Journeys through the Master Innovation and Development Plan
(Digital Innovation Appendix)

Evaluating the DIA through a participatory design and authentic consultation process.

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Introduction

In her review of the November 2019 Digital Innovation Appendix (DIA), Dr. Jutta Treviranus, Founder and Director of the Inclusive Design Research Centre (IDRC) describes the problem of artificial intelligence (AI) or machine decisions that are based on analyses that prioritize frequency and lack sensitivity to small and/or outlying data clusters. This problem is fundamental for smart systems like those proposed in the DIA. Currently, smart systems are inherently biased against small groups and individuals who do not follow the dominant patterns of algorithms that fuel machine learning. People with disabilities, like most, can benefit greatly from the capacity of AI to support daily needs and activities; however they are also most vulnerable to data systems that cannot accommodate patterns that are at the outside of the central average.

In evaluating the DIA, IDRC undertook a participatory, bottom up approach that would consider how the systems proposed in the DIA might impact an individual with disabilities. We were interested in impacts that could be beneficial as well as impacts that were potentially harmful. Experts from the disability community who had a good understanding of technology and disability were invited to participate in creation of vignettes that were based on the DIA. Two sessions were hosted: the first session included four experts with lived experience of disability and/or experience supporting people with disabilities and three experts in inclusive design. The second session included two individuals with expertise in education and support for people with disabilities, two experts in inclusive design and an illustrator. Collectively, the participants could give a variety of unique perspectives related to diverse aspects of disability.

The result of the vignette creation sessions was ten vignettes that imagine how systems proposed in the DIA might impact an individual with disabilities. This report presents each of the ten vignettes and is organized by the proposed subsystem in the DIA. Each vignette includes an illustration and quote that represents the impact of the proposed digital system (and subsystems where appropriate). The vignette is accompanied by a description of what is happening, the proposed service, the data being collected, data decisions based on that data, privacy expectations, impact of the data decision/system, the experience of the individual, opportunities and questions that can be utilized to evaluate the system. Finally, each vignette includes a description of other contexts that would have similar impacts from the system. We included the relevant MIDP sections and DIA sub-systems.

The purpose of this report is to provide authentic consultation with individuals left out of the decision-making process through real scenarios that describe potential impacts of the proposed digital systems in the DIA. The report provides questions that can inform further development of the proposed digital services as well as provide a mechanism for ongoing assessment of them.

Dynamic Streets—Mobility Management*

Hasani, Jamila, and young Amara are out for a walk in their new community. As they cross at a signaled crossing, Amara drops her "Lamby" in the middle of the intersection and cries out. Jamila quickly rushes back to pick it up, against the warnings of her husband and the three of them hurry to complete their crossing to the other side. When this has happened in the past, the light changes before they reach the opposite curb. Happily, this time, the pedestrian light remains lit because it is controlled by sensors that detect that pedestrians are still in the middle of the crossing.

Other Contexts: Sensors in the platforms for streetcars to prevent doors from closing when a passenger is not yet boarded.

*** MIDP Sections:** Vol 2: 1 – Mobility page 49, 88-89, 129

1 Proposed Service: Adaptive Traffic Signals

- Uses in pavement sensors and pedestrian push buttons to detect pedestrians crossing the street, adapting traffic signals to give them more time to pass the street safely
- Integrated into the real-time traffic operational system which enables real-time adjustments, using data from connected traffic lights, vehicle detection sensors, transit signal priority receivers, Bicycle Green Wave sub-system, and Real-Time Crosswalks sub-system

Data Being Collected

- Personal info: None.
- Non-personal: vehicle presence, vehicle counts, transit vehicle speed, pedestrian volume counts.
- De-identified: pedestrian presence.
- Data is generated using:
  - Passive detection for pedestrians: radar
  - Active detection for pedestrians: pedestrian push-buttons
  - Transit Signal Priority (TSP) receiver
  - Passive detection for vehicles and bicycles: electromagnetic loops or radar, detects the presence of a bike or car waiting to use the intersection.

Data Decisions

- Decision made to detect pedestrian, if pedestrian needs more time to cross street, and if traffic signals will adapt
- Process of pedestrian crossing street:
  1. Does radar detect that a pedestrian is crossing? If yes, include in pedestrian volume count
  2. Does pedestrian need more time to cross the street?
  3. Adapt traffic signal lights accordingly

Privacy Expectations

- Pedestrian detection and volume count are non-personal data and non-identifiable. No further behavioural tracking occurs.

2 Impact

- Hasani, Jamila & Amara feel more relaxed when navigating crossings in their new environment.

Experience

✔ Family feels increased security at monitored crossings

✖ Safety risks with fatal consequences, if AI system does not detect Hasani using a scooter as a pedestrian, or determine he needs more time to cross

3 Opportunities

- Prominently post a sign to display to pedestrians that it is an adaptive traffic signal intersection to help people learn about changes to traditional signalling system.

Arising Issues

1. Does passive detection for pedestrians (via radars/pedestrian detection sensors) accurately detect a pedestrian on a wheelchair/mobility device, add them to the pedestrian volume count, and adapt traffic lights accordingly?
2. What accessibility features will the pedestrian push-buttons have for individuals who cannot see/hear traffic?
3. How will you display to pedestrians that they are crossing at an adaptive traffic signal light intersection?

Building—Energy Management*

Lee has been retired for three years and lives alone in a third-floor condo that he can afford on his fixed income. Recently, Lee learned about the Home Scheduler which will help him save money on utilities by controlling when his appliances and systems turn on and off. Lee has tried to sort out when it is and isn't "peak times" so that he can pay less for hydro, but it seems confusing and inconvenient. Lee wants to save as much money as possible but it means that he will have to give up a lot of control to the scheduler and it will collect a lot of information about his behaviour to plan systems to match his needs. For example, it will know when he's out, how long he'll probably be, and will adjust the temperature accordingly. It feels a bit weird to Lee to have his movements followed so closely, but he wants convenience and money savings. He's not sure what to do.

Other Contexts: Go beyond energy saving to supporting people with physical, sensory, and cognitive disabilities, to live more independently.

*** MIDP Sections:** Vol 2: Chapter 4 – Sustainability page 322

1 Proposed Service: Home Scheduler

- Uses energy budget (set by tenant), actual and predicted occupancy, weather and energy prices to automate the operations of energy systems and devices (e.g. air conditioners, dish washers).
  - A low budget results in more automation control to operate in low peak times and will delay operation in high peak power pricing; the tenant can override this decision. If the tenant sets a high budget, the tenant has more control with little/no intervention.
- Generates data feed for households to understand the actions being taken, and can learn individual household preferences over time.

Data Being Collected

- Personal info (restricted, not published for privacy reasons): Further system development is needed to identify the data required to optimize energy performance. As this system is further designed, it would be subject to the Responsible Data Use Assessment process. Personal data would be patterns of occupancy and use for appliances/electrical equipment.
- Service receives data inputs from the Building Energy Management sub-systems (HVAC Performance Monitoring, Efficient Building Lighting, Building Electricity Monitoring, Digital Electricity) and the Dynamic Rate Engine.

Data Decisions

- Determines if the device will operate based on the set budget, actual & predicted occupancy, weather and energy price, and learned individual preferences. The user can intervene and override automation decisions.

Privacy Expectations

- Information is shared between the scheduler system and Building Energy Management sub-systems. Expect the data is only used for automation and energy optimization purposes and is not anonymized and sold.

2 Impact

- Lee is having trouble using the service to support his needs and independence. Sometimes, he's stressed and concerned that the app isn't working properly. Ideally, Lee wants to set his own schedule for his appliances, but the Home Scheduler automates based on different parameters. Instead, he must allow the collection of information about himself so that it can learn his individual preferences.

Experience

- ✓ Moderate, helps save energy, reduce energy bill.
- ✗ Learning curve can stress Lee out, human support options are limited in the system. Inconvenient/difficult to contact building management each time he has an issue.
- ✗ Doesn't fully support his autonomy; he wishes he could use it for his exact needs.

3 Opportunities

- Introduce features to serve people with physical, sensory, and cognitive disabilities (e.g. automation of lights turning on when occupant enters a room, and windows closing in case of rain/snow).
- Have the system more customized to the user's needs and ability to enter in their preferences to better support individual needs & autonomy.
- Possibility to enable and disable features.
- Ensure client-facing staff have accessible customer service & diversity/inclusion training to provide technical support to diverse communities.
- In-system human support options

Arising Issues

1. The system will automate based on "energy budget, actual/predicted occupancy, weather & energy price", and learn household preferences overtime. Can other information be inputted to support autonomy?
2. How can some items be designated as "always on" (e.g. a scooter charger)?
3. How can a person using this app seek human assistance? Can this be possible directly within the system?

Waste Management System*

Maria is a single mom with a toddler. Recently, her father Aren moved in with them so that she can help care for him and he can help with the baby. Aren has a physical disability and uses a wheelchair, he regularly uses incontinence products. Maria also uses diapers for her toddler. Maria disposes the incontinence product waste mostly at home. She received her bill for waste disposal in February, which went up to double the amount compared with the previous month. Maria feels frustrated that her decision to care for her father in home rather than have him live in a subsidized care home is adding to her costs in unexpected ways. She feels penalized for taking care of her father and that the Waste Management System is arbitrary.

Other Contexts: People may generate excess waste for a variety of reasons related to medical conditions and disability, and may require special consideration when calculating waste costs.

*** MIDP Sections** Vol 2: Chapter 4 – Sustainability page 350

1 Proposed Service: Waste Management System

- "Smart" trash chutes register the individual's residential unit using the digital user interface, quantifies the weight/volume of the waste deposited into the Smart Chute, and provide users with waste sorting feedback. Smart Chute will connect to a waste pricing and billing platform to charge tenants for the waste that they deposit.

Data Being Collected

- Operational System: uses data inputs from the Waste Sorting, Processing, & Monitoring sub-system, the Pneumatic Waste Collection sub-system, and the Digital User Interface to perform system functions.
- Aggregate: Trash weight and volume.
- Digital user interface/billing system: De-identified: anonymized, unit level waste production for comparing waste trends between typical sized units.

Data Decisions

- Calculates the amount of waste a household produces, and charges tenants accordingly.

Privacy Expectations

- Expect that that information collected will be limited to weight and material type (rather than specific product identification) and that information will not be a factor when applying for lease extensions/future leases.

2 Impact

- They are having trouble balancing their waste disposal bill, rent, and food budget. They don't know how to dispose of the incontinence products without incurring additional fees, and they don't want to illegally dump the waste in public garbage.

Experience

- ✔ Feels more confident that she is recycling correctly based on waste sorting feedback.
- ✖ Feels discriminated against because they are being penalized financially over a natural human process that they cannot control.
- ✖ Feels uncomfortable in confiding in superintendent/building management.

3 Opportunities

- Determine guidelines to prevent discrimination in waste disposal, e.g. option to disclose medical waste or packaging waste related to disability.
- Ensure building management and client-facing staff have accessible customer service training and diversity and inclusion training.

Arising Issues

1. What measures can be put in place to prevent discrimination in waste disposal billing?
2. How can ways for individuals to feel comfortable confiding in building management/staff for additional support be improved?

Outcome Based Code—Building Systems*

Renata and Adonis recently celebrated their 23rd anniversary of being together. This year the anniversary is especially important because Renata is undergoing treatment for breast cancer. She has a prescription for medical marijuana to help relieve her pain and prefers to use her prescription indoors, because she feels safer in the comfort of her own home. Adonis knows that many people still have a negative view of marijuana and is a bit nervous about the situation and how the sensors in the apartment might react. Adonis also wonders if, because of his wife's prescription use, he will be marked as a smoker when he is not one.

Other Contexts: Odours are generated for many reasons that could be a source for discrimination: cooking (e.g. strong spices), hair dye, personal odours.

*** MIDP Sections:** Vol 2: Chapter 5 - Digital Innovation pages 448-449

1 Proposed Service: Building Monitoring (Air Quality)

- Monitors building nuisance and air quality to detect pollutants and unsafe conditions using air quality sensors.

Data Being Collected

- Personal info: None.
- Non-personal (Restricted - data would only be provided to building owners, facilities managers and city regulatory officials for buildings): odour, CO2, CO, VOC, lead detection; aggregate number of occurrences that thresholds have been exceeded; overall building performance e.g. structural performance.

Data Decisions

- Data influences building environmental decisions/rules made by building owners, facilities managers, and city regulatory officials

Privacy Expectations

- Expect to have their privacy respected in their home and that they can do as they please without any repercussion or penalty from data collection.

2 Impact

- Adonis and Renata can do this in their home freely, but they are worried that data from the sensors could impact their leasing term or relationship with the facility managers/ building owners or be used as evidence in legal proceedings.

Experience

- ✓ Feels safe, prevents pollutants like carbon monoxide.
- ✗ Feels anxious that they can be penalized in the future based on data collected.

3 Opportunities

- Be transparent with the process of data collection and use
- Clear guidelines for tenants on how data will be used by building owners, facilities managers, and city regulatory officials

Arising Issues

1. What is the threshold to determine if there is an air quality disturbance?
2. What types of gas/elements are being detected in air quality (e.g. odour/CO2/smoke)?
3. Can this data be used by building owners, facilities managers, and city regulatory officials to penalize tenants? Can this data impact the decision to end a tenant's lease term, extend a lease term, or sign future leases in the community?
4. Can this data be provided to law enforcement agencies?

Outcome Based Code—Building Systems*

Alex is a young man who lives semi-independently. Along with a cognitive disability, Alex has involuntary vocalizations that can occur at any time especially when he experiences emotional extremes (happy/sad) change of situation or stress. Alex's caseworker, Pat, visits daily and today she finds him very distressed because he was visited by a police officer earlier in the day regarding excessive noise alerts from sensors that pick up his vocalizations. The effort to not vocalize is increasing Alex's distress causing his vocalizations to increase and his stress to spiral out of control.

Other Contexts: Family with one or more babies/toddlers, practicing an instrument

*** MIDP Sections:** Vol 2: Chapter 5 - Digital Innovation pages 448-449

1 Proposed Service: Building Monitoring (Noise Conditions)

- Monitors building nuisance and environmental noise conditions using sound level sensors to ensure that tenants adhere to acceptable nuisance thresholds.
- If the noise level goes above the threshold, building owners & city regulatory officials will be notified.

Data Being Collected

- Non-personal: Decibel levels from a noise/decibel meter (total volume level, no audio recording) floor plate loading, vibration; aggregate number of occurrences that thresholds have been exceeded; overall building performance e.g. structural performance
- Data is provided to building owners, facilities managers, and city regulatory officials

Data Decisions

- Determine if there is a building nuisance or not, ensure tenants are adhering to an acceptable nuisance threshold.
- Determine the number of occurrences that thresholds have been exceeded

Privacy Expectations

- Alex expects that there are no sensors in his home, but only in the hallway, public areas, and outside. He expects building management to be transparent with the location of sensors.
- Only sound levels are monitored not the content of the noise (e.g. not words)

2 Impact

- Bylaw enforcement (the police) may be called without any empathy or understanding because the decision is made by Artificial Intelligence. Alex feels upset that he has been visited by the police and it is anxiety provoking to be monitored in his home for vocalizations that he cannot control.
- Pat (his support worker) feels stress because she's not able to prevent the police intervention; she doesn't want Alex to get a reputation with the police and fears that misunderstanding of his vocalizations could lead to abuse allegations. Police visits can generate a bad reputation for Alex within the support community and with neighbours who do not know why the police are showing up.

Experience

✖ Both Alex and his support worker feel stress around the contextless noise monitoring.

3 Opportunities

- Use a tiered approach with human judgement/intervention before calling the police
- Any intervention (police/building management) should be by someone with sensitivity/inclusion training
- The data only reports a decibel number, "total volume level, no audio recording". This is not sufficient for understanding the noise, managing this challenge requires more thought.

Arising Issues

1. How will individuals be able to register exceptions to noise level tolerances?
2. Will lease decisions be influenced by noise data that is outside of the tenant's control?

Civic Engagement—Collab*

Nuna is an Indigenous spiritual healer. Being many hours away from her home community, she needs a ceremonial space for her Indigenous support group to connect with their ancestors through spiritual ceremonies, such as smudging ceremonies. It's important that she finds a safe space for them to practice their traditions and connect with the land that they live in, free from external judgement. Her group is quite small, so their needs are not prioritized by the Collab app.

Other Contexts: Other ethno-cultural communities that need a safe area for events and cultural practices.

*** MIDP Sections:** Vol 1 Chapter 1 - Social Infrastructure page 217 & Vol 2 Chapter 5 - Digital Innovation pg 446

1 Proposed Service: Collab

- Collab is community crowdsourcing voting application:
  - allows community members to vote in decisions for event programming in public spaces
  - neighbourhood associations use data from Collab to make event programming decisions
- The prototype can be accessed here: collab.sidewalklabs.com. The prototype is as follows: The user can see the top five pre-selected events and see what percentage of users voted for those events. The user can also view the demographics (age/gender/ethnicity/living situation) of voters (opt-in/opt-out) and see the top five events selected among the demographics. On the same page, voters can also vote for the top custom events submitted by other users.

Data Being Collected

- Non-personal: Program choice selections, pre-populated and user-generated options
- Aggregated and/or de-identified: Opt-in, broad demographic information

Data Decisions

- Public space event programming allocation
- Data will be used by neighbourhood associations to influence decision-making

Privacy Expectations

- Expect to vote for an event or propose an event in the community in a fair process, without bias or discrimination based on demographics.

2 Impact

- Nuna created a custom event for her proposal for the use of space; however, many community members had voted on a pop-up playground, so that was the event programming instead. Nuna will try again for the next date available to submit her idea, although she isn't sure if other members in the community will vote for her idea. It continues to be difficult for her to secure a safe, ceremonial space.

Experience

✖ Nuna feels that the needs of her community are not valued by her neighbours

3 Opportunities

- Remove publicly displayed demographics: the top events selected among a specific demographic are shown publicly, and this can present a bias in voting and decision making.
- Be transparent with the decision-making process
- Add diverse event options relevant to different communities and interests
- If demographic information must be released then it should not be released until after a vote concludes.

Arising Issues

1. What is the decision-making process to determine how event space will be used? What criteria will be used to determine this? (i.e. highest number of votes on Collab, event effects, trade-offs such as cost and coordination)
2. How can smaller community groups have their voice heard and use public space for event programming? How to ensure fair use of space for all community members?
3. Will the Neighbourhood Association have access to the demographic data for pre-selected events and customized events? How will bias be prevented?
4. Would a user be able to vote once, see the most voted events and specific demographics, then go back to the app to vote again? Or can they use this information to influence the outcome of an on-going vote?

Public Realm Management *

Suzanne, a fifth grader on the autism spectrum, lives with her family. She has a noise sensitivity that she mitigates with a noise-cancelling headset. Suzanne's mom, Yuki, knows that when Suzanne is getting agitated that she may need to have quiet time. Suzanne's mom gets increased noise level notifications for her neighbourhood with a phone app that utilizes open data collected in her "smart community." Yuki plans their route or makes environmental changes based on the alerts that are sent to her.

Other Contexts: A variety of GIS-related information may be of interest to individuals who want to plan activities within areas of the smart community.

*** MIDP Sections:** Vol 2 Chapter 2 - Public Realm page 186, 19& Chapter 5 - Digital Innovation page 445

1 Proposed Service (Noise Sensor Data)

- Public Realm Geographic Information System Database ("Maintenance Map")
  - Shared repository for information about the public realm; map is updated through data transmitted by environmental sensors and open-space managers.
- Third party application
  - An app created by a third party that utilizes the maintenance map data and other available municipal data

Data Being Collected

- Sensor information such as sound volumes (decibels) measured in public spaces, using sound pressure level meters and related location information.

Data Decisions

- Monitor sound levels to determine if there is a loud noise level, then send alert or do not send alert.

Privacy Expectations

- Sound (e.g. conversation) is not decoded except as a noise/decibel level

2 Impact

- With this application, Yuki can use information about the environment to help Suzanne avoid noise stressors which keeps her daughter more comfortable and happier. Yuki finds that she has less stress related to managing Suzanne's noise sensitivity outside their home

Experience

- ✔ Allows Yuki to manage Suzanne's noise sensitivity
- ✔ Yuki feels confident about taking Suzanne to new places

3 Opportunities

- Support app development that connects sensor, permit and other geographical information that allows app users to plan travel (e.g. proposed service "Infrastructure that enables personal assistive tech") and activities.

Arising Issues

1. Will access to community data be governed by a code of ethics for use (e.g. the app cannot be used to surreptitiously install unwanted software)?

Public Realm Management*

Agnes identifies as a member of the LGBTQ+ community. She feels that her new neighbourhood is safe and inclusive and is proud of the human rights advances the LGBTQ+ groups she works with have made. In the past, Agnes has experienced discrimination because of her gender identity, appearance and activism. She wants her privacy to be respected, valuing her personal/data privacy and her freedom to express herself. Agnes is shocked to learn that there are people in her neighbourhood who have the job of documenting and surveying how residents like her use public spaces. She feels like her privacy has been violated and wonders about how data from surveillance in the neighbourhood is used.

Other Contexts

- Any visible minority may feel at greater disadvantage in observational studies conducted without their consent.
- Visitors to the area may not be aware of the observation practices and unable to make an informed decision about being in the space.

*** MIDP Sections:** Vol 2: Chapter 2 - Public Realm pages 183-185

1 Proposed Service: CommonSpace (Observation Data)

CommonSpace – Community Tool for Management of Public Space Use

- Field-based data collection tool that helps city planners, designers, and community groups to make decisions on how public space is used.
- Research questions and observation needs are entered in CommonSpace portal for public life studies.
- Surveyors conduct the study and are assigned to shifts to observe the public space in the study, using the app to record their observation data.
- After the study is completed, study organizers can download data via the CommonSpace app and can choose to publish the underlying data on a public data portal.

Data Being Collected

Field observation/map-based data collection:

- Aggregated observational data: public life activity categories and usage counts, high-level demographic summaries.
- Personal info (Restricted data not published for privacy reasons): User login credentials for public life study administrators and surveyors.
- Records data in accordance with the Public Life Data Protocol, a published data standard for public life studies.
- Data can be published on a public data portal.

Data Decisions

- Data influences public space use decisions
- Data can influence a wide range of decisions (e.g. business, housing).
- Decision will vary depending on an organization's public life study, research question, and intended use of data

Privacy Expectations

- She expects to have privacy and freewill in her neighbourhood.

2 Impact

- One day, Agnes learns about CommonSpace and views the public data in her neighbourhood. She is negatively impacted because she wasn't aware and didn't exactly consent to this. She feels like she's being watched by surveyors, and she isn't sure why these public studies are conducted and what the data will be used for. She has no control over when and how data collected about her can be used.

Experience

- ✗ Feels that her level of comfort while out in her neighbourhood is diminished.
- ✗ Feels scared, that data can be used to discriminate and impact her negatively because of her gender identity.

3 Opportunities

- Be transparent with the community about the use of CommonSpace, on-going public life studies, and the intended use of data.
- Follow data ethics guidelines to ensure that external organizations have qualifications to conduct the study and analyze the data.

Arising Issues

1. What data ethics guidelines/criteria are in place to ensure that these organizations and surveyors have qualifications to conduct the study and analyze the data properly?
2. How will you prevent bias in the study? (e.g. surveyor excludes a demographic in observation shifts to achieve favourable results)
3. How will you ensure that the study and observation data are accurate?
4. How will you ensure that the public use of data is used for its intended purpose, and it won't be used to discriminate against a certain demographic in business, funding, housing etc. decisions?

Digital Housing Application System*

Arpit has an intellectual disability. He works part-time and receives ODSP. He is looking for an apartment where he can live with a moderate level of support. His personal support worker (PSW), Pat, visits him a few times a week. He's applied for rent-geared-to-income housing from the city of Toronto and for support from Developmental Services Ontario (DSO). He is looking at the new smart community as a place to live, and he wants to stay connected to his support system and live near his friend Josie.

Other Contexts
- Elderly parent wanting to be near child's apartment for support
- Integration with information systems of other social services recipients (e.g. Ontario Works)

*** MIDP Sections:** Vol 2: Chapter 3 Buildings and Housing, page 277

1 Proposed Service: Digital Housing Application System

- Arpit will be using the *Digital Housing Application System* to apply to live in the smart community. The Digital Housing Application System also uses the digital service distributed identity credentials (See Digital Infrastructure), which enables auto-verification for income eligibility.

Data Being Collected
- Personal Information: users self-report leasing application data (e.g. employer information, proof of income, household size, name etc.). Data restricted and not published for privacy reasons.
- Aggregate: total volume of applications and acceptance rates.

Data Decisions
- Eligibility for affordable housing.
- Successful applicants; allocating affordable housing.

Privacy Expectations
- Expect personal information is only shared between relevant organizations (e.g. DSO), with permission and safe-guarded data.

2 Impact

- Arpit gets a unit but there is little support and he has no peers who live in the same building, so he feels isolated. He wishes that his building had a good neighbour system that would help him know who in his building would help him sometimes.

Experience

- ✓ Meets financial needs and housing needs.
- ✓ Increases transparency and speed of housing application processing times.
- ✗ Doesn't meet emotional/dependent needs, lacks personal and accessibility support.
- ✗ Unfair advantages: tech-savvy users have applications processed faster while less tech-savvy users with less support have longer waiting times, less housing options, etc. (see Digital Infrastructure).

3 Opportunities

- Integrate the Digital Housing Application System app with housing support agencies.
- Expand application data to include personal support and nearby friend preferences.
- Add digital accessibility support features
- Add human app assistance: ensure client-facing staff have accessible customer service training and diversity and inclusion training to support diverse communities.

Arising Issues

1. If income is updated in real-time how will decisions to change housing status/rent agreements be implemented?
2. What criteria (machine learning) will be used to determine successful applicants and eligibility for affordable housing?
3. How can an individual with a disability disclose that they have a disability in their application? How does this impact the criteria for housing selection?
4. Will accessible apartments be for people who have disabilities only?
5. How to ensure fairness between tech-savvy vs. non-tech savvy users in overall housing process and allocation? (See Digital Infrastructure)

Digital Infrastructure*

Arpit used the *Digital Housing Application System* and *distributed digital identity credentials* to auto-verify his income eligibility in the housing application when he applied for his apartment. He has since used the distributed digital identity credentials for many services such as his Ontario Disability Support Program (ODSP) and his Independent living support programs. He has recently received several letters saying that his income has increased so he needs to pay more money for his rent-geared-to-income apartment, owes money to ODSP and may be having some of his independent living supports stopped. Arpit hasn't had a pay raise and doesn't understand why he has received this letter and doesn't know what to do to fix the problem.

Other Contexts: There is potential for an error in any of the attributes that are part of the digital identity to cause multiple problems (e.g. date of birth, gender, disability, etc).

*** MIDP Sections:** Vol 2: Chapter 5 Digital Innovation, page 398

1 Proposed Service: Identity Credentials

Distributed Digital identity Credentials

- Enables individuals to securely store digital identity credentials on user devices, can be used to verify attributes/identity of the user.
- Individuals consent to sharing their information in a digital transaction and can control what information is shared.
- Increases transparency in the housing application process with auto-verification and real-time updates

Data Being Collected

- No data generated; identity credentials are stored directly on a user's device (not the cloud).

Data Decisions

- Verifies the identity and attributes of the person

Privacy Expectations

- Expect to provide consent and have full control in providing personal information to another party.
- Personal information is shared only between the two parties, data is safe-guarded and stored privately.

2 Impact

- While the digital identity credentials sped up the housing application process and was useful for other services, it's ability to share and instantly update his information to all the organizations who support him creates a lot of problems throughout Arpit's life when an error is introduced into his income attribute/credential. The error is rapidly transmitted to many of the organizations he relies on to live independently and the services that are based on low-income are being cut off or reduced. Arpit must wait for Pat (his personal support worker) to visit in a couple of days to provide help and is worried about what to do.

Experience

✔ Verifies Arpit's income and protects his privacy/personal information, eliminating bias and streamlines sharing personal information across organizations.

✖ Risks due to lack of human interface that he cannot detect or correct changes in his credentials.

✖ All income-based services that Arpit rely on are impacted at once by a single error

3 Opportunities

- Integrate a human interface or human assistance options
- Include an alert for changes in credentials/attributes

Arising Issues

1. Will access to community data be governed by a code of ethics for use (e.g. the app cannot be used to surreptitiously install unwanted software)?