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Digital Neighbour Network

Acknowledgements

This project was made possible thanks to the financial support of AMS Healthcare.

We would also like to thank the members of our advisory board and key project partners, as well as all of the industry stakeholders and NORC residents who offered their time and ideas as participants in our co-design engagements.

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How to cite: *Recknagel, J., Madho, C., & Frew, M. (2020). Vertical Aging: The Future of Aging in Place in Urban Canada, The Digital Neighbour Network (No. 1). UHN OpenLab. http://verticalaging.uhnopenlab.ca/wp-content/uploads/2020/09/DNN_20-09-16.pdf [verticalaging.uhnopenlab.ca]*

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Abstract

In order for seniors to remain living in their homes, most will eventually require support with instrumental activities of daily living. In some senior-dense residential buildings, known as Naturally Occurring Retirement Communities (NORCs), newly retired seniors are willing to volunteer their time to help others, but find it difficult to connect. A technology platform could improve the ability for groups of neighbours to self-organize and provide mutual support. Through collaborative exploration with 20 seniors currently living in NORCs, a concept model for a Digital Neighbour Network was developed. This paper describes the envisioned functionality of this platform, as well as key user experience criteria including safety, privacy and flexibility.

Contents

This paper is the first of three projects exploring high-potential solutions that can help shape the future of aging in place in urban Canada. They take the decades old concept of a naturally occurring retirement community (NORC) and reimagines it within the context of the tech-driven world of today and the near future.

Introduction

Seniors want to age in place and avoid institutional care for as long as possible. Long-term care, with its structured programming and regimented schedules, has been criticized by seniors for removing some of the fundamental aspects of being human: self-determination, autonomy, and choice.[1] However, in order to remain at home, most seniors will need some type of support to get by.

While most Canadian are able to access publicly-funded home care, such services do not typically include help with simple daily tasks, sometimes called instrumental activities of daily living, such as accessing groceries, rides to doctor's appointments, or simple home maintenance.[2] Through OpenLab's work 'Taking Charge: Participatory Models of Aging in Place, Designed by Seniors, for Seniors', our team learned that these instrumental activities are key in helping seniors maintain a sense of independence, freedom, and vitality, which, in turn, builds the confidence to continue aging independently.[2]

While private services are available, most require paying a 3-hour minimum, making them prohibitively expensive for low- and middle-income seniors. What's more, according to a 2017 report, of the 95% of seniors in Ontario who do receive home care, only 2% can get by without help from a patchwork of 'informal caregivers,' such as family, friends, and neighbours.[3] Thus, there are service gaps in both the public and private systems that prevent seniors from getting the help that they need.

In Canada, unpaid caregivers are responsible for 80% of seniors' care in the community.[4] Traditionally, adult children have fulfilled this role; however, social and economic shifts have led to adult children living more geographically dispersed, working longer hours, maintaining dual income households, and having children later in life than previous cohorts.[2] These changes are putting pressure on this so-called 'sandwich generation' and disrupting the ability of adult children to care for aging parents.

In the face of this generational shift, neighbour-to-neighbour networks may help fill the gap, especially those co-located within the same building or neighbourhood where there is a high concentration of older residents. These areas, sometimes called 'naturally occurring retirement communities' or 'NORCs', are populated by older seniors who need help, as well as younger seniors looking for avenues to participate meaningfully in their community.[5] This is particularly true for recent retirees who are experiencing a loss of connection as they retreat from the working world.[6]

Although social isolation can occur at any age, old age has been shown to be a major factor due to the loss of daily contacts resulting from retirement or the death of friends or spouses.[7] Interestingly, research has shown that neighbours play a key role in maintaining social relationships due to proximity. In a meta-analysis from 2001, it was found that

interactions with neighbours led to a larger decrease in loneliness than with family members because neighbours were closer and thus had more frequent interactions.[7,8] As adult children move farther away from their aging parents, there is an opportunity to tap into neighbour networks as a source of support for our aging populations.

Creating networks of support amongst neighbours is not only beneficial to the recipient of the help, but to the volunteer as well.[8] There is ample evidence that suggests volunteering helps individuals feel more connected to their community by creating a sense of belonging, purpose, and identity.[9–11] Volunteerism among older adults also has positive impacts on physical and mental health, including a reduction in depressive symptoms, stress levels, and overall life satisfaction.[12–16]

We propose that creating organized neighbour networks in NORC communities can play a larger role in supporting independence amongst seniors who want to age in place. At the same time, these networks can provide opportunities for retirees to actively participate in their community and discover a new sense of purpose and belonging.

Background

OpenLab has been working with senior residents in several NORC buildings to understand how technology might be used to build a neighbour-to-neighbour network that connects older adults with neighbours willing to help. Through a design research protocol that involved semi-structured interviews and co-design engagement, we discovered that many younger seniors actively seek volunteer roles and view supporting elders as a pay-it-forward investment in their own future. However, they have no means of connecting with their senior neighbours, and are unsure of how to offer help without overstepping.

In the US, the community-driven 'Virtual Village Movement' directly addresses this problem.[17] Neighbours sign up to help seniors from their local community through a centralized hub, specifying what activities they are able to help with and on what days and times. The hub then acts as a "one-stop-shop" where seniors can call and request help and a coordinator will match them with a willing volunteer.

Unfortunately, for many villages, the cost of hiring a coordinator is difficult to maintain. While some villages charge a modest membership fee, many report that these types of administrative costs are hard to meet and ultimately impact the sustainability of the organization. Some villages have attempted to use volunteers to fulfill the coordinator role, but report high rates of burnout and turn over, which negatively impact their organizations.[2]

A digital platform may hold the key to making this model more sustainable in Canada. By automating labour intensive tasks such as matching and coordinating, the administrative burden could be drastically reduced while keeping costs low.

A 2019 AGE-WELL survey showed that 74% of seniors aged 65 and over feel confident using current technology, and 8 in 10 Canadians over the age of 65 believe technological advances can help older adults stay safe, in their own homes longer, and independent.[18] While these data are somewhat skewed, in that they include younger seniors as well as the 'elderly elderly', it is our belief that as the boomer generation comes of age and starts requiring support, a digital solution could be widely adopted.

As part of this project, the OpenLab team conducted an environmental scan to seek out digital solutions that attempt to address a similar need for informal support. A handful of products were found. Most notable are the social networking platforms, such as Facebook community groups, NextDoor, or Front Porch, which are electronic messaging boards for self-defined communities, such as neighbours.[19–21] While these platforms do benefit from having a large pool of active users, they are not particularly well organized for task fulfillment and do not focus on seniors-specific needs or user experience (UX) guidelines for seniors' accessibility.

Task-based platforms, such as Jiffy On-Demand, TaskRabbit, and Instacart, do connect seniors with some of the supports

they need to remain independent, such as home repair, handyperson services, and grocery delivery respectively.[22–24] However, they do not offer the full spectrum of services in one place. Most importantly, as with private home care, they also work on a fee-for-service model that can become costly if ordered à la cart.

The closest approximation of what we are envisioning is a "crowd caring" platform developed in Israel called Vitalitix.[25] This platform bills itself as a "21st century model for active volunteering" and helps connect seniors to their immediate circle of care, as well as neighbourhood volunteers called 'social angels'. However, through research we learned that while there was a dedicated community of volunteers, the platform was unable to become financially independent and failed to raise funds to continue operations, effectively falling victim to the sustainability problems experienced by Virtual Villages.

Although there are numerous technologies that accomplish some of our identified needs, it is clear that none are specifically designed to facilitate low-cost, low-barrier support for seniors. This has led us to propose the "Digital Neighbour Network", a seniors help platform grounded in community and relationship-building that connects seniors who need help with volunteers in their NORC building willing to help.

The following is a concept model for how the proposed Digital Neighbour Network would function. This concept was co-designed in collaboration with 20 seniors who currently reside in naturally occurring retirement communities in Toronto.

The Digital Neighbour Network

We envision a computer and mobile-based platform that will:

a) Provide a mechanism to sign up and organize local volunteers
b) Take requests from seniors looking for help with instrumental tasks of daily living
c) Match seniors with volunteers in a timely way

It will accomplish these objectives by providing a mechanism for peer-to-peer networks to flourish in NORC buildings, where there are both older seniors in need of help and younger seniors looking for opportunities to pay it forward.

This platform will serve the same function as the coordinator role in the Virtual Village model, the key difference being that tracking requests and matching volunteers will be automated and information will be relayed digitally. Initially, the Digital Neighbour Network will provide help along four categories of support: rides, pickups, tech support, and safety/security checks.

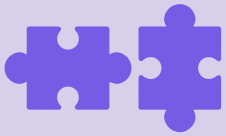
Key to the Digital Neighbour Network is the acknowledgment that all users are capable of volunteering and may equally benefit from support. Acknowledging this duality and designing for this reduces the creation of a volunteer-senior dichotomy and equalizes all participants.

Functionality

The Digital Neighbour Network has 4 main touchpoints that are mirrored on both the senior and volunteer neighbour side of the platform:

1. Onboarding

2. Requesting



3. Matching

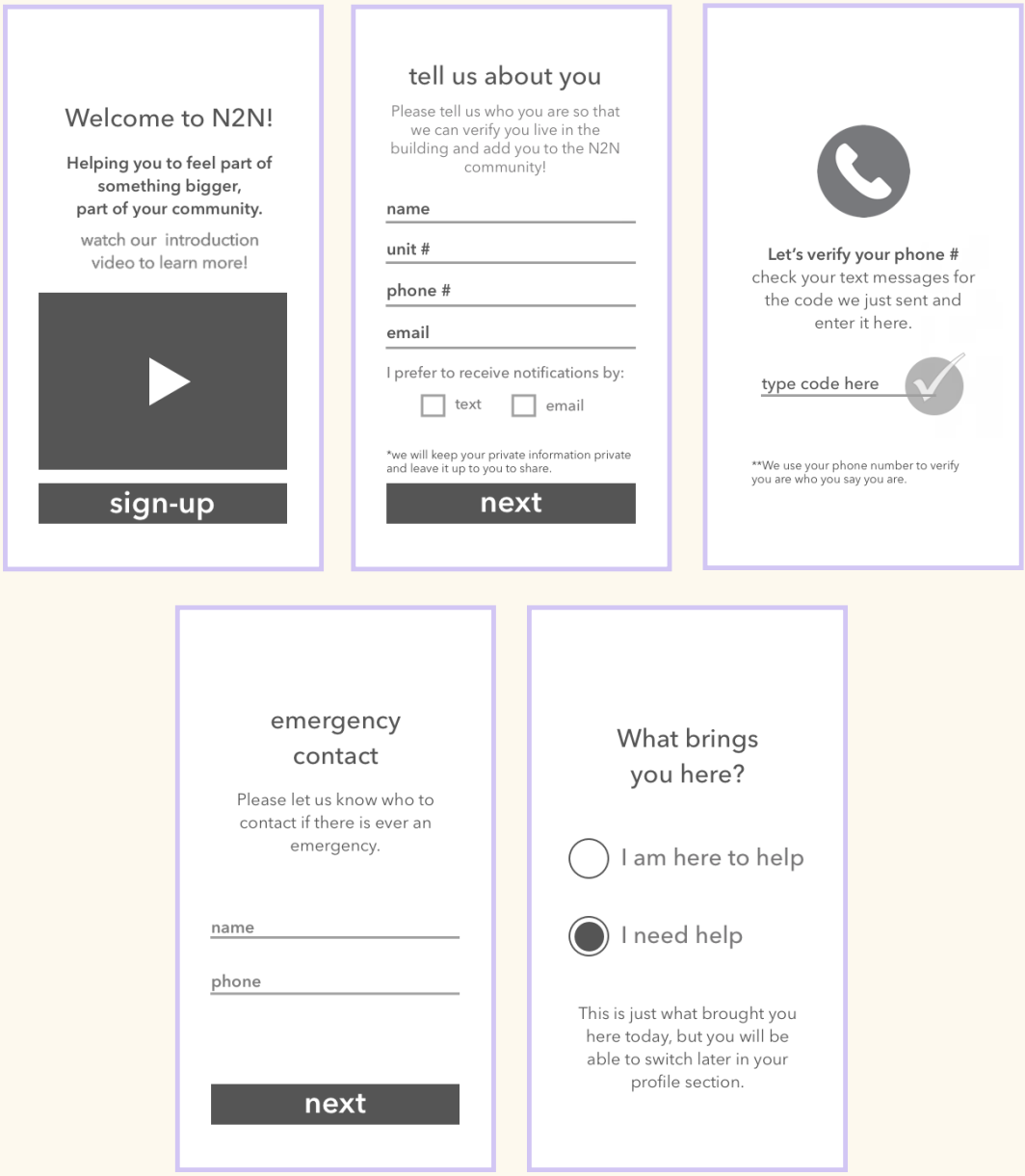
4. In-Appointment Support

5. Completion

1. Onboarding

All potential users must apply to be a member of their building's community. This includes going through a sign-up and verification process, and providing personal details, including language needs, gender preferences, disability support, and mobility considerations.

Applications are then reviewed and verified by a system administrator prior to applicants receiving an invitation to join the app. The administrator will confirm the identity of the user and confirm residence in the building. Once access to the app is granted, seniors and volunteer neighbours must complete a training module that outlines the community code of conduct, how to manage boundaries and expectations, safety standards, and training on how to support seniors effectively.



2. Requesting

When a senior identifies that they need help, they can submit a new request through the app by choosing from four categories of support:

1. Rides

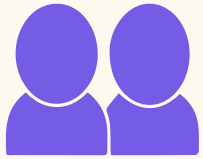
The intention of the ‘rides’ option is to provide both a ride and an escort. For example, if the ride is to a specialist appointment, it would include a ride to the hospital, help getting inside, and the return trip home.

2. Pickups

This includes shopping support for the pickup of groceries and other household items. Payment will not be managed through the app, users will negotiate those details once they are connected.

3. Tech Support

Assistance with technology can range from simple tasks, such as learning to use a new app, to more complex tasks, like figuring out why the internet is not working. Volunteers will be asked for their technical knowledge and skill level during the onboarding process. This information will help triage requests and pair neighbours with appropriate skills.

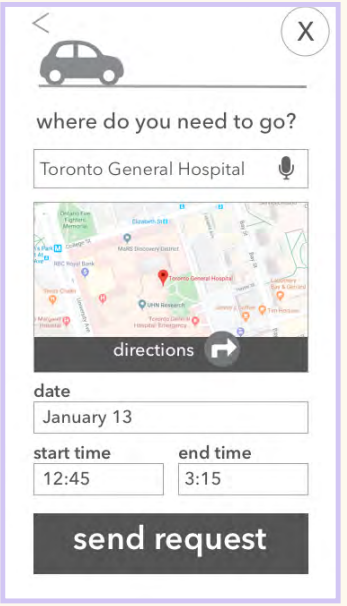


4. Neighbourhood Watch

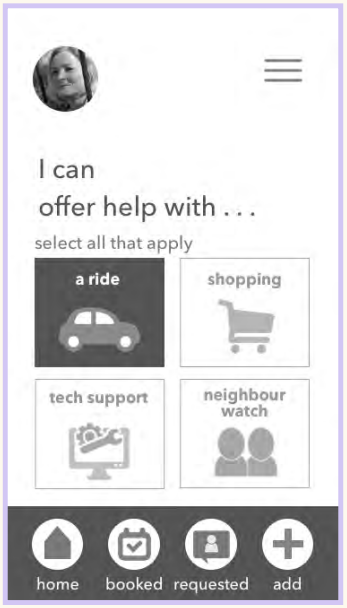
Sadly, many seniors have anxiety about dying in the middle of the night and not being found for days. The neighbourhood watch function pairs seniors up to check in on one another daily.

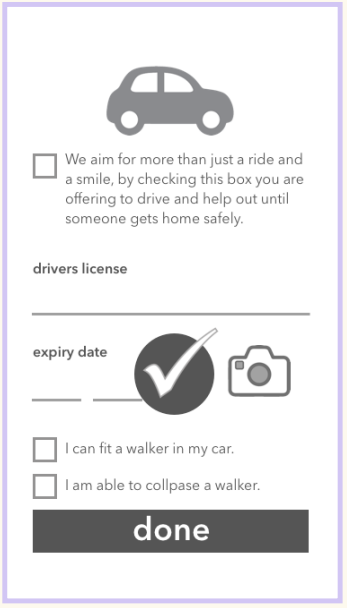
2. Requesting

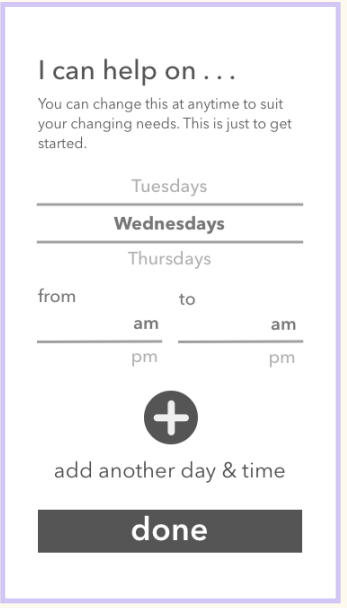
After selecting the appropriate category, seniors will then have the opportunity to provide additional information about the trip, such as the address, date, time, and any special notes that may be relevant to a potential volunteer.



Similarly, when a user agrees to sign up as a volunteer they are prompted to fill out a set of availability preferences, including tasks they are willing to help with and dates/times they are available for requests.

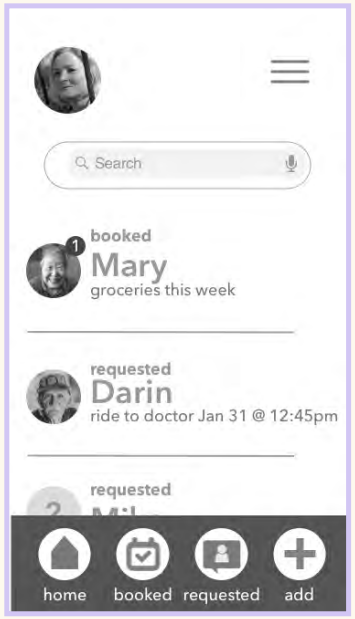


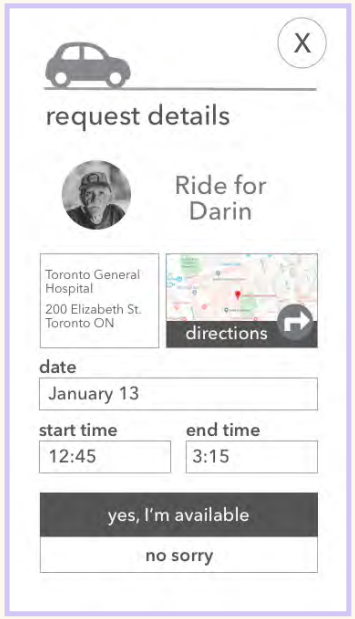


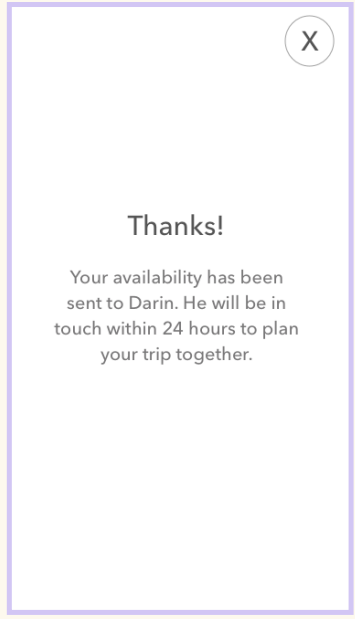


3. Matching

When a senior finishes making a request, the app sends details of the request to all volunteers in their building who match their criteria. Volunteers are able to see a list of new requests in their home screen, as well as a summary of the requests they have booked. If a volunteer chooses to confirm availability for a request, a ping is sent to the senior.

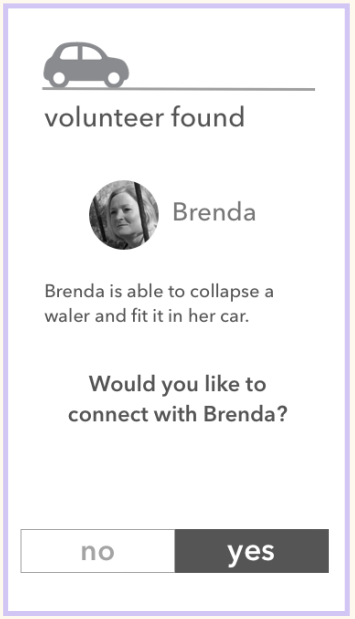


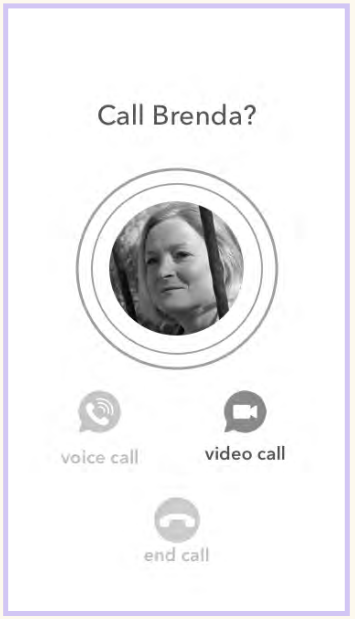




The senior can then decide to connect with them through voice or video call within the app, or pass on this particular volunteer and wait for another one to match.

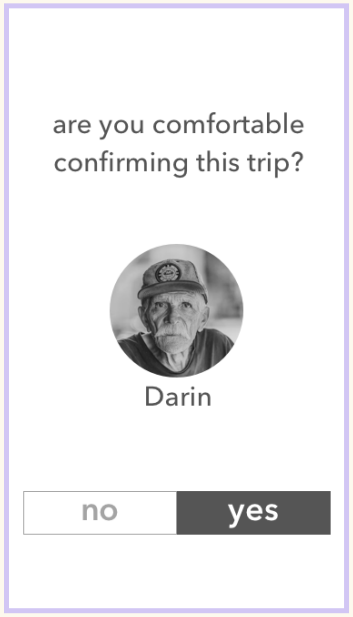
The purpose of connecting through a call is to discuss important details, such as expected duration or reimbursement, before accepting the request.

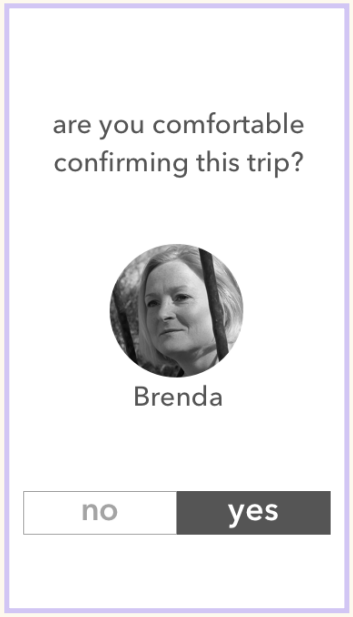


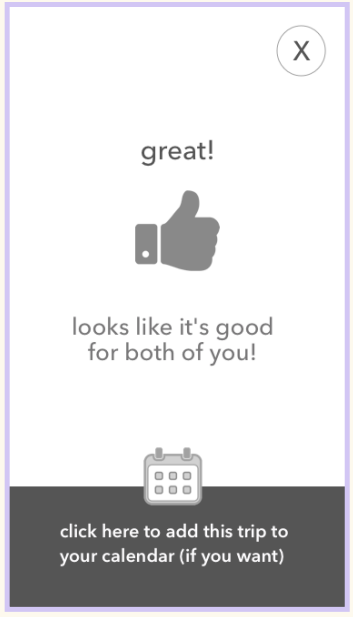


3. Matching

Once the senior and the volunteer have discussed the details, both parties will receive a final confirmation. Both the senior and the volunteer must agree on the match before the appointment is booked.



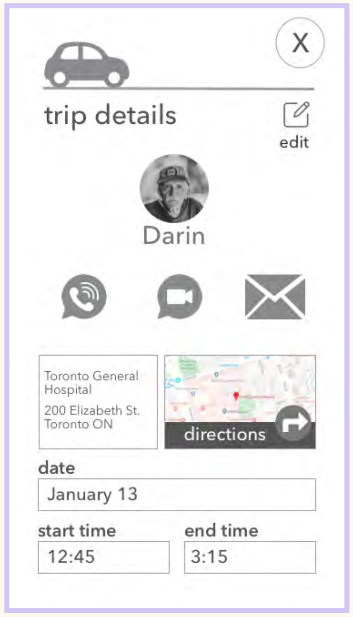




4. In-Appointment Support

During an appointment, the application screen will change to allow quick access to trip details, such as the duration, request details, a map to the destination if it is relevant to the task, and emergency contact information.

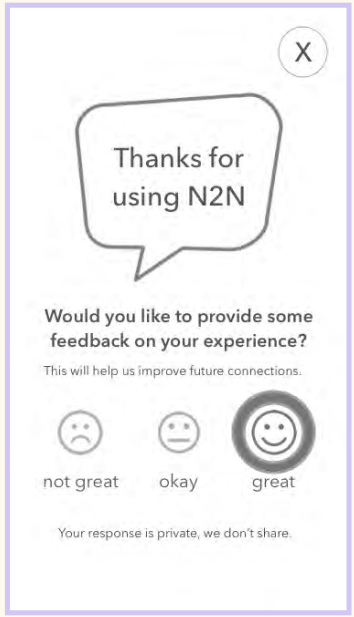
During this time, the app will also turn off incoming volunteer requests.



5. Completion

Once the task has been completed, the senior and the volunteer will be given an opportunity to rate the overall experience and report any inappropriate behaviour. This information will be sent privately to the system administrators for further investigation.

Seniors and volunteers are also given an opportunity to express gratitude to their neighbour by either selecting a pre-written response or typing in their own message.



Key Technology Features

Where the Digital Neighbour Network sets itself apart is in its use of robotic process automation. This will remove the labour-intensive nature of receiving requests, matching, and coordinating volunteers.

Self-service forms and algorithmic processing will allow the comparison of criteria across a database of users to find appropriate matches—including matches that respect user preferences, comfort, or security concerns. Other security features include in-app communication, which will allow seniors and volunteers to connect directly on the platform and avoid sharing personal information until they both feel comfortable.

What's more, there are several existing technology solutions that can be incorporated to improve the user experience. For volunteers, geolocation can be used for those assisting with shopping, such that when they enter their local grocery store a shopping list can pop up and even make recommendations based on which items are on sale. For seniors, implementation of an AI chatbot would support those with vision or dexterity issues by allowing them to engage with the platform using voice commands and home hub interfaces.

It is our contention that this type of digital automation will make neighbour-to-neighbour networks less labour and cost intensive, allowing for more communities to self-organize and provide mutual support.

A full map of the Digital Neighbour Network User Flow can be found *here.*

Discussion

The goal of the Digital Neighbour Network platform is to help seniors get support with instrumental activities of daily living, expand their network of informal support, experience a stronger sense of belonging to one's community, and improve quality of life.

During the development of the Digital Neighbour Network, several issues were identified by seniors as highly important and needed to be addressed through the design of the platform.

Safety

Safety and security for vulnerable seniors was an identified concern. This included flagging problematic users, preventing unscheduled contact, managing emergencies, same-gender matching, and ensuring that volunteers have proper credentials, such as a valid driver's licence.

To address these concerns, the following features were implemented in the design of the platform:

- Ability to request volunteers of the same (self-identified) gender.
- Limiting communication between users to in-app phone calls or video calls.
- Advising against sharing personal information such as phone numbers and unit numbers.
- Advising pairs to meet in the lobby and not in each other's homes on first visit or whenever possible.
- Adding a quick access emergency contact button to the in-visit screen for both residents and volunteers.
- Conduct criminal background checks and driver's license validation.
- Adding a training video and quiz to the onboarding process, detailing expectations of boundaries and proper conduct, confidentiality, steps to take during an emergency, and how to safely support seniors with disabilities.
- Adding a system administration function to ensure accountability among users and to act as mediators if conflict arises.
- Allowing seniors or volunteers to anonymously block requests and alert system administrators to negative engagements and potentially problematic users.

Volunteer Flexibility & Burnout

Volunteer burnout was highlighted as a potential sustainability concern for the platform. One of the mitigation strategies taken in the design of the Digital Neighbour Network is to allow volunteers control over their own schedules. Participants are free to hop on or hop off as schedules or desire allows. A culture that respects and encourages flexibility will be cultivated through language and visual tone.

To cut down on 'notification overload', the platform will also ensure that volunteers are not sent notices that are outside their designated task area or availability window. A 'declining safely' feature ensures that volunteers will never feel obligated to accept a request by offering pre-vetted messages to send, should they choose to decline a request at any stage along the matching process.

As a means to ensure that volunteers feel valued, the ability to send messages of gratitude was integrated into the user flow. The platform will facilitate this sharing in three ways post appointment: a warm and playful animation will be sent, customized emojis, or the ability to send customized or pre-vetted messages of kindness.

Lastly, a foundational principle in the design of this platform is the idea that providing an opportunity to perform micro-tasks, rather locking people into a long-term commitment, will encourage more volunteerism as well as give seniors the sense that "the community is out the looking after me".

Building Trust

Finding the appropriate language and tone for seniors using the platform is imperative, not only from a user experience standpoint, but also as a way of overcoming the safety and security concerns present among seniors. The goal is to not only convey a sense of trustworthiness, but to also use language that is welcoming and eases anxiety around connecting with new people.

In order to explore the effect of language and tone, co-design participants were presented with prototypes that had both a personal, casual, and friendly voice, as well as a formal, functional, and transactional tone. Although both prototypes received positive feedback, a greater numbers of seniors seemed to indicate a desire for a more formal and transactional approach. An overly personal and casual tone connoted expectations of friendship and, for some, even suggested it might feel like a "dating service". A formal yet conversational tone was seen as providing a greater sense of security and gave the platform a more "official" feeling and the appearance of being trustworthy.

Beyond Technology

One of the goals of the Digital Neighbour Network is to build a stronger sense of connection and belonging to one's community. A core bias of the project is the belief that the integration of technology into NORCs buildings should encourage more face-to-face interaction, rather than increasing the amount of purely screen-based experiences. As such, a deliberate design decision was made to connect volunteers and neighbours directly following the first match through phone or video calls. This also helps to minimize back and forth via text messaging, which can be cumbersome for seniors with poor vision or dexterity, and will help ensure details are agreeable before accepting an appointment.

Unsuccessful Matching

Pairing of volunteers and neighbours is the core function of the Digital Neighbour Network. Matches are facilitated in

the back-end by an algorithm that accounts for designated interests and skills, as well as availability and frequency of activity. Profile preferences and needs, such as language, gender, disabilities, and mobility impairments are identified during the onboarding process and inform appropriate matching.

There remains the possibility that in some instances there will not be any matches found. In these cases, there are a number of scenarios that might be possible. Firstly, the local community may decide to expand their network to include local neighbours who do not reside in their NORC building. Secondly, they may choose to form a partnership with a local volunteer agency who could act as 'backup' volunteers. Thirdly, the platform could provide a list of recommendations for local businesses that can help for a small fee. Depending on the system administrator model chosen below, this could also provide an avenue for administrators to negotiate bulk-discounted rates for local services based on volume.

System Administrator

The Digital Neighbour Network was designed with a system administrator role to support security and proper vetting, as well as community management. It has yet to be determined who would fulfill this role and, as a business problem, is closely linked to issues of cost and sustainability of the platform.

Throughout this research project, multiple opportunities for sustainability emerged. However, it is too early in the development process to determine which model is appropriate. A key next step is to pilot the Digital Neighbour Network and, in parallel, explore the various options for sustainability based on what is appropriate for the long-term goals of the platform.

Summary

In this paper, we presented our vision for the Digital Neighbour Network platform to connect seniors with support for instrumental tasks of daily living, expand networks of informal support in NORC buildings, and help to develop a stronger sense of belonging to one's community. We described the platforms envisioned functionality for seniors in need of help, as well as for volunteer neighbours willing to help. We then discussed key design elements that were generated through co-design engagement with 20 seniors.

Throughout this process, we were able to gain a better understanding of not only the technology landscape available to help seniors age in place, but the breadth of needs present among seniors in high-rise buildings. Through this work we were able to come up with a concept model for a digital platform that can overcome the administrative barriers faced by virtual villages in order to help seniors age in place.

Pandemic Post-Script

The research outlined in this report concluded in November 2019, preceding what would become one of the defining public health crises of the 21st century: the outbreak of the novel coronavirus, COVID-19. The coronavirus is lethal not only because of its severe respiratory effects, but because it is easily transmissible and those infected can spread the virus for up to two weeks while being asymptomatic. For the average person this is concerning, but for vulnerable populations living with existing health conditions, such as seniors, this poses a significant threat.

As uncovered in this research, many seniors require assistance with tasks such as grocery shopping. In the presence of a global pandemic, these challenges were made worse by the new reality of having to wait in long lines at some stores, which may not be possible for frail seniors, and province-wide quarantine orders, which made many seniors fearful of leaving the house due to the risk of contracting COVID-19.

In the face of this growing need, OpenLab was able to leverage our learnings from the Digital Neighbour Network project to create the Friendly Neighbour Hotline, a volunteer-run service that connects seniors who needed help purchasing groceries and household essentials with volunteers from across the city willing to shop on their behalf.

For all intents and purposes, the Friendly Neighbour Hotline is a low-fidelity prototype of the Digital Neighbour Network platform. Over the course of its first few months in operation, the Friendly Neighbour Hotline enlisted over 1,400 volunteers, resulting in over 1,000 completed deliveries, demonstrating that there is an appetite for neighbour-to-neighbour support in Toronto.

Through the development of the Hotline, we were able to connect with a growing community of mutual-aid organizations across Canada. In speaking with these organizations, it became clear that these new groups were facing the same issues that organizations such as Virtual Villages faced: how can they efficiently and sustainably coordinate tasks, match volunteers with recipients, and communicate across their communities? Beyond validating the issues presented in this report, it signals that an open-source technology solution could be immensely valuable in supporting self-organizing groups across the country.

We also encountered many seniors, particularly those with low-income, who do not have digital access. If we are to move towards a digital future, we must consider how to do so equitably. Although digital literacy is on the rise, for some, poverty will likely continue to be a barrier to accessing digital services.

The COVID-19 pandemic is creating a paradigm shift in how we view social services in Toronto. Not only has it inspired citizens to volunteer their time to support their communities, it has also motivated businesses and shifted political appetite towards supporting these types of community-led groups. Though this is a needed change for the immediate quarantine response, the reality is that beyond the pandemic the need for these social supports will still exist. As the city prepares for future waves of the virus, social supports such as the Friendly Neighbour Hotline / The Digital Neighbour Network will become increasingly necessary in supporting seniors to remain aging in place—during and beyond the pandemic.

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