

Grandcare: Proposal for a Mobile Application Aiding Grandparents in Raising their Grandchildren

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Executive Summary

Grandparents raising their grandchildren (GRGs) are predisposed to depression, anxiety, as well as other mental, emotional and physical health problems. Moreover, GRGs tend to come from socioeconomically disadvantaged backgrounds, meaning that attaining the resources necessary for childcare and household maintenance can be difficult. Coupled with a generation gap that makes it difficult for grandparents to adjust to modern culture, education, and technology, GRGs face no easy task. As a result, it is imperative that they are provided with the means necessary to obtain the economic and emotional support they need. The proposed application, Grandcare, is to partner with the Central Massachusetts Agency of Aging (MCAA), assisting in its efforts to provide grandparents the resources they need. Current competitors do not tailor their services to the specific plights that GRG face, though they do a good job at providing some level of support to grandparents in some aspects of their as a GRG, be it economical or emotional. However, by directly linking GRGs to the services of the MCAA, the hope is to increase the effectiveness of institutions in providing support to this population. Functionalities include systems for verifying clients, allowing them to track service availability and schedule appointments, as well as to request services. By expediting the processes that the MCAA engages in to provide for GRGs, the hope is that Grandcare and similar apps shall act as tools that amplify the support infrastructure available to GRGs.

Introduction

Problem

As a grandparent, raising a grandchild is no easy task. As of 2017, about 36% of grandparents live with their grandchildren, totaling 2.7 million people (Kelley et al., 2020). On the other side, at least 1 in 10 children are raised by their grandparents (8). Grandparents raising grandchildren (GRGs) are susceptible to mental health problems, namely depression and anxiety (Kelley et al., 2020, Clark et al., 2022). Moreover, GRGs are more likely to be impoverished, with the majority of GRGs being single women of color (Kelley et al., 2020, Clark et al., 2022). While both upper-class and lower-class grandparents struggle to raise their grandchildren, the latter faces a much more challenging situation due to their greater lack of resources (Dudley et al., 2023; Kelley et al., 2020). Overall, many GRGs are in a position where they struggle to provide sufficient support and resources to their grandchild or grandchildren (Dudley et al., 2023, Brunissen et al., 2020). Beyond these negative pre-dispositions, there are many other challenges associated with GRGs' situation. Oftentimes, grandparents take custody of their grandchild due to their own adult child's inability to raise them. This inability may arise from their child's death, substance abuse, incarceration, or their maltreatment towards their grandchild(ren), meaning that many GRGs must take in children who have faced a significant amount of trauma (Dudley et al., 2023; Kelley et al., 2020). Coupled with this are the sentiments of guilt and unpreparedness felt widely among GRGs as they progress through their journey (Brunissen et al., 2020; Dudley et al., 2023). The generation gap between the grandchild and grandparent also creates unique challenges for GRGs. Societal culture, norms, institutions, and technology have progressed, and are not in the same state they were when grandparents were raising their own children. Consequently, GRGs must navigate their way through conditions that are highly unfamiliar to them (Brunissen et al., 2020; Dudley et al., 2023). These dynamics manifest themselves in the form of struggles related to proper discipline and outdated beliefs on health (Brunissen et al., 2020). A notable area where GRGs struggle is with providing their grandchildren with adequate education resources. This is due to the combination of the grandparent's unfamiliarity with the new landscape of the education system, as well as their inability to easily navigate online school portals (Brunissen et al., 2020; Dudley et al., 2023).

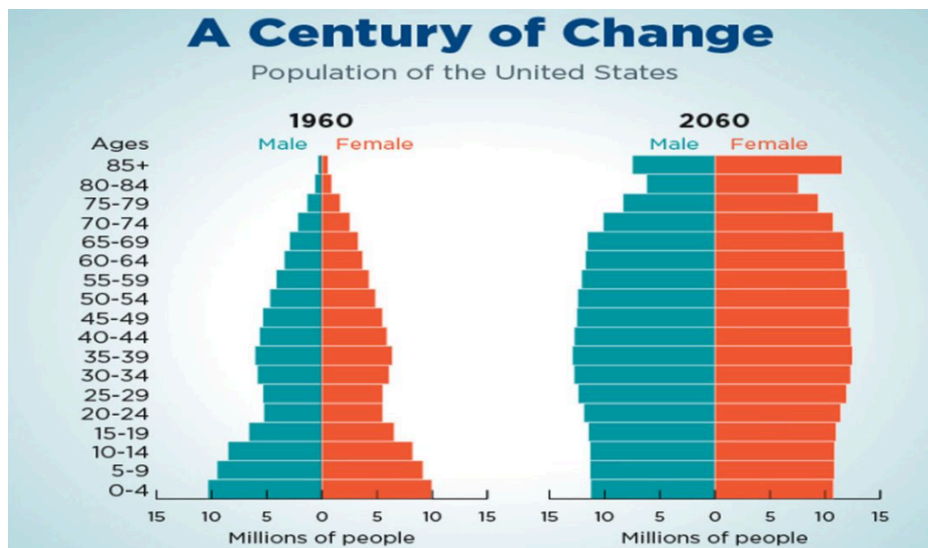
It is evident that GRGs need aid as they go through their journey. While there exist local programs dedicated to assisting GRGs, they are seldom able to provide adequate support for them (Harris et al, 2021). Seeking institutional support likewise yields an insufficient amount of help for GRGs. This is because support systems are

designed for traditional family structures (i.e., the nuclear family). Thus, inherently, institutional support cannot properly assist GRGs (Dudley et al., 2023). Luckily, many GRGs are able to achieve some level of support by forming supportive bonds with those in their community, especially with those in the same situation as them (Dudley et al., 2023). While informal structures are an important and useful component of support resources for GRGs, the imperative for proper institutional support remains.

If the hardships of GRGs are to be properly alleviated, it is imperative that tools capable of providing economic, emotional, and mental support be developed. Raising one's grandchild is no easy feat. According to the AARP, in 2018, just under 2 in 5 grandparents have been raising their grandchildren for at least five years (6), meaning that the journey for GRGs is a long one. Moreover, the United States has an aging population. Figure 1 (7) illustrates two population pyramids: one from 1960, and another from 2060 that is based on population predictions. It is clear that the number of people above the age of fifty shall increase, suggesting that there shall be an increase in GRGs. GRGs face long, challenging journeys wherein support is often not adequately provided. With this situation poised to become more common, it is only logical and just to provide a solution that aids GRGs.

Figure 1

Population Pyramid of the United States, 1960 vs. 2060



Note. The pyramid on the left is the distribution of population by age in 1960. The right is that of 2060, based on predicted population changes.

The United States' population is projected to grow overall, notably including those age fifty and above (7).

Audience

As such, the present proposal aims to develop a mobile application to assist the Central Massachusetts Agency on Aging (CMAA) in their efforts to provide GRGs with adequate resources. The CMAA is an institution dedicated to providing support to elderly individuals in the Commonwealth. Having been commissioned for fifty years, the CMAA is the largest support organization for the aging in New England, serving 61 communities in central Massachusetts (Central Massachusetts Agency on Aging). This includes hundreds of families. To aid GRGs, the CMAA has established the Grandparents Raising Grandkids Resource Center program. Having received \$1.2 million from Congressman Tim McGovern (Central Massachusetts Agency on Aging), this organization provides resources to GRGs in a myriad of areas, ranging from Housing and Shelter to Sports and Recreation (Central Massachusetts Agency on Aging).

In a personal interview with the current CEO, Dr. Moses Dickson, a need to expedite and enhance the process of providing services to GRGs was noted (Moses Dickson, personal communication, 1 April 2024). Potential features for a mobile application discussed included GRGs being able to track the location of transportation services and support personnel and to schedule meetings with personnel and request services. The agency is also looking to find a way to digitize the process of authorizing support services for clients (Moses Dickson, personal communication, 1 April 2024). A mobile application that simultaneously allows GRGs to more easily seek economic and emotional support, and aids the agency in the provision of services would appeal to both stakeholders. GRGs, embroiled in the challenges associated with raising their grandchild, would be glad to be afforded the opportunity to seek support. The CMAA, looking for ways to expand their capabilities, would appreciate the ability to more easily provide services to GRGs. While the current scope remains with the CMAA, this idea could present greater prospects for the long term. A mobile application that partners with a local institution to more easily provide support for GRGs would be crucial. If local institutions like the CMAA were to utilize a mobile application, the efficiency of their operations would increase. If services that were difficult to provide currently were to become easily provided through the use of an app, local institutions would have a greater amount of time and resources at their disposal. This energy could be used to expand the capabilities and scope of local agencies. As a result, with efficient processes for support provision and the potential to grow, institutions can better help GRGs receive the economic and emotional support they urgently need. Consequently, the development of an app whose various features assist the CMAA is crucial.

Competition

Before providing the specifications of the proposed mobile application, a few existing solutions currently in the market are to be analyzed. Their merits and limitations are to be discussed as a way of framing the innovations provided by the proposed application.

Competitor #1: Chime

The first application to be dissected is Chime. This is an app dedicated to online banking and financial management. Users are able to easily make transactions, and securely plan and manage their finances. Notably, there are no monthly, overdraft, or minimum balance fees. Users can receive their paycheck up to two days easily with a full deposit to their account. The app also harnesses location services to provide the user with the locations of local ATMs. While personal data is collected, all data is encrypted. Moreover, the user can request for the data to be deleted (Chime, 2024; Google Play, n.d).

As a GRG, managing finances can be a major challenge, especially since economic hardship is very common for this population (3; Clark et al., 2022). Therefore, having the means to easily manage one's finances at their fingertips is incredibly helpful. With the lack of fees that are typically associated with online banking, Chime appears to be a uniquely accessible option for GRGs when it comes to banking. However, while Chime may ease GRGs' burden in terms of how to actually manage the assets they have, it does not aim to address the root cause of poverty that GRGs face. While accessible for its lack of fees, the app is not tailored to serve the unique financial needs for GRGs, instead opting for a standardized approach less appropriate for GRGs. It does not provide GRGs with the means to receive financial aid. It merely helps them manage what finances they do have. The proposed application can rectify this issue by allowing GRGs to seek financial aid through the services provided by a local institution. Additionally, another way this application may build upon the provision of economic aid is by providing resources on financial literacy and other pertinent topics. In that sense, it will emulate the tools for financial *management* that apps like Chime already provide, while also enabling financial *aid* to be received.

Competitor #2: EarlyBird

The next application is known as EarlyBird. There are two core features of this app: the first revolves around the ability to document the child's milestones and create an album of all of their experiences. The second involves the ability to create an account for the child to invest money in. Once the child becomes an adult, they can then access this money and use it for their own endeavors (EarlyBird, n.d.; Google Play, n.d.).

Albums, especially the “digital time capsule” used by the app, can serve as a way to bring back fond memories about certain occasions. GRGs, predisposed to poor psychological and emotional health (Kelley et al., 2020), would benefit from a resource capable of reminding them about happy memories of the past. Remembering the positive emotions associated with certain experiences would be able to help a grandparent struggling with depression as they try to raise their grandchild. Additionally, a digit time capsule would serve as an effective medium whereby the grandchild and grandparent can bond with one another. This may even help break down some of the barriers of the generation gap. Moreover, the app does an effective job of broadening its scope to include the ability to financially invest in the child’s future. Part of the grandparent’s burden would be relieved knowing that their grandchild has at least some level of support as a result of being given support through an app such as EarlyBird. Of course, as was the case for Chime, such financial maneuvers cannot substitute for economic security. Similarly, while the functionalities of this app may help a grandparent emotionally, it cannot substitute for proper support for mental, emotional, and behavioral health. Another limitation in this regard is that the app’s functionalities center around the assumption that the user is a parent, not a grandparent. Once more, the proposed application builds on the ideas of providing tools for emotional and economic aid by linking users to these services via the CMAA. In addition to providing access to professional counseling and support, the app may also harness previously-developed machine learning models that address mental health. This includes models capable of detecting suicidal ideation, among other potential signs of mental and emotional health problems.

Competitor #3: brightwheel

The final application to be focused on is brightwheel. This application focuses on assisting childcare facilities and all of their stakeholders, including caretakers. The app includes a digitized billing system, allowing for grandparents to easily provide payments to their childcare providers. Grandparents can also message their grandchild’s caretaker through the app, as well as track their academic progress (brightwheel, n.d.; Google Play, n.d.).

Childcare programs can be an important resource for GRGs. Indeed, in order to make ends meet, over 1 in 5 grandparents have a job (stats page), necessitating such resources. Having an application that allows for grandparents to view their grandchild’s progress and activities as well as communicate with their provider helps encourage a sense of security within the grandparent, as they know their grandchild is safe and enjoying themselves. However, the app does not help grandparents to actually find these resources to begin with. Childcare, much like

many other resources, is often hard to come by for GRGs (Clark et al., 2022; Harris et al., 2021). This app is only helpful for those fortunate enough to attain childcare services in the first place. However, the proposed application provides solvency for this by connecting grandparents to the NCAA's resources for childcare. In future iterations, the proposed application may provide a system for locating and recommending childcare facilities to grandparents based on their unique circumstances, further building upon the provision of robust childcare services that a mobile application may be capable of providing.

At a broader level, all of these applications deal with some aspect or aspects of the GRG experience. However, within their respective areas of focus, though their functionalities are helpful for GRGs, they are not the main audience, creating an inherent disconnect between these applications and their potential GRG users. Since they are not the main focus of the app, their functionalities and user interfaces are not ideally suited for the needs of GRGs, potentially hampering their ability to assist them with their situation. This can be seen with finances for Chime, mental health support for EarlyBird, and childcare for brightwheel. In these and many other areas of the GRG's life, the proposed application seeks to make amends by directly providing GRGs with the means to attain resources that can guide them through their journey.

Section II: Specifications

Features

The proposed application, henceforth referred to as "Grandcare" is to comprise of three features. The first feature is a system whereby the MCAA can authorize that clientele receive their services once they log into the app. This would be implemented for both previous and new clientele. The second feature is the ability for GRGs to track the availability and location of the MCAA support staff as well as transportation services. This would involve the use of an in-app calendar system so that GRGs may track the availability of the NCAA's support staff and schedule appointments with them. Accompanying this would be a map displaying the live location of MCAA support staff as well as transportation services (courtesy of existing API for location and satellite services). The third feature involves a system whereby administrators (i.e., members of the MCAA managing the provision of services), can handle GET requests. This shall involve the use of tables to organize data regarding user requests. Parameters, including the category of the service being requested, the user making the request, among other pieces of

information, would be used in this process. The exact details of these three features are detailed using the criteria listed below.

Feature #1: Authorization of Clientele to Receive MCAA Services

- (1) Structurally, Grandcare is to include a lock screen that appears immediately upon opening the application, followed by a login page.
- (2) This login page should provide the option to sign in either as a grandparent or as an administrator.
- (3) Upon installing and opening Grandcare for the first time, the user shall be able to set up an account, being prompted to state whether they are an administrator or a grandparent.
- (4) Criteria for establishing an account as a grandparent:
 - (a) For those who have previously qualified to receive the agency's services:
 - (i) The user will be able to request confirmation of their status from the agency.
 - (ii) Upon confirmation from agency staff, the user shall gain access to their designated login credentials. Upon logging in, the user will have access to all the services the agency has deemed them qualified to receive.
 - 1) Services are to be organized into a hamburger (drop-down) menu. This menu shall be accessible by grandparents. Once selected, it will reveal the drop-down list of services they can make requests for. Additionally, other functionalities, such as viewing the location of support staff, transportation, and scheduling appointments will be accessible from this menu. The diagrams of the user interface provide a visualization of this organizational system.
 - (iii) From then on, the user shall be directly prompted to the login page upon opening Grandcare.
 - 1) Functionalities for recovering credentials shall be provided.
 - (b) For those who have **not** previously qualified to receive the agency's services:
 - (i) The user shall be prompted to fill out the necessary paperwork involved in requesting services from the agency for the first time.
 - 1) The submission process is to either occur using digitized versions of paperwork or through uploading scans of the completed forms.
 - (ii) Upon submission, an administrator shall be able to receive and review the request from the first-time client.
 - (iii) Based on the criteria laid out by the agency, the administrator shall be able to accept or deny the applicant.
 - (iv) If accepted, the user shall gain access to their designated login credentials. Upon logging in, the user will have access to all the services the agency has deemed them qualified to receive.
 - (v) From then on, the user shall be directly prompted to the login page upon opening Grandcare.
 - (c) While confirmation or acceptance from the agency is pending, the user shall have access to resources and services that do not require qualification (see *Part II of Non-Essential Features*).
 - (i) This is analogous to pay-walls seen in many other applications: the user can access some features for free, but must pay for others. The "pay-wall" in this case is the agency's applicant turnover rate.
 - (d) If denied service, the scope of the resources grandparents can access shall remain limited to those not requiring confirmation from the agency.
 - (e) On the login page, an option to reapply (either to qualify or to expand upon the services currently provided) shall be provided.
- (5) Criteria for establishing an account as an administrator:
 - (a) The administrator shall be able to create an account using their existing credentials as a staff member of the agency.
 - (i) This set-up process may involve some verification system, based on current agency practices for authorizing staff.

Feature #2: The Ability of GRGs to Track Location and Availability of Services and Schedule Appointments

- (1) When on Grandcare, the grandparent shall be able to view the availability of the agency's support staff.
 - (a) This is to most likely come in the form of a calendar system. Each day of the week is to exclusively present the timeframe(s) when the selected care provider (of the six employed by the agency) is available.
 - (b) From the perspective of an administrator, all of their time slots will be listed for them. All slots will be labeled differentially based on availability.
 - (c) This functionality could necessitate the use of existing calendar API (e.g., Google Calendar, Outlook, etc.)
- (2) When on Grandcare, both grandparents and administrators shall have access to the live location of support staff.
 - (a) This process would involve linking the accounts of support staff to existing location-tracking services (e.g., Find My Friends). Their location would in turn be viewable by the clientele and administrators.
 - (b) Other specific personnel may have their location tracked based on the parameters desired by the agency as well as the needs of grandparents.
 - (c) Location services would be useful for scheduling purposes as well as other logistical matters, especially amid managing sixty-one facilities.
- (3) When on Grandcare, both grandparents and administrators shall have access to the live location of transportation services (buses, specialized personnel, etc.).
 - (a) This functionality shall be performed by drawing on existing location service API. Specifically, the GPS locations and routes of buses can be utilized to display ETA to a destination and other pieces of information beyond pure location.
- (4) Grandparents shall be able to request appointments within the calendar system described in the previous section.
 - (a) Grandparents shall select the available slot to meet with the given support staff member.
 - (b) Upon doing so, the user will be able to confirm their selection of this slot. Once confirmed, the calendar will be updated accordingly.
 - (i) The option to cancel and reschedule shall be made available.
- (5) When a new appointment is scheduled, the administrator shall be notified, and their calendar shall be updated accordingly.
- (6) Upon scheduling an appointment with the given support staff member, grandparents shall be able to track their location and ETA in greater detail.
 - (a) This may involve the creation of a temporary menu for this purpose as a way of providing the user a strong idea regarding the location, ETA, and other pertinent information regarding their appointment.
 - (b) This functionality would mainly be used for in-person appointments.

Feature #3: A System For Making and Managing Service Requests

- (1) Grandparents shall be able to request services.
 - (a) This is to include the fifteen categories listed in Item (1) of the *Statement of Goals* section, as well as a sixteenth category dedicated to requests for qualifying and confirming clients to receive services.
 - (b) Grandparents shall be able to see the history of their requests, as shall any administrator that views any of their requests.
 - (c) Along with selecting the category of service, the user shall be able to write a short message to accompany the request.
- (2) Requests are to be organized and presented in a streamlined manner from the administrator's viewpoint.
 - (a) This shall involve the storage of pertinent data in a spreadsheet or some other form of tabular data.
 - (i) Columns may include data related (but not limited) to:
 - 1) The user's ID
 - 2) The category of the request

- a) Category-specific parameters (e.g., what type of food if food is being requested)
 - 3) Whether or not the request has been seen/addressed
 - 4) The supplementary message sent by the grandparent
 - 5) Time the request was sent
- (b) Administrators, upon selecting the User ID, shall be provided a pop-up of more specific information about that user.
 - (i) This would include identification and the user's request history.
- (c) Each administrator shall have the ability to modify the display of the tabular data. This shall include:
 - (i) The ability to filter the data by service category, whether or not the service has been seen or addressed, all requests made by the given user (based on their ID), among other parameters.
 - (ii) The table shall have the ability to be collapsed.
 - 1) I.e., the administrator shall have the ability to hide a certain column (e.g., the column of supplementary messages).
 - (iii) These criteria shall aid in providing visual clarity for administrators managing requests.
 - (iv) The tabular data is likely to be treated as a comma separated value (csv) file to easily encode programs and algorithms.
- (d) Administrators shall have the ability to accept or deny requests.
 - (i) This shall be implemented by making the rightmost column a checkbox or button indicating acceptance or denial.
 - (ii) Administrators, like grandparents, shall be able to attach a supplementary note when making this decision.
 - 1) Providing supplementary notes would be a required field for both parties to ease communication.
 - (iii) Once a decision is made and a message is written, the grandparent is to be updated on this information.
 - 1) Both parties shall retain communication capabilities for the given request should the need for any clarification arise.
 - (iv) This is the exact process that is to be followed when first-time clients are applying to be qualified.
 - 1) To clarify, a temporary link of communication shall be constructed between the administration and prospective clientele within Grandcare. That way, even without login capabilities, they shall be able to receive word of whether they have been accepted or denied.

Feedback

In the first stages of development for Grandcare, feedback acquisition is to be achieved mainly through correspondence with the MCAA. Indeed, the developers of the app have chosen to partner with this organization. Direct communication with this group shall foster an understanding between the developer and the agency as the application is created. This will help maximize the application's quality as well as its ability to properly carry out its intended goal.

Potential Future Additions

There are other features of Grandcare that could be included, however, they are beyond the scope of the MVP. There are two features: one relates to direct communication between GRGs and staff at MCAA. The other relates to direct provision of services via Grandcare itself, rather than the app acting as an intermediary (these

services would be provided to even those not qualifying to receive MCAA services). The set of criteria below thoroughly detail the components of these two additional functionalities.

Feature 1: Direct Communication Between GRGs and MCAA Staff

- (1) Grandcare is to implement a direct system for digitized communication between administrators and grandparents (phone calls, video calls, etc.).
 - (a) If implemented, this functionality would be placed in the calendar structure previously referenced (see *Part IIa* and *Part IIb* of the MVP specifications).
 - (b) Instead of scheduling an in-person meeting with the given support staff member and subsequently tracking their location, the option to schedule a phone call or video call would be provided.
 - (i) Securing a phone or video call session would involve the same exact process as securing an in-person appointment.
 - (ii) Consequently, implementation would involve using existing audio and video call API.
 - (c) In conjunction with this system would be another that acts more like a hotline.
 - (i) This would ensure that there is always some source of support available to grandparents, should the need ever arise.

Feature 2: Direct Implementation of MCAA Services

In addition to using Grandcare as an intermediary for the agency to provide service using their own channels, a possible extension would be the direct implementation of information regarding the services provided by the agency. This may involve the agency partnering with local organizations (“provisional organizations”) that provide these services in conjunction with the agency directly providing data on its services. In turn, provisional organizations would have to be able to make their own accounts within Grandcare. This part of the application would be important as it would also provide resources to those who do not qualify to receive services from the agency. Some examples of services are provided below:

Translation Services

- (1) Grandcare is to utilize existing translation API to facilitate language translation for grandparents.
 - (a) Such API may include Google Translate in addition to other interfaces.
- (2) Text-to-text, text-to-speech, and speech-to-text features shall be available.
- (3) Additionally, an effort shall be made to maximize the quality of translation for as many languages as possible.
- (4) These translation features shall also be made fully available to provisional organizations to easily communicate with clients should there be any direct interactions.

Information on Events

- (1) Grandcare shall be able to provide grandparents information about upcoming events including time, location, purpose, and other logistics.
- (2) Events are to be portrayed in the form of a calendar, with events listed in chronological order. Users should be able to select an event on the calendar, and from there, be redirected to the information on said event. The use of a calendar may necessitate borrowing from previous API (e.g., Google Calendar).
 - (a) This would serve as a nice addition to the calendar structure previously discussed.
- (3) Organizations associated with hosting events will be able to input information about their event. This data will then be displayed to grandparents.
 - (a) This may include time, date, location, purpose, and other information.

- (4) Grandcare shall allow provisional organizations to upload media (e.g., a digital poster) and display it to grandparents in conjunction with other data.

Educational and Childcare Opportunities

- (1) Grandcare is to utilize a combination of user-inputted data (from provisional organizations) and location services (i.e., Google Maps API) to provide grandparents with information about local educational, extracurricular, and childcare opportunities.
 - (a) This shall necessitate some sort of filtration system based upon location, accessibility (i.e., cost), and the needs and focuses of the grandparent.
- (2) Organizations associated with educational, childcare, and extracurricular opportunities shall be able to provide information about themselves.
 - (a) This could include operating hours, age group, topic, location, and other pertinent details.
- (3) Grandcare is to display to the grandparent a list of such organizations.
 - (a) Organizations are to be listed in order of decreasing proximity (that is, the closer the location, the higher its position on the list).
 - (b) However, the ordering of this list could be done using other parameters.

Mental and Behavioral Health

- (1) Grandcare is to provide access to mental and behavioral health resources in a similar manner to the provision described in *Part IIc*, i.e. via a mixture of provisional organizations and Google Maps API.
 - (a) In this context, provisional organizations may include local support groups, psychologists, psychiatrists, behavioral specialists, and similar facilities focused on providing mental and behavioral health support.
 - (i) To clarify, support can be either for the grandparent or grandchild.
- (2) Grandcare is to develop and display a list of organizations in a similar manner as described for *Part IIc*, i.e. using distance in the MVP, and possibly using other parameters upon further development.
- (3) In addition, Grandcare is to include various machine learning models related to mental and behavioral health treatment.
 - (a) There are pre-existing models for suicide detection in social media posts. Using similar models, the goal is to develop computational tools that can provide (to a certain degree) support for mental and behavioral health.
- (4) Grandcare may also make use of anonymous surveys to help assess client needs.

Section III: References

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