Sending Trustworthy News to the Elderly Through TV Notifications

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Abstract: Fake News is a global phenomenon that is increasing. They have the potential to spread rapidly in social media due to the ease of sharing and to the large audiences these platforms can reach. Users need to be vigilant in checking the accuracy of the information they consume. Considering that some older persons do not have the digital literacy to distinguish between trustable digital sources, this paper depicts a proposal for a system that sends trustable news to the elderly through TV notifications – by far the most used media device of this target group.

1 INTRODUCTION

Fake news has become an increasingly prevalent issue in recent years, with the proliferation of social media and the ease of spreading misinformation. Fake news is intentionally misleading information that is presented as if it were real news. It can take many forms, such as fictional articles, manipulated photos, or distorted videos, where advanced Artificial Intelligence (AI) techniques pay a major role. Fake news can be spread through various channels, including social media or websites or traditional media like newspapers (Bathla et al., 2023).

This can be especially concerning for elderly individuals, who may be more vulnerable to believe in false information due to cognitive decline or a lack of digital literacy (Baptista & Gradim, 2020). Munger et Al in (Munger et al., 2018) reinforce that the Clickbait effect is very prevalent among seniors thus creating the potential to them to be influenced by fake news.

According to the United Nations, the number of elderly people (defined as those aged 60 or over) in the world is expected to more than double by 2050, from 962 million in 2017 to about 2.1 billion in 2050 (World Health Organization, n.d.).

The increase in the percentage of elderly population is largely due to declining fertility rates and increasing life expectancy. Many countries are experiencing an aging population, but the trend is most pronounced in developed countries, where birth rates have been below the replacement level for several decades.

The aging of the population has implications for health care systems, social security systems, and the economy more broadly. It is important for societies to plan for, and address the needs, of their elderly populations to ensure their well-being and support their contributions to society.

However, to guarantee that elderly can participate in the society it is crucial that they are well informed. In this way, this paper proposes a solution that sends trustworthy news to the elderly, through TV notifications allowing them to be well informed.

2 STATE OF THE ART

For Industry (digital service providers), push notifications have become a strategy that has the power to attract audiences' attention throughout the day. As for the users, checking notifications is an embedded behaviour across media sources to get updates and quick access to personalized information, namely, news feeds. In the TV ecosystem (that in its wider concept includes the user's experience in audio-visual content consumption over an ecosystem of different sources and devices) there are several projects and initiatives that use notifications in TV

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applications to get viewers' attention. Some examples include:

- Notification systems for social media apps, such as Facebook or Twitter, which can send notifications to a user's TV when a new message or update is received (Anyfantis et al., 2018)
- Alert systems for news apps, that pop-ups on the user's TV when a breaking news event occurs (Anyfantis et al., 2018).
- Reminder systems for TV shows or movies, which can send notifications to a user's TV to remind them to watch a particular program (Yoong et al., 2018).
- Personalized recommendation systems for TV shows and movies, which triggers a notification in the user's TV with recommendations based on their viewing history (McGee-Lennon, 2012).
- Alert systems for weather, traffic, and other local information, which can send notifications to a user's TV to keep them informed about important events in their area (Silva et al., 2020), (Silva, 2022).

Despite this significant number of works that use TV notifications to get users attention, it is worth to note that sending trustworthy news to elderly through iTV notifications it is not an explored solution.

3 METHODOLOGY

To design, develop and test the digital solution, a user centred design approach based on the following main methodological steps was carried out:

1) A Focus group
2) The solution development
3) A field trial.

Figure 1 depicts the process and the key objectives of each phase.

Figure 1: Research steps.

3.1 Focus Group

A focus group is a research method used to gather insights and opinions on a specific topic or product. A focus group typically consists of 6 to 10 participants who are selected to represent a larger target audience.

In this case, the Focus Group (FG) sample is composed of six individuals aged between 64 and 80 years, 4 of them female and 2 males. The participants knew each other, as students at the Senior University of AAA (Removed for blind review), and one of his teachers accompanied the session, in addition to the moderator. The session lasted approximately 1h30m, in a UX Lab, simulating a living room with a TV (Fig 1).

Figure 2: Focal Group in the UX Lab.

After contextualizing the session and signing the informed consents, the importance of their opinions for the future development of a notification service was highlighted, and that none of them was being evaluated and, on the contrary, the team need them to contribute with their living experience. Then, the participants were invited to introduce themselves and report their television consumption habits and use of technological devices.

The oral collection of habits and demographic data was adopted instead of filling out a questionnaire, so as not to tire the participants and make them more available to focus on the discussion of the proposed scenarios about TV notifications. For this purpose, animated videos were shown, depicting the proposed solution with a realistic character, to maximize the understanding of the pratical scenarios presented. After the presentation of each scenario, participants were invited to openly express their opinion on the usefulness of these notifications in their daily lives. At the end of the session, a summary image was presented, recalling all the scenarios, to promote a discussion about their preferences and collect suggestions for other scenarios they considered relevant.

Regarding television consumption habits, all participants stated that they watch TV every day. The newscasts are the most watched programs by the group, being consumed daily. In addition to news content, 2 participants mentioned watching documentaries, 2 mentioned movies, 1 mentioned

entertainment programs and 1 of the participants mentioned programs about sport. Additionally, 2 participants stated that they usually do other activities while watching television, such as "playing crosswords" or "making lace". Another participant demonstrated second screen practices, when referring that he usually uses a tablet to search for news or subjects he saw on TV – *"It is a way of deepening themes that I like or find interesting"*– while another participant demonstrated that he uses TV mainly as a way of "feeling accompanied during the day", since she leaves the TV-sets on in different rooms of the house.

As for the use of other devices, all participants have cell phones. Only 2 individuals stated that they use the cell phone only to answer or make conventional calls. The remaining 4 participants use their mobile phones daily to send messages, browse social networks and make video calls. One of the participants mentioned that this form of communication facilitates contact with his family: *"My children live far away. Talking to them via video is a way of being closer"*. Regarding other devices, in addition to the cell phone, 3 participants claimed to own a computer, 1 participant owns a tablet, and 1 participant owns a smartwatch.

In order not to disperse attention, nor to tire the participants too much, six scenarios centred on information and contexts highlighted in the literature for this senior audience were presented: phone call notification on TV; exchanging messages with family members; notification for participation in public events; invite friends to public events; health monitoring and breaking news from trustable sources.

As a final remark, all the participants considered that notifications in the TV about breaking news were very important.

3.2 Digital Solution Development

Digital news formats, specially provided by social media and news aggregators, are dominant in younger audiences, while older audiences tend to be more focused on traditional media, like the printed press and television. Thus, news notifications from credible sources displayed on the TV can bring a surplus value, specially to older adults.

The digital solution proposed in this paper comprises components from 2 projects: TRUE and OverTV.

On the one hand, the TRUE project offers a set of news sources and robust instruments for the automatic selection and credibility assessment of information sources, as well as a newspaper creation tool that incorporates a news writing tool, to help high school students to produce trustworthy content. The proposed solution in this project aims to promote critical thinking and awareness about fake news. On the other hand, the OverTV project provides a digital solution based on TV-first interface to push notifications, by using a notification management platform, that allows scheduled personalized information to be displayed on-screen in the TV device as well as on personal connected devices, such as smartphones and tablets.

The solution proposed in this article was based on integrating news notifications in the OverTV project information flow, that are generated and curated (in terms of credibility) in the TRUE project. Thus, older adults, that spend a considerable amount of time in the front of the TV, will receive notifications about breaking news (from credible sources) in their TV sets allowing them to be informed and, consequently, more able to participate in society. Figure 2 depicts the System architecture of the digital solution.

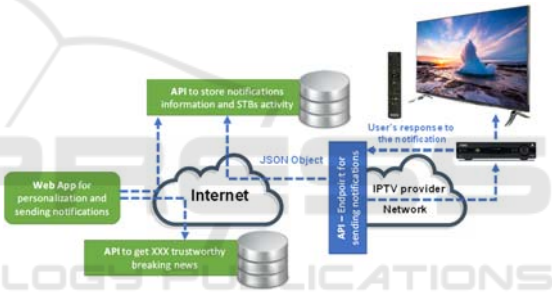

Figure 3: System architecture.

The digital solution proposed comprises the process of displaying news notifications on the TV screen; a pop-up message integrated into the morning and evening routines, with headlines of breaking news (in the morning routine) and local news (in the evening routine). This richer format of notification adopts the look and feel of social media and Over the Top (OTT) platforms' thumbnail cards to appeal audiences, aiming to foster the sense of knowledge of older adults and generate engagement, to reinforce a sense of community.

The solution was designed based on a flow of information that automates the selection and dispatch of credible news to people's households.

Firstly, a WebApp obtain the content used to create a notification based on news from the TRUE engine main role.

Figure 4: News' notification.

For the notifications content, the OverTV engine detects the breaking news' key points. Then, the project's API returns the breaking news' information and their credibility level. Next, the system detects the viewers' district location, and the most credible and relevant breaking news for that geographical area are stored in the OverTV project's database. Then, the OverTV project solution creates and sends notifications to the user's TV, based on pre-determined parameters.

Afterwards, if the user's TV STB (Set Top Box) is on and if the viewer is surfing TV channels, the notifications are sent to the TV's service provider API. Finally, this API sends the notifications to the designated household TV STB.

The news notifications are sent using the following criteria: the general and local news notifications are integrated into the morning (from 7 AM to 11AM) and evening routines (from 7PM to 11PM) sent when a viewer is zapping.

3.3 Field Trial

The main goal of the field trial was to understand how the users react to TV notifications in a shared device and how useful the trustworthy breaking news were to their daily lives. After the users' experience during the trials, the aim was also to obtain suggestions for improvements and for other typologies of notifications.

The field trial was carried out between July and August 2022. The assessment protocol was divided into four phases: i) the recruitment of participants and the provision of instructions about the proposed solution and the field trial; ii) the filling-in of a pre-test survey to characterize the users' sample regarding the usage of devices and TV consumption habits; iii) the implementation of the developed solution at the participants' households, with permanent remote monitoring and technical support when needed; and iv) the final phase, which consisted of filling-in a post-trial survey to obtain feedback, namely about the different thematic notifications, problems faced, suggestions for improvements, and the receptivity to this service in the future.

The sample was comprised of 9 participants, 5 female and 4 males, between 65 and 85 years old. The 25 participants are distributed into 6 houses (each corresponding to a STB) with different compositions of family households.

The characterization questionary showed that, given the wide age range of the sample, some participants expressed difficulties using certain devices. Seven users mentioned that they faced difficulties using the smartphone, whilst other 2 do not use this device at all. Regarding the tablet, 10 participants do not use it and another 2 have difficulties doing so. Finally, 4 participants expressed difficulties using the computer and 7 do not use it at all. Regarding the TV consumption habits of the sample, 7 of the participants mentioned that they watch TV more than once a day, and 2 said they watch it once a day.

4 PRELIMINARY RESULTS

Overall, throughout the field trial, 504 notifications were created, of which 442 were sent (meaning that the STB of the users are connected when the notification was sent). When questioned about how many notifications they viewed, 3 of the users said, "more than 3 per day". Complementing these statistics, 6 of the participants considered that the number of notifications they saw every day was "adequate", and another 2 considered it "very adequate", and one, "not adequate".

In the post-trial survey, 5 of the users expressed that the routines' notifications were "very useful" and 4 considered them "useful". However, 5 of the users considered particularly "useful" the breaking news sent in the mourning routine, suggesting that this type of content may be more suited to the beginning of the day.

5 FINAL REMARKS AND FUTURE WORK

To evaluate a solution of notification on the TV a field trial was carried out with a sample of 9 participants from July to August of 2022. Overall, there was a

positive response to TV notifications in terms of usefulness of the messages (56%) and a manifest willingness to use such a service in the future (80%). Despite the delivery rates registered (approximately 46%, conditioned to having the STB turned on), the participants indicated the following preference of time slots to receive notifications with trustworthy breaking news in the TV: afternoon period (56%) and the morning period (44%).

In this way, the field trial validated the usefulness of TV notifications with trustworthy breaking news, although with the need of fine-tuning the sending schedules to increase the rate of sent notifications. Improvements to the prototype according to suggestions for new types of notifications will be addressed in future iterations of the prototype and in an extended field trial to allow to optimize the impact of the delivery times.

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REFERENCES

Anyfantis, N., Kalligiannakis, E., Tsiolkas, A., Leonidis, A., Korozi, M., Lilitsis, P., Antona, M., & Stephanidis, C. (2018). AmITV: Enhancing the role of TV in ambient intelligence environments. *ACM International Conference Proceeding Series*, 507–514. https://doi.org/10.1145/3197768.3201548

Baptista, J. P., & Gradim, A. (2020). Understanding fake news consumption: A review. *Social Sciences*, *9*(10), 1–22. https://doi.org/10.3390/socsci9100185

Bathla, S., Garg, S., & Kumar, S. (2023). Fake News, Rumours and Misinformation: Characterization, Causes and Detection Techniques—A Survey. In S. Tiwari, M. C. Trivedi, M. L. Kolhe, & B. K. Singh (Eds.), *Advances in Data and Information Sciences* (pp. 35–45). Springer Nature Singapore.

McGee-Lennon, M. R. (2012). Reminders that make sense: Designing multisensory notifications for the home. *Journal of Assistive Technologies*, *6*(2), 93–104. https://doi.org/10.1108/17549451211234957

Munger, K., Luca, M., Nagler, J., & Tucker, J. (2018). *The Effect of Clickbait **.

Silva, T. (2022). Broadcasting, through TV, social services information to older persons. *Working with Older People*, *26*(4), 249–257. https://doi.org/10.1108/WWOP-01-2022-0001

Silva, T., Almeida, P., Cardoso, B., Oliveira, R., Cunha, A., & Ribeiro, C. (2020). Smartly: A TV Companion App to Deliver Discount Coupons. In *Communications in Computer and Information Science: Vol. 1202 CCIS*. https://doi.org/10.1007/978-3-030-56574-9_4

World Health Organization. (n.d.). *Mental health of older adults.*

Yoong, S., López, G., & Guerrero, L. A. (2018). Smart device-based notifications: A survey on user's satisfaction of traditional notification mechanisms. In *Advances in Intelligent Systems and Computing* (Vol. 609). https://doi.org/10.1007/978-3-319-60477-0_12.