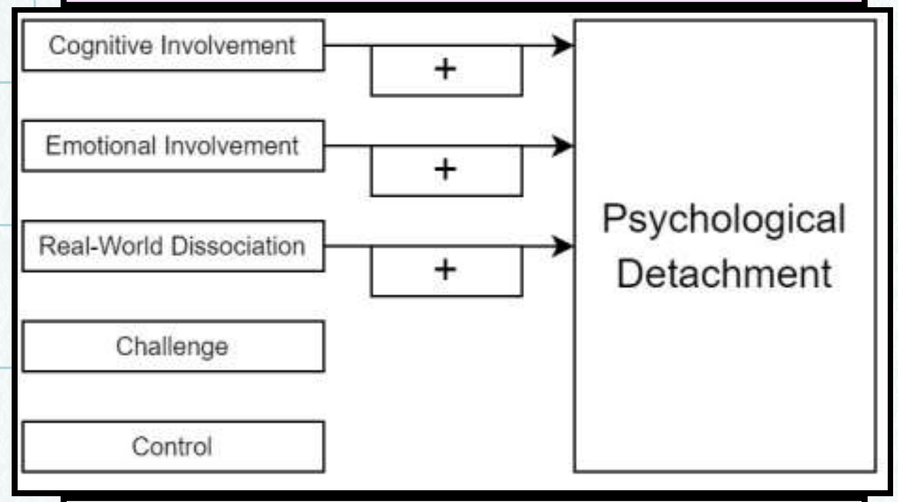
Mastery will be positively predicted by (a) cognitive involvement, (b) challenge and (c) control, but not (d) emotional involvement or (e) realworld dissociation.

• HYPOTHESIS 4

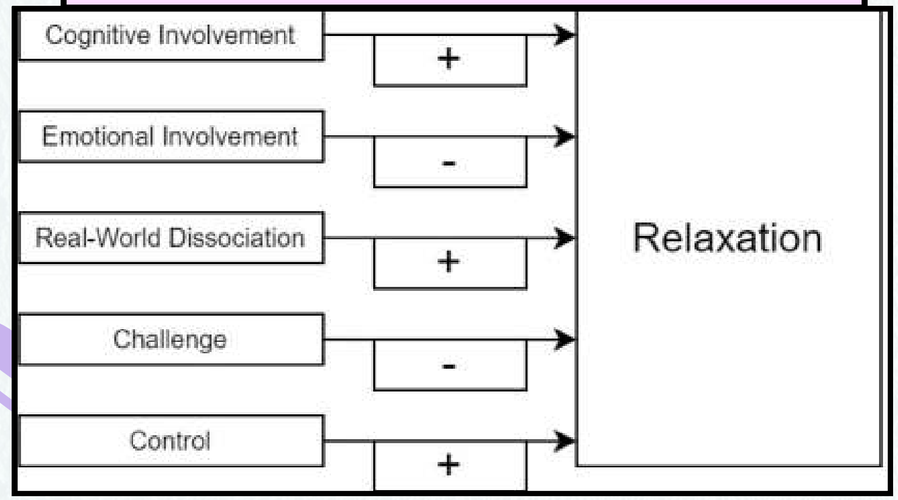
Control will be positively predicted by (a) cognitive involvement, (b) emotional involvement (c) real-world dissociation and (d) control, and negatively predicted by (e) challenge.

Which components of immersion when gaming after work are predictive of the four recovery experiences?

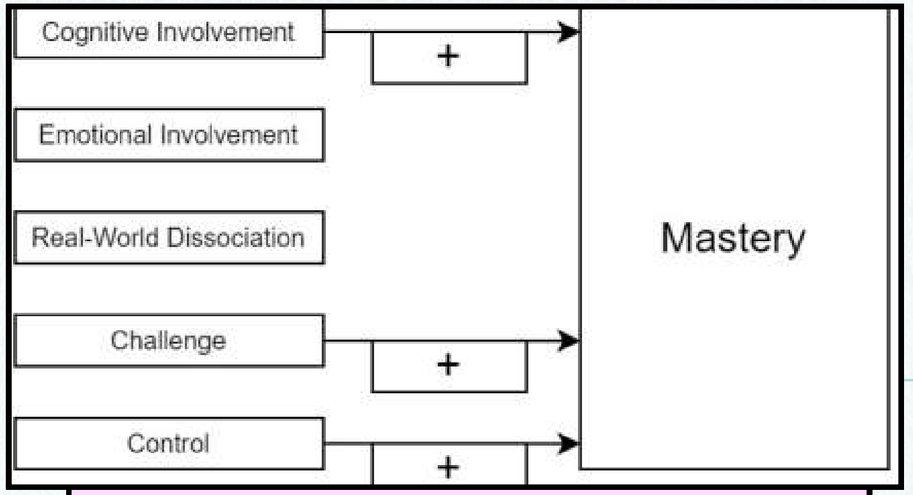
• HYPOTHESIS 1



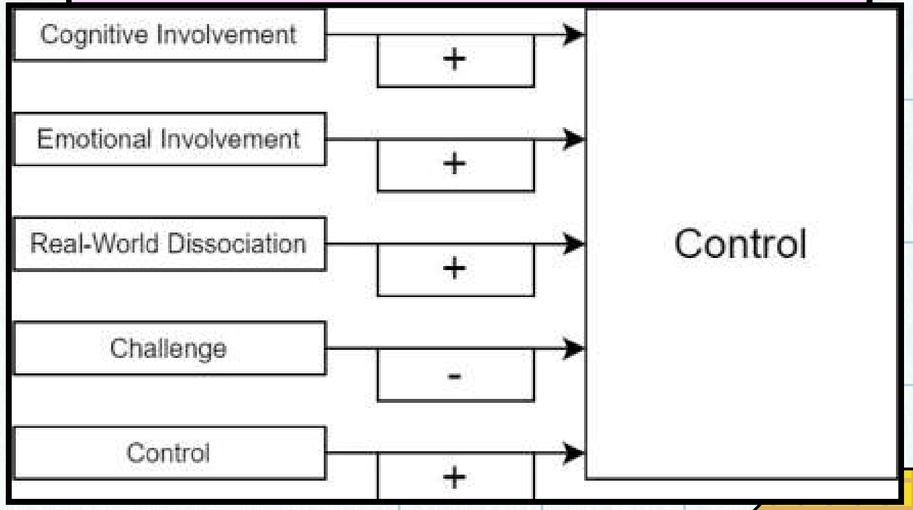
• HYPOTHESIS 2



• HYPOTHESIS 3



• HYPOTHESIS 4



METHODOLOGY

1

Participants

Participants were recruited using Reddit, Social Media and word of mouth.

The eligibility criteria included persons who were employed (full-time or part-time) and had played a digital game within the last week.

A total of 75 participants successfully completed the survey. They varied in gender, age, work hours per week and occupation.

2

Procedure

- Overview of the concept of post-work recovery
- Provide consent and demographic information
- Name the digital game and date of most recent play
- Guided Recall Process
- Open-ended questions for qualitative data
- Questionnaire for quantitative data

3

Materials

Immersion during post-work digital game play was measured using the Immersive Experience Questionnaire which consisted of 5 subscales: Cognitive Involvement, Emotional Involvement, Real-World Dissociation, Challenge and Control.

Recovery Experience during post-work digital game play was measured using the Recovery Experience Questionnaire which consisted of 4 subscales: Psychological Detachment, Relaxation, Mastery and Control.

The Activation-Deactivation Checklist was used as a recovery outcome measure for Energy, Tiredness, Tension and Calmness.

RESULT & FINDINGS

The gameplay episodes reported by participants occurred 1.62 days previously on average. The participants played a range of games during the reported recover episode.

01. Optimizing Immersion for Post-Work Recovery, Immersion as a Post-Work Distraction, The Mastery-Relaxation Dichotomy and Prioritizing Completionism & Convenience over Immersion.

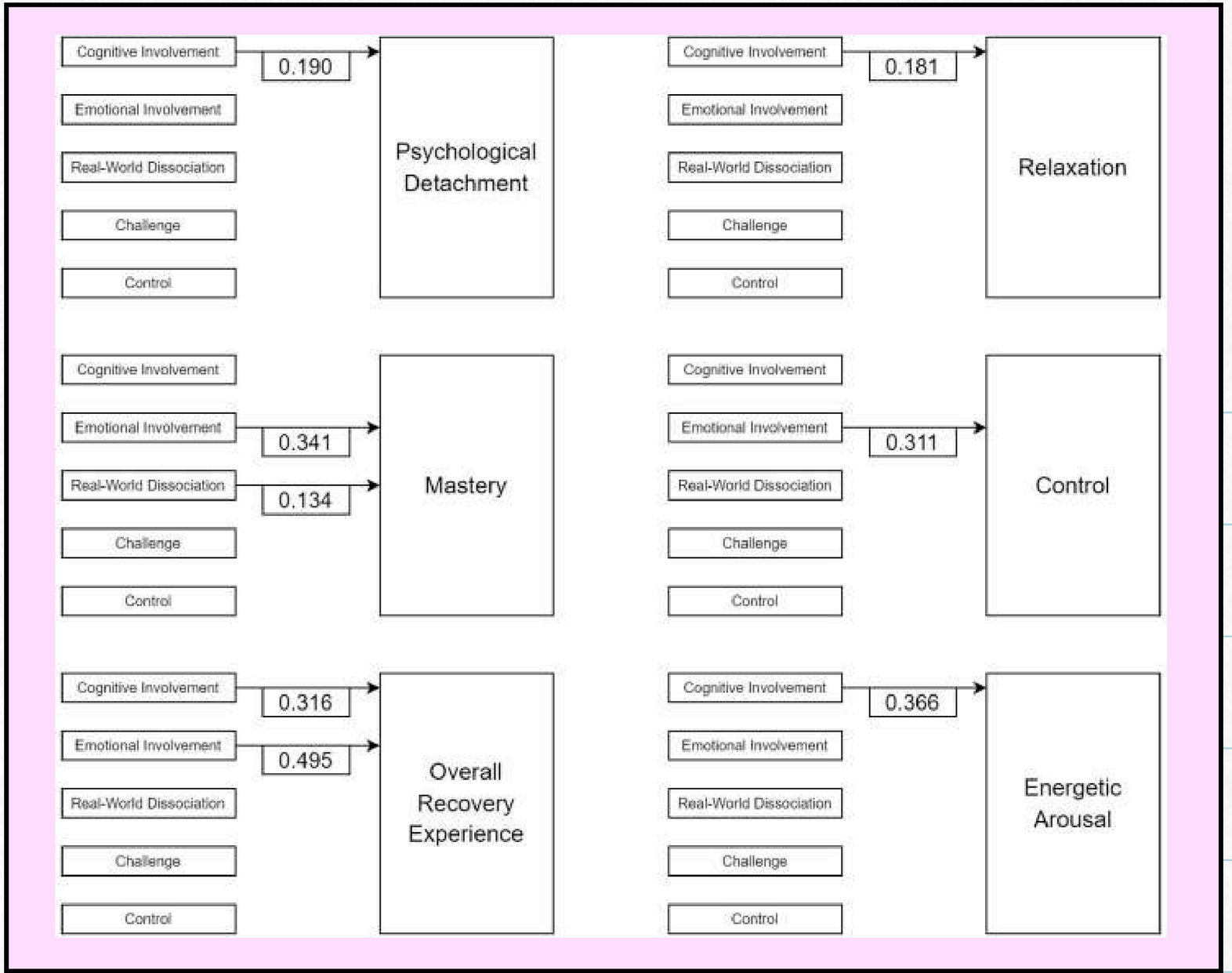
02. The results for all four hypotheses had mixed results compared to their predictions. They were plotted and are shown in the next slide.

03. Both cognitive and emotional involvement were significant predictors, with participants who experienced greater involvement having a stronger overall recovery experience.

04. Cognitive Involvement was the only significant predictor, with greater involvement associated with greater energetic arousal.

RESULT & FINDINGS

The five components of immersion and the prediction of their effect on their relationships with the overall recovery experience.



DISCUSSION

The study explored how immersion in gaming influences post-work recovery. It identified a new concept called "immersion optimization for post-work recovery," where players use strategies to achieve the right level of immersion for their recovery needs. The thematic analysis revealed that immersion can be beneficial for recovery in some cases but not universally.

This complex relationship was reflected in the quantitative results, where many expected connections were not found. However, a clear link was observed between cognitive involvement and various recovery outcomes, supporting the idea that games can aid recovery by capturing players' attention.

CONCLUSION

Previous research on the restorative effects of gaming has largely overlooks the role of immersion and lacked real-world context. To fill this gap, a mixed-methods survey was conducted where participants reflected on how immersion in games affects post-work recovery.

The findings of this survey indicate that immersion in digital games is generally beneficial for recovery and that people actively adjust their gaming experience to enhance this restorative effect.

This study has contributed to the enhancement of understanding how immersion contributes to the recovery process and how digital games aid in post-work recovery.

REFERENCES

This paper references eighty-four sources which focused on topics including video-games, post-work recovery and immersion in other contexts.

These sources took the form of books and other research papers.

The extensive reference list shows that this topic is one that has been studied many times and will continue to be studied as work-related stress leads to many physical and emotional health concerns


GAMING
WORK
THE ROLE O
Presented by

TOWARDS COMPLETE ICON LABELING IN MOBILE APPLICATIONS:

A LITERATURE REVIEW

Presented By : Rynnia Ryan

BACKGROUND

Research Scientist at CSIRO's Data61

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Jeffrey Nichols
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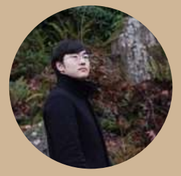
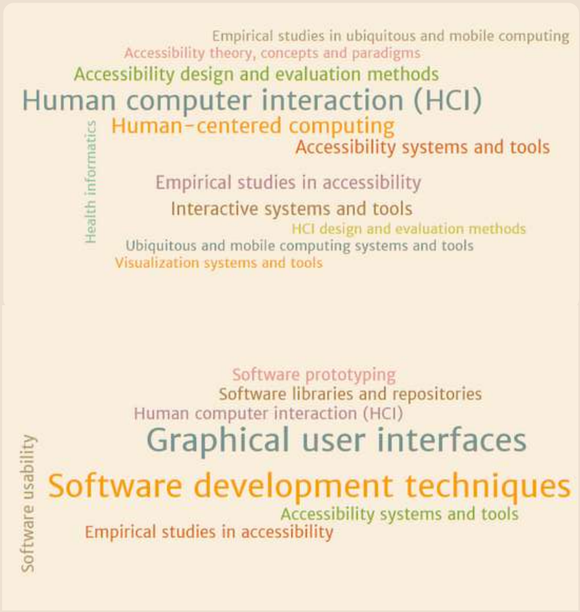
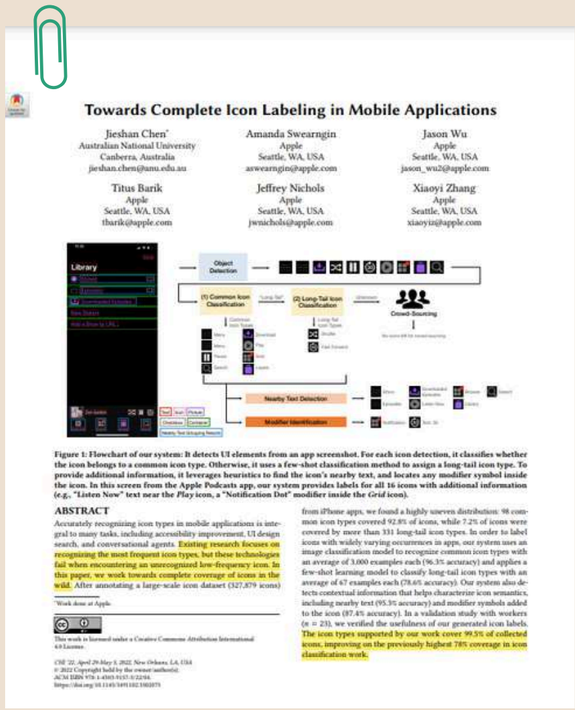
Machine Learning Research Engineer



Xiaoyi Zhang
University of Washington Seattle, Washington.



72 Contributed Papers in other relating fields published on ACM



Towards Complete Icon Labeling in Mobile Applications

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Figure 1: Flowchart of our system: It detects UI elements from an app screenshot. For each icon detection, it classifies whether the icon belongs to a common icon type. Otherwise, it uses a few-shot classification method to assign a long-tail icon type. To provide additional information, it leverages heuristics to find the icon's nearby text, and locates any modifier symbol inside the icon. In this screen from the Apple Podcasts app, our system provides labels for all 16 icons with additional information (e.g., "Listen Now" text near the *Play* icon, a "Notification Dot" modifier inside the *Grid* icon).

ABSTRACT

Accurately recognizing icon types in mobile applications is integral to many tasks, including accessibility improvement, UI design search, and conversational agents. Existing research focuses on recognizing the most frequent icon types, but these technologies fail when encountering an unrecognized low-frequency icon. In this paper, we work towards complete coverage of icons in the wild. After annotating a large-scale icon dataset (327,879 icons) from iPhone apps, we found a highly uneven distribution: 98 common icon types covered 92.8% of icons, while 7.2% of icons were covered by more than 331 long-tail icon types. In order to label icons with widely varying occurrences in apps, our system uses an image classification model to recognize common icon types with an average of 3,000 examples each (96.3% accuracy) and applies a few-shot learning model to classify long-tail icon types with an average of 67 examples each (78.6% accuracy). Our system also detects contextual information that helps characterize icon semantics, including nearby text (95.3% accuracy) and modifier symbols added to the icon (87.4% accuracy). In a validation study with workers (α = 23), we verified the usefulness of our generated icon labels. The icon types supported by our work cover 99.5% of collected icons, improving on the previously highest 78% coverage in icon classification work.

*Work done at Apple.

CHI '22, April 29-May 5, 2022, New Orleans, LA, USA

ACM ISBN 978-1-4503-9157-3/22/04.
https://doi.org/10.1145/3491102.3502075

Published on 29th April 2022

Presented at CHI' 2022

Theme: 'Natural Language'

ABSTRACT

1. **Challenge:** Common icons are recognized, but 'long-tailed' icons often go unnamed by current classification models. This creates issues in icon recognition for interactive applications

2. **Goal:** The paper proposes a system to accurately classify long-tailed icons, minimizing human input.

3. **Findings:** The use of: (1) Pixel Information (2) Surrounding text around icons (3) Contextual idea of humans ability to recognize object with few examples (Few-shot learning; Prototypical model), can be implemented and aid the accuracy of classification models in icon labeling for both common and long-tailed icons

METHODOLOGY

Crowdsourcing Method

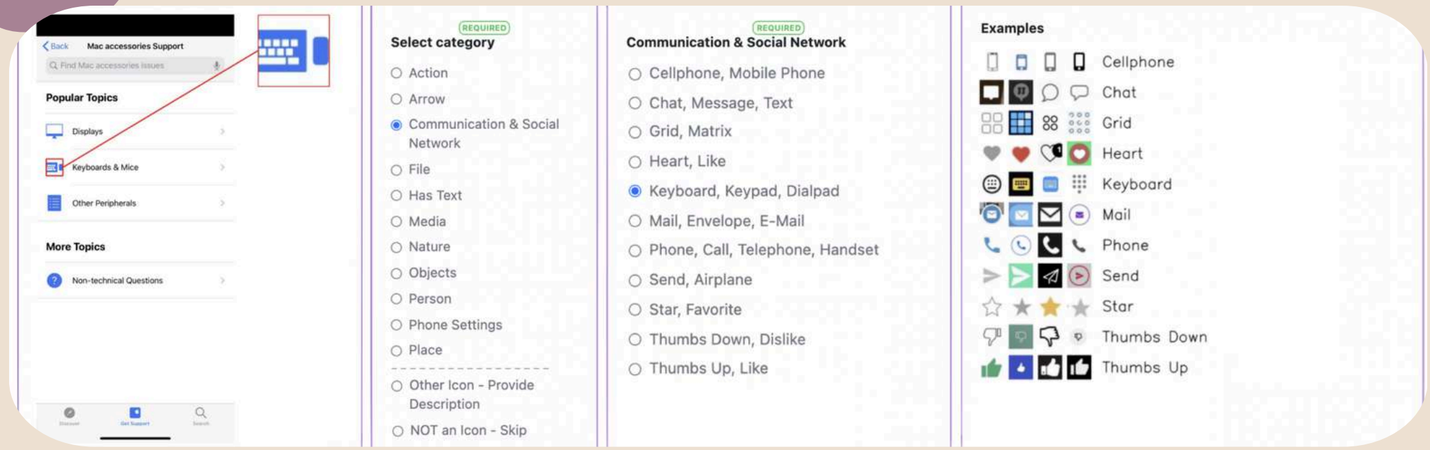
Leveraging a large number of people (the crowd) gathering data, solving a problem, or addressing a challenge.

Clustering Method

Designed originally by research team in aims to further refine dataset for non-predefined categories

Both methods were necessary to ensure a comprehensive and accurate dataset by combining broad crowdsourced labeling with targeted clustering and filtering, addressing both common and rare icon types.

CROWDSOURCING METHOD



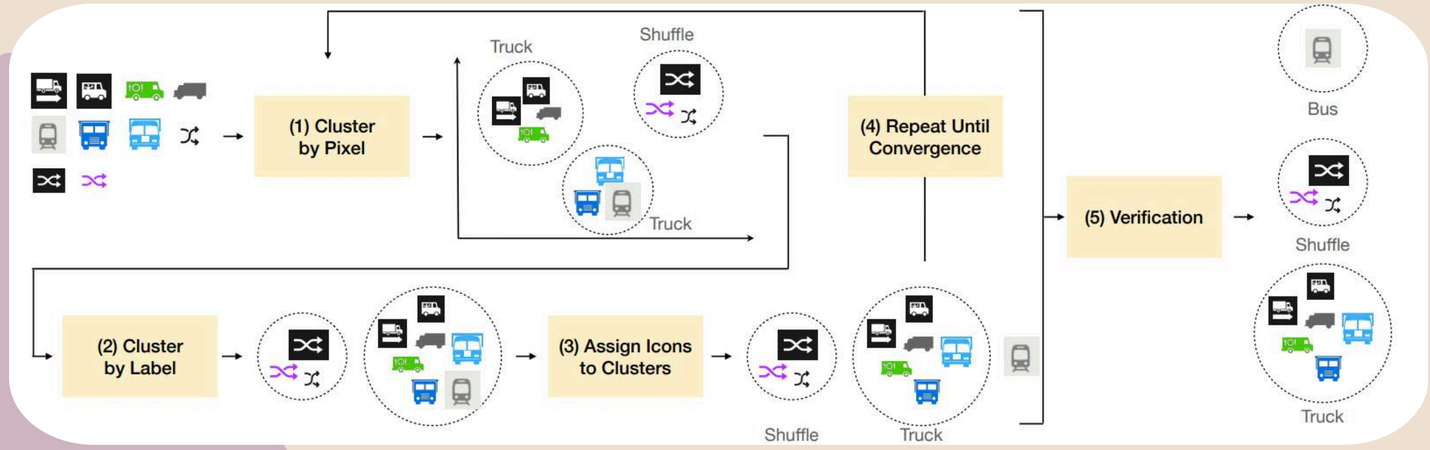
Steps

(1) Icon Highlighted
(2) Select Category
(3) Choose Icon Type
(4) Consult Instructions
(5) Write Description
(6) Skip Task

Starting with 90 predefined icon categories to choose from

Using dataset of 327,879 icons from IOS app screens using screenshots

CLUSTERING & FILTERING METHOD



Steps

1) Cluster the icons by pixels;

2) Compute keywords for each potential cluster and merge clusters with the same keyword

3) Assign icons to a cluster if the distance between the icon and the corresponding cluster centroid is less than a predefined threshold

4) Repeat step 1-3 until convergence

5) Let workers verify the clustering results

MODELS

1

Image Classification Model

- **Model: Fine-tuned ResNet-50 (pre-trained on ImageNet)**
- **Input Processing: Icons pre-processed to 256x256 pixels and color-normalized**
- **Training Process: Used pre-processed icons to train the model**

2

Prototypical Model

- **Model Type: Few-Shot Learning model**
- **Training Process:**
  - **Create prototypes (average representations) from a few icon types and samples**
  - **Extract key features from sample and test icons**
  - **Compare features to prototypes and assign test icons to the closest match**

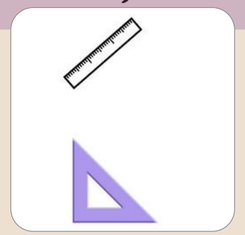
REFINING SOLUTION

Training the proposed system's two models alongside other existing ones aided the research in upbringing new findings and issues which help them improve the system by introducing new models and methods

First Problem

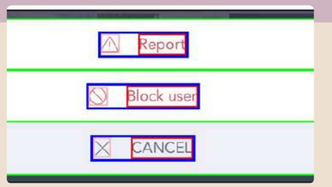
Icons depicting same concept from different angles or different levels of abstraction (long-tail icons)

Eg.



First Solution

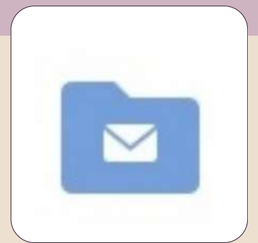
Introducing heuristics feature of the system to recognize nearby text surrounding icon using Optical Character Recognition (OCR) API



Second Problem

Existence of "modifiers" where an icon is made up of multiple objects

Eg.

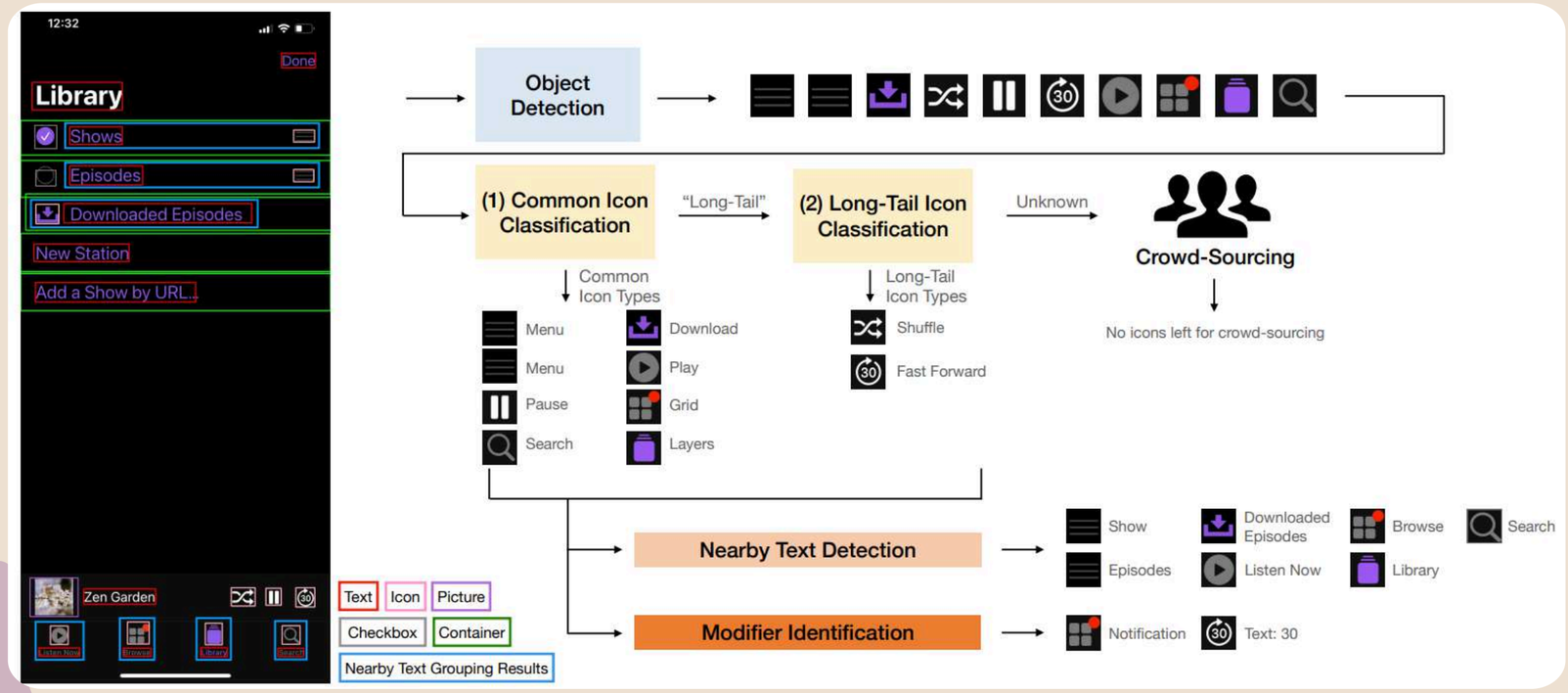


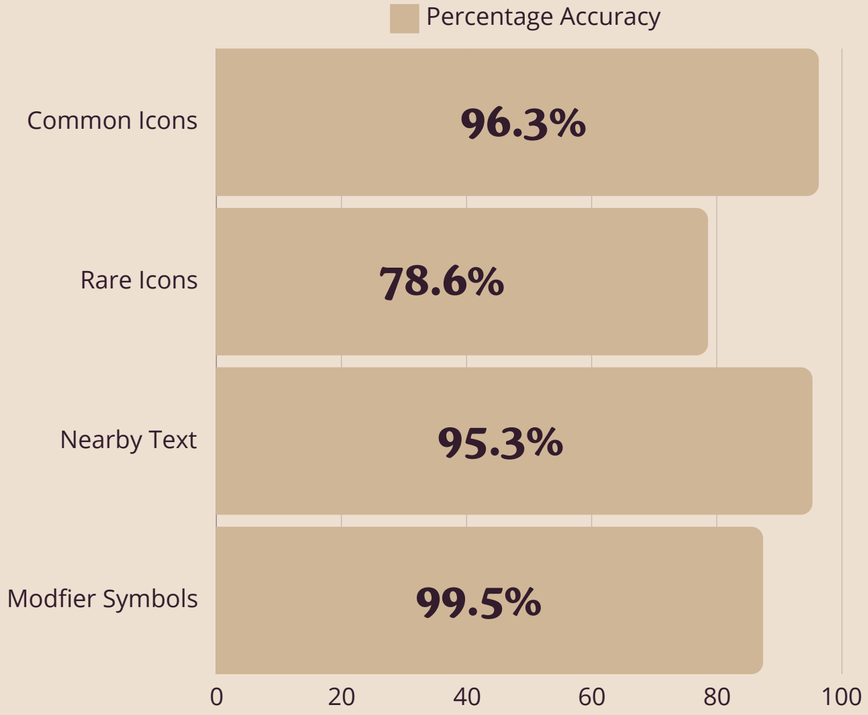
Second Solution

Adding the creation of a Modifier Identification Model (Object Detection) to suit inspired by OCR

RESULT

Figure showing end-to-end classification system





In summary, it covered 99.5% of icons, a significant improvement over previous classification works which only covered 78%.

IMPLICATIONS

Support for Screen Readers

- Adds labels to icons in apps lacking alt-text
- Supports both common and rare icons for more inclusive design

Assisting Conversational Agents

- Improves interactions by providing clear icon references
- Enhances natural language instructions for smoother UI navigation

Natural Language Based UI Search

- Search for icons in screenshots using natural language
- Expands recognizable icon types in large UI datasets

LIMITATIONS

- **Incomplete Logo Coverage**

  The removal of most company logos from the dataset, leaving only major ones like Apple, Google, Facebook, and Twitter.

CONCLUSION

This research showed that by combining image classification and few-shot learning, labels can be successfully generated for most commonly used and rare icons with higher accuracy and wider coverage than previous systems.

Their large-scale dataset and conducted validation study suggest that it is possible to improve such areas as: (1)accessibility, (2)UI, and (3)conversational agents, by applying this technique.

Eventually, this work opens avenues for further developments in icon recognition as an integrated solution.

-Research Paper References-

The paper referenced 37 sources, including foundational works on data mining, machine learning, and image recognition, as well as recent studies on GUI design, accessibility, and usability.

Key contributions included methods for clustering, classification, and improving icon recognition accuracy, highlighting advancements in handling rare and complex icons and integrating design and accessibility considerations.

- LITERATURE REVIEW REFERENCES -

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THANK YOU

From

Rynnia Ryan

JALENE ARMSTRONG

SHANICE MAUNDY