

TV/Media Remote Application - USER STUDY

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ABSTRACT

A design for a TV/Media Remote Controller application for smart-phones is presented here. In past milestones, problems were identified with conventional Media Remote applications. A unique optimized design for a new Remote Controller User Interface was proposed that will improve over existing solutions. The final working application will be presented and will be evaluated using Normans design principles [1]. The design will then be evaluated through the use of a user survey.

Author Keywords

User Interface; Norman; Human-Computer Interactions; UI; Design; Visibility; Feedback; Constraints; Mapping; Consistency; Affordance; Roku; Apple TV; Media Remote

INTRODUCTION

This design project focused on the development of a TV/Media Player Remote Controller for smart-phones - in particular on effective user interface design. Existing remote controller solutions, both hardware and software, do not provide a single interface for a modern home media system, they resulted in multiple controllers for one media system. These existing solutions resulted in an over-complication of already complicated systems. Our goal was to design a software solution that will provide a simple, effective, and efficient means to remotely control most of the common components of a modern home media system. All while providing the user with a seamless and overall pleasant experience for navigating and the consumption of media.

Key elements of our design that will improve on existing solutions are outlined below:

1. Providing the user with one location for controlling the volume of the media system as a means for simplification.
2. Large scale Compatibility with most external media devices and smart TVs. Ex: Roku, WD Live, Chromecast, Netflix, Spotify, etc.

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3. Consistency in the layout and functionality of playback controls for the different devices compatible with our solution.
4. Providing instant access to all media controls in one main screen.
5. The ability to control playback without having to stop looking at the TV.

To achieve instant access to all media controls on one screen we had to imagine new ways to interact with the applications. These features will be explained to the user via a brief tutorial upon first using the application. These features are described below:

1. Options for subtitles and audio track will be available by double tapping the volume control.
2. Device specific controls such as power, eject media, or audio input will be available by long pressing a device icon in the devices menu.

With the above features we believe that we designed a TV/Media Remote that will provide a better user experience than existing solutions.

RELATED WORK: SOFTWARE SURVEY

To achieve the best design possible for a TV/Media Remote application it was required to first survey existing applications to document their good and bad design decisions so that our product design would include none of the bad, and all of the good and more. 4 different existing products were accessed, they were: Roku [Android], WD (Western Digital) TV [iOS], Apple TV (2015), and WatchOn [Android].

ROKU ANDROID APPLICATION

The Roku application developed by Roku Inc. [2] allows users to control Roku players or Roku TVs over Wi-Fi. The app's interface was laid out in a simplistic design allowing the user to intuitively learn to use the interface (see Figure 1). In addition to providing users with access to playback controls, the application also allows users to play media from their phone to their chosen Roku device, voice search through available content, as well as adding, browsing and rating different streaming channels.

Though the interface was simple to use, certain features were not visible in the start menu creating inconsistency and resulting in the user either looking through the application menu to find the feature or overlooking the feature as a whole. The

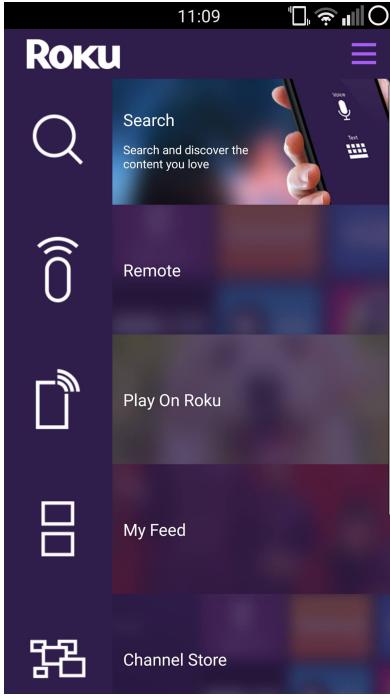


Figure 1. Roku Application Start Menu

“My Channels” menu for example, a major feature of the Roku system, was not accessible in the start menu of the application and instead the user was required to find it in the application menu. Though this does not limit the functionality of the application, the lack of visibility certainly does add a degree of inconsistency as well as an extra step when trying to access channels.

In addition to the inconsistency and lack of visibility in the start menu of the application, selecting a menu entry was counter-intuitive. One would expect to select a menu entry in a single tap; instead, the user first needed to highlight a menu entry by tapping it before tapping it again to select it.

Overall, the Roku application provided the user with a simple yet feature-rich design. The application was easy to use and adds to the user experience of the Roku system. Though it could benefit from improved consistency, visibility and affordance; the features, ease of use, and aesthetics are a result of a well designed application. From this software it is clear that the redesign presented should be consistent with commands throughout and make all key commands immediately accessible else accessible from a single swipe from the right or left.

WD REMOTE FOR iOS

Western Digital’s iOS remote application [3] allowed a user to control Western Digital Media Boxes over the same Wi-Fi it was connected to. It allowed the user to power on the device and send inputs to the media box through the use of an on-screen keyboard, and the following signals: play/pause, stop, forward, backwards, next, previous, next page, previous page, home, back, search, options, subtitles, eject, directional pad + center button (Figure 2).

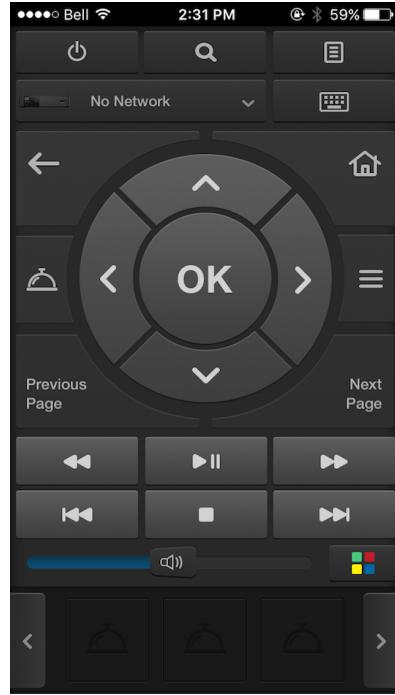


Figure 2. WD Remote Application Start Menu

What the WD Remote did really well was that the home view mirrors their traditional physical remote, and has all of the most important inputs within reach providing little need to leave the home screen (See Figure 2). There was instant access to the media control buttons; play/pause, reverse, etc. as well as the controls needed to navigate through the various menus; home, back, and a directional pad. This layout was good because it removes the need for the user to have to navigate an application while they are watching media. A complicated UI would result in a poor experience while watching TV.

What the WD Remote application did not do very well was that there was an additional options page, and on this page there are 6 additional options that seem to be put there only because there was no more room. Subtitles, Audio Track, Setup, Options, Eject, Gesture. All of these options could have been place throughout the UI in various places that would have made intuitive sense, eliminating the need for another screen. Another issue with the WD Remote application was that it does not provide the user any feedback. When the button was pressed a signal was sent to the media device but there was no warning if the device was not connected or if the signal was received. In addition while it was a good thing for western digital to add a full keyboard to their application, rather than acting like a true keyboard where each key was sent to the TV, you had to craft a text string, and when it was complete press “done” to send the text to the TV. This implementation did not afford the user the ignorance that they should have from the back end workings of an application and was another example of Western Digitals failure of imagination while creating this application. In the design that will be presented bellow the UI shall mirror the users command to



Figure 3. Apple TV Interface

reflect what action was interpreted and when completed will reflect that back to the user.

APPLE TV (4th Gen)

Apple TVs [4] evolved application of the traditional TV remote control offers an elegant interface for the user to explore media on. This bundled product came with a receiver 3 which connected to the TV, via HDMI cable, and a corresponding remote control that sent requests to the receiver. The controller offered an uncomplicated design which consisted of 6 physical buttons as well as a fluid track-pad to naturally maneuver around the operating system. However, without a direct keyboard input, these coupled devices fell short of user satisfaction when frequently used functions such as Search require a tedious and archaic pointer traversal through an on screen keyboard.

SAMSUNG WATCHON

Samsung had a unique feature in its Galaxy smart-phone lineup in the form of an application called WatchON [5], which allowed the user to control your TV using only your smart-phone. The way it works is by taking advantage of the IR blaster on some Galaxy phones, and WI-FI or Internet connection to connect to a TV and satellite box.

Although complex and somewhat confusing due to the overwhelming number of options and steps to get to something, the overall feel of the user interface the application offered



Figure 4. WatchON TV Remote Interface

was good in terms of aesthetics. For instance, the application did very well in providing a clean remote interface (see Figure 4), a list of shows and programs provided from your TV set-box, and information on them (see figure 4). The application also allowed for the user to control it through the lock-screen of the phone or through a widget on the home-screen, which was a benefit in the user experience [6].

Where the application fell short was not being able to connect with other existing media boxes and services, like Netflix, Roku, HBO, Chromecast, etc. In addition, the application also provides the user with an overwhelming number of options and features, that makes it too complex to use. For instance, the application tries to control most of the gadgets in your home [7], rather than focusing on your home media center. The application also has a baked in feature of integrating with the user's Twitter account to allow them to share information about what they're watching, and keep up with people on Twitter. While all those sound like nice features, they result in a very cluttered user interface and a lot of information that the user has to in-take all at once, deviating from the purpose of the application. The user interface and user experience should be designed to be simple, to get the user where they want to go without any clutter or unnecessary features.

SURVEY RESULTS

After surveying existing hardware and software solutions, we concluded that our proposed design could provide an application that greatly improves on the user interface and offered a much better user experience. Users would be provided with a simple interface to access all the controls needed for media playback. The application would also serve as a single point

of contact between the user and the entire media system. Additionally, controls will be implemented in such a way that the user will not have to look at the remote to send simple commands such as play/pause and navigating. We aimed to design an application that will address all of the issues limiting existing applications, such as those listed in our software survey.

USER PERSONAS

We imagined 4 different characters - which we drew the personas around - for this project. The characters came straight from our user experience research, as we casually chatted with random selection of our friends in order to paint a picture of who our more common users would be.

Given the nature of our product - a TV remote control - what we found was that the most common users are typically found in one family setting, due to the fact that TV is typically watched by almost everyone in the family. As thus, the four personas our field research yielded to are outlined in the Appendix and summarized bellow.

These users were used as tools to design our UI around. Their technical knowledge, past experiences, and expectations were taken into account while designing the UI.

John Stephenson: See Appendix D for full persona

- Primary Persona
- 31 years old
- Single
- “Techie”
- Hates having to look for the remote while using Netflix
- Wishes there was “one remote to rule them all”

Tanya Gonzalez: See Appendix D for full persona

- 18-23 years old
- University Student
- If technology does not work as she expects, she gets really frustrated
- Always looks for technology to “just work”

Frank Costanze: See Appendix D for full persona

- 57 years old
- He’s a laggard
- Does not understand the younger generation but wants to be relevant in their eyes
- Has been waiting for a universal remote that just works for ages

Susan Stephenson: See Appendix D for full persona

- 43 years old
- Home maker
- Desires to be involved in children’s lives
- Does not like finding remotes in between couch cushions
- Does not want anything to be more complicated than they need to be

DESIGN OVERVIEW

Based on our 4 personas, we designed a user interface that focused on the users as the sole center of this product, and not necessarily the technology used. The UI was carefully designed based on our understanding of each of the 4 personas, and we made sure it accommodated all 4 of them at the same time.

Our Design had 4 main displays:

D1 Devices menu

D2 Main control page

D3 TV/Stereo (quick) settings page

D4 Settings page (advanced)

The device menu is accessible with a swipe in from the left. The user will see a list of devices that have been paired with the application. At the bottom of the list there will be a “+” symbol to add more devices.

The main control page is where the user will have access to all of the media controls needed for navigation and controlling playback and volume. This will be the primary display of the application.

The TV/Stereo settings page will be accessed by a swipe in from the right side of the screen. On the top half of the screen the TV information and settings (and power buttons) will be displayed, on the bottom half of screen there will be the (optional) stereo settings and information. The stereo information will only be available if the media system has a stereo and it has been configured in the app.

The advanced setting page is accessed through the quick setting page by swiping in from the right of the screen and tapping a gear icon in the top right of the screen. This is where the user will have access to change advanced settings such as what the time out will be before automatically shutting off inactive devices, whether switching devices will result in the previous device being shut off, etc.

VERSION 1

This is the phase where we started brainstorming how the UI would look and behave (See Figure 20 in Appendix B).

A lot of things were discussed in this phase on how the user interface should be in order to cater to our four personas. It went from simpler things, like how the buttons would look, to more complex ones like where should this button take you next and why (See Figure 21 in Appendix B).

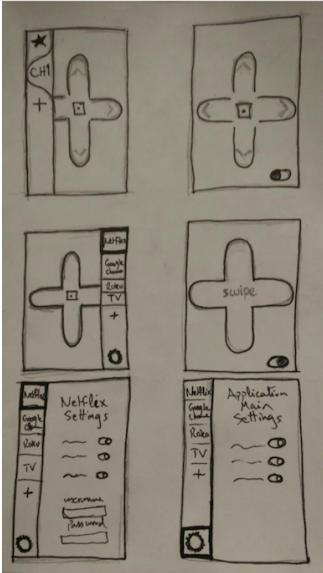


Figure 5. The Final Sketched UI

In the end, the design was simplified down to key elements which best met the needs of our 4 personas. Those elements were carried on to the next phases, and further improved upon (See Figure 22 in Appendix B).

It was decided on that the UI will have 2 menu that are accessed by swiping from each edge of the screen.

- The menu on the left will be the “Favorites” menu, and this is where all the users favorites - either a channel, an app, or even a show - will remain in order conveniently give the user the ability to jump to their favorites within a 2 clicks of starting the application.
- The right menu will be a Input Devices menu, where all the users devices - like TV, Roku, etc - will remain. This menu will also allow the user to add any new devices, switch between devices, as well as edit the settings of each device. At the bottom of this menu is also where the global application settings will be.
- The middle is where all the control of the devices and what is on the screen will be. There are two methods of control; firstly is by pressing on the buttons (like pressing on your keyboard), and secondly by swiping on the screen (like a touch-pad)

VERSION 2

The UI was chosen and drawn based on the design decisions the team came up with in the previous iteration. In this version, some elements previously decided on were chosen not to be part of the final UI, as the team felt that some (or all) of our four personas would not like that specific element (See Figure 5).

VERSION 3: Final Version

This is the final version of the UI of the app. As you can evidently see, some small elements were changed - as well as

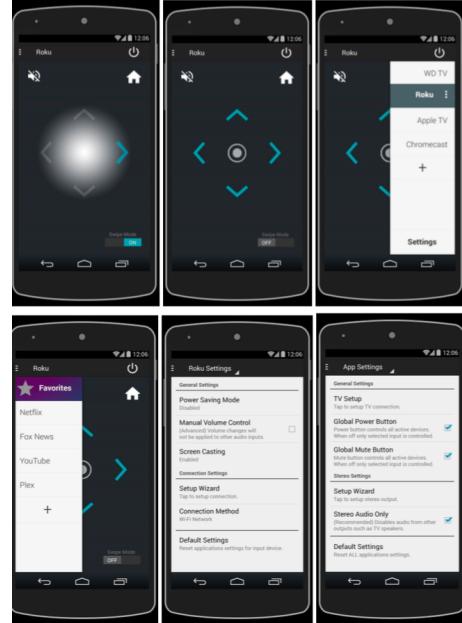


Figure 6. The Final Screen Renders

some new ones were added - compared to the previous iteration. However the concept of the whole application remained to be the same as our previous sketches. The additions were a power button for the device being controlled, a home button required by some devices, and lastly a mute button.(See Figure 6).

DESIGN DECISIONS

DD1 Swipe Mode The user has the option to choose between two main methods of navigating their device: They can enable ‘Swipe Mode’ to swipe, or tap, in the direction they wish to navigate, or they can disable ‘Swipe Mode’ to tap the arrow corresponding to the direction in which they wish to navigate. The toggle included in the navigation screen allows for both accessibility to change the state and visibility to view the current state.

DD2 Mute Toggle Another element in the navigation screen, the mute button, allows users to quickly toggle the volume of the device. The implementation of the mute button also allows the user to see the state of the device (muted or unmuted).

DD3 Swipe to Access Menus In the design of the main navigation screen a key objective was for it to remain simple and free of clutter. One way this was accomplished was by introducing swipe gestures to access the app’s primary menus (the input menu and the favorites menu). Though this may not be immediately apparent to users, the learning curve is small and outweighed by the added functionality. Additionally, users are also provided with an alternative method of accessing both menus as they can tap the current input in the action bar to access the input menu and the menu button in the action bar to access the favorites menu.

Ideal Results

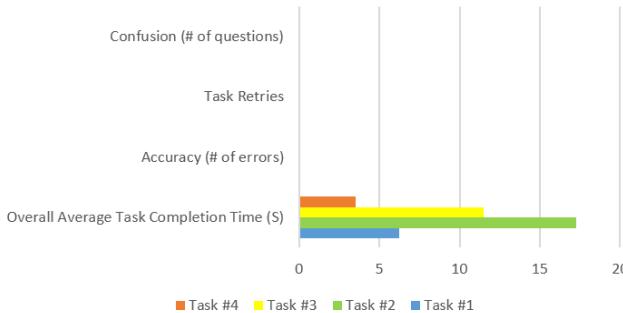


Figure 7. Average Completion Time

DD4 Favorites Menu A favorites menu was added to allow the user quicker access the shows or apps they view most frequently on the device. The favorites shown on in the menu are added by the user and are for the particular device selected, allowing the user to save a unique group of favorites for each device they use.

DD5 Input Device Menu The input menu allows users to switch between devices they have configured with the remote. The menu provides easy access for all devices and also allows the user to access specific device settings for each device. Additionally, we also chose to add a general settings menu where the user can change a list of global settings that will be used across all devices.

USABILITY EVALUATION

Testing was conducted on a sample of four subjects consisting of an older generation of users and a younger generation. The within-subject experiment required each person to execute four distinct tasks, after which, the results were recorded.

The tasks were defined as follows:

Task 1 Change the channel

Task 2 Access settings

Task 3 Change media source

Task 4 Access Favorites

For each one of those tasks, there were four criterion that each were measured against for each single user tested. The four criterion were:

CQ1 Task Completion Time (in seconds)

CQ2 Accuracy (number of wrong presses)

CQ3 Task Retries

CQ4 Confusion (number of questions asked)

RESULTS

The results of the user testing were analyzed and broken down to graphs per person, in order to analyze how each one of them performed. For the results of the Task Completion Time, the numbers were compared to the overall average

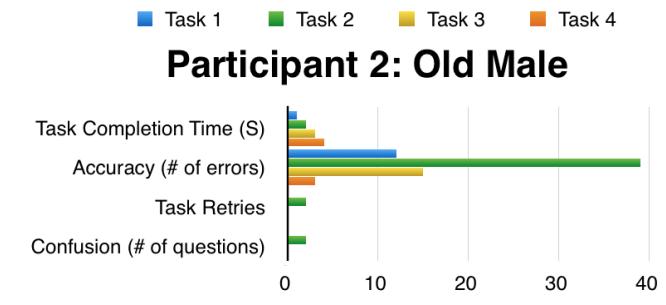


Figure 8. Performance of an old male.

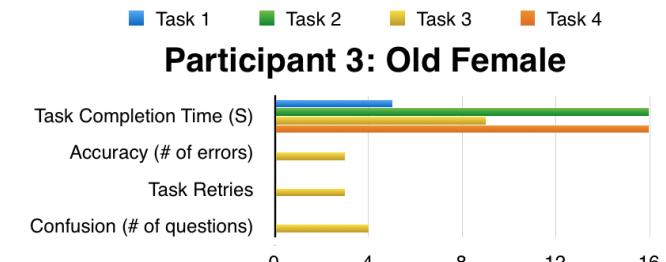


Figure 9. Performance of an old female.

completion time shown in figure 7. This overall average completion time was calculated using the time it took to complete each participant to complete each of the tasks. For the rest of the four criterion, they are compared to a result of “0” each, since ideally that is the number each one of them should be at. On the other hand, the full results table of the user testing can be found Appendix E, figure 31.

Figure 8 shows that the old male was able to execute the tasks fairly slowly.

Figure 9 shows that the old female was able to execute the tasks slowly and asked the most questions.

Figure 10 shows that the young male was able to execute tasks 1 2 and 4 fairly well and was above average in terms of performance.

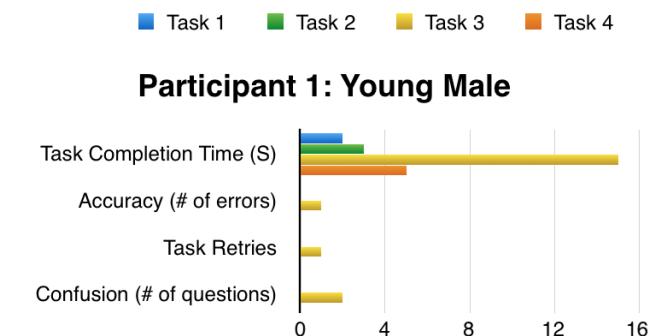


Figure 10. Performance of a young male.

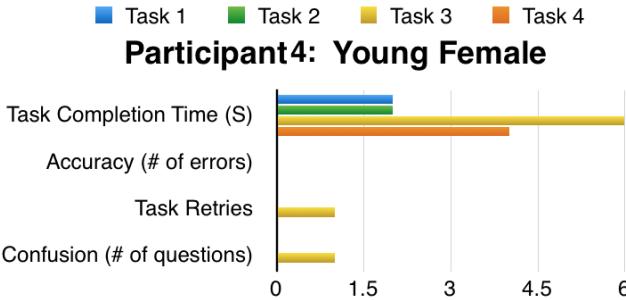


Figure 11. Performance of a young female.

Figure 11 shows that the young female was able to execute tasks 1 2 and 4 extremely well and was the most proficient out of anyone on the 3rd task.

DISCUSSION

From the results and the feedback results above, the design was concluded as an overall successful. The users found a couple of positive elements in the proposed design; which were the simplicity of the overall user interface, and the minimal number of steps to perform a task. However there were a few areas that were found that could be improved.

From the user testing that was conducted, there were a couple of critiquing points that came up that are outlined below that would improve the overall experience of using the application. Ideally, those points would be addressed in future versions of the app. However due to the time-line of the project, they were not. The critiquing points were;

CQ1 On the home screen, the placement of the power button and the device name should have been switched. This is due to the fact that when you press on the device name (which is placed on the top left), it brings the device menu (the right side-menu); where the placement of the power button does not depend on any of the side menus. Thus, swapping them would have been more consistent with the placement/position of the menu and would have been a better mapping (mapping [1]).

CQ2 On the home-screen, the power button is ambiguous, and lacks affordance to what it actually does. For instance, by just looking at it, the user may be confused to which devices the button controls (given that the app controls more than one device). Just by looking at it, the user cannot necessarily figure out if it does power on/off the device in control only? Or the TV only? Or both? Etc. The intended function of the button was to switch on/off the device in use, based on the device in selection on the home screen of the app. A possible improvement for this would be to have a pop-up ask the user if they would like to also turn on/off other devices linked to the device in use or just the device in use, or to give the user a first time tutorial when pressing the button that explains its behavior.

CQ3 On the favorites screen, the affordance of adding something to the favorites can be drastically improved by replacing the “add” button with a “bookmark star” instead. This is because an add button is usually associating with

manually entering and adding information in some sort of a data field (like adding a new contact in your “Contacts” app on your phone), which is not the goal of the bookmarking feature of the favorites. Instead, what’s culturally complied is a bookmark star that just saves whatever screen you’re on into favorites, much like internet browsers do. Moreover, the bookmark star already besides the word “Favorites” would be removed, to avoid user confusion.

CQ4 On the home screen, the Devices menu (right-side menu) swiping is not very visible (visibility [1]) - in other words, just by looking at the home-screen, the user cannot tell that there is a right-side menu. Thus the user may completely miss this menu of the app. A fix of this would be to add a “three stripes” menu button - like what has been done for the left-side Favorites menu - which would universally indicate a side menu on the app.

CQ5 With the “swipe” option turned on, the user interface of the middle “light” does not necessarily communicate the swiping task that the user can do, nor does it communicate how to do it. This can be improved by mimicking the shape of an analog stick similar to the ones on control pads, which would improve the affordance of what it can do, as well as how to do it.

CQ6 When pressing on the home button, the current message (which is the feedback) is ambiguous and does not tell the user exactly what happened; as well as the icon itself does not necessarily afford its function. The function of the button is to take you straight to the home screen of the app/device that the user is saying from whichever screen they are on at the moment. Both the feedback and the affordance of the button could be drastically improved by changing the message to display a more detailed message of what task was just accomplished, as well as changing the icon shape/placement to something that affords the function of the home button more (although a bit more testing would need to be done in order to get this latter one correctly)

CONCLUSION

Overall, the team believes that the submitted application has successfully re-designed the traditional media remote app for smart-phones to be a lot more user friendly, which would allow it to replace the multiple remote controls that can be found at home. The entire development process was followed thoroughly, throughout with first a software survey that addressed problems in current applications and made sure they did not appear in our application. There were many problems that were identified with existing media remote applications; like complexity of use, too many options, and poor user interface. These problems were avoided in the submitted design, and were evaluated to have been successfully solved through conducted user surveys.

It is the team’s belief that with the feedback and results given from the user survey that were compiled into this document, that a developer could create a better application that could improve upon other existing remote applications and our final application.

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APPENDIX

APPENDIX A: MILESTONE 1 HTAS

Roku: HTAs

Roku: HTA 1

0. Select a channel from My Channels
1. Open application menu
2. Select My Channels
3. Select desired channel from the list displayed

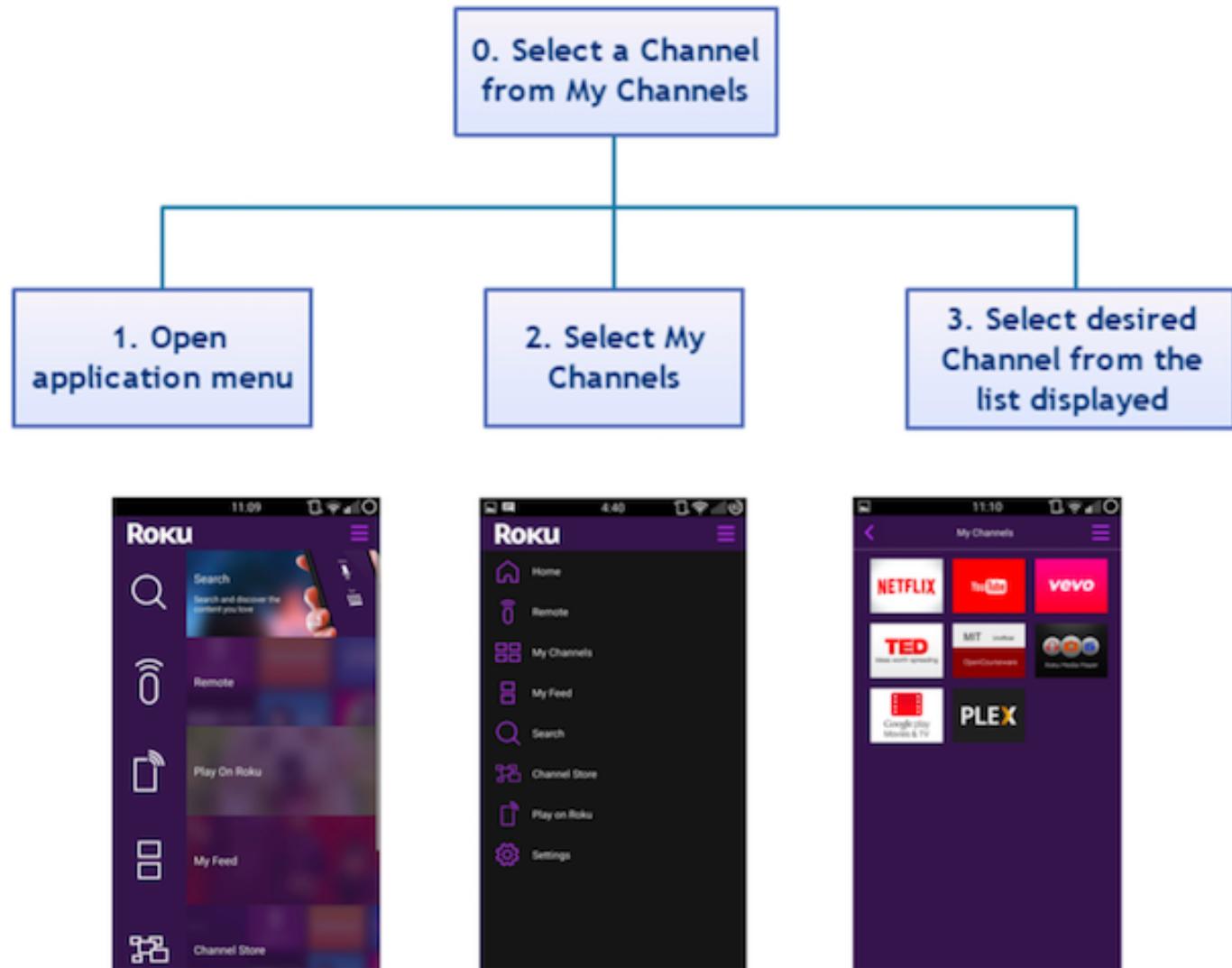


Figure 12. HTA 1: Roku

Roku: HTA 2

0. Voice Search
1. Select Search
 - 1.1. Highlight search
 - 1.1.1. Tap Search
2. Select voice search
 - 2.1. Tap the microphone button
3. Wait for the search dialog to appear
4. Vocally enter the search criteria
 - 4.1. Say search criteria
 - 4.2. Tap the microphone button when done
5. Wait for interpretation
6. Select desired content from list
7. Try again
 - 7.1. Tap on the microphone

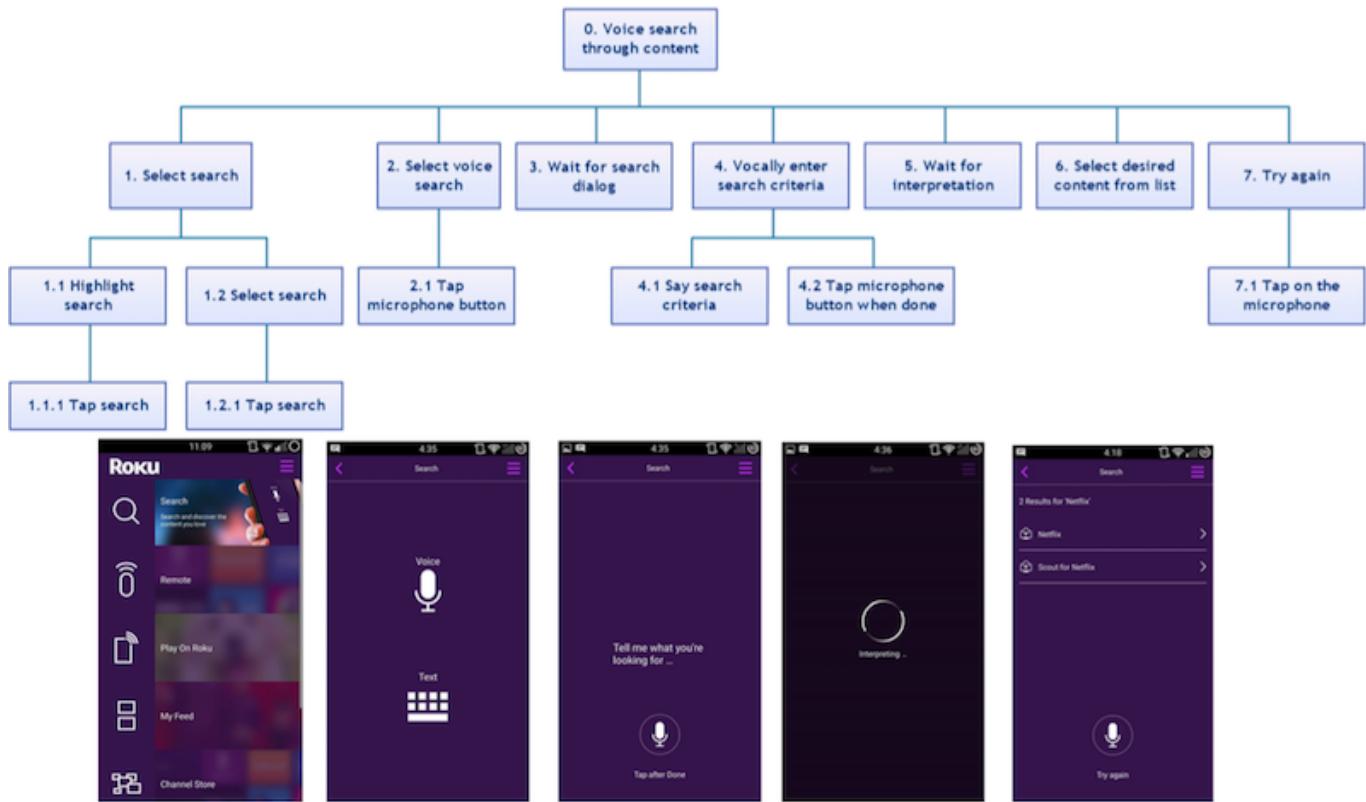


Figure 13. HTA 2: Roku

WD TV: HTAs

WD TV: HTA 1

0. Search for content
1. Open search field
 - 1.1. Tap the search icon
 - 1.2. Wait for the search to appear on TV
2. Enter search query
 - 2.1. Open keyboard
 - 2.2. Type in query and edit query
 - 2.3. Click "done" to send the text to device
3. Wait for results

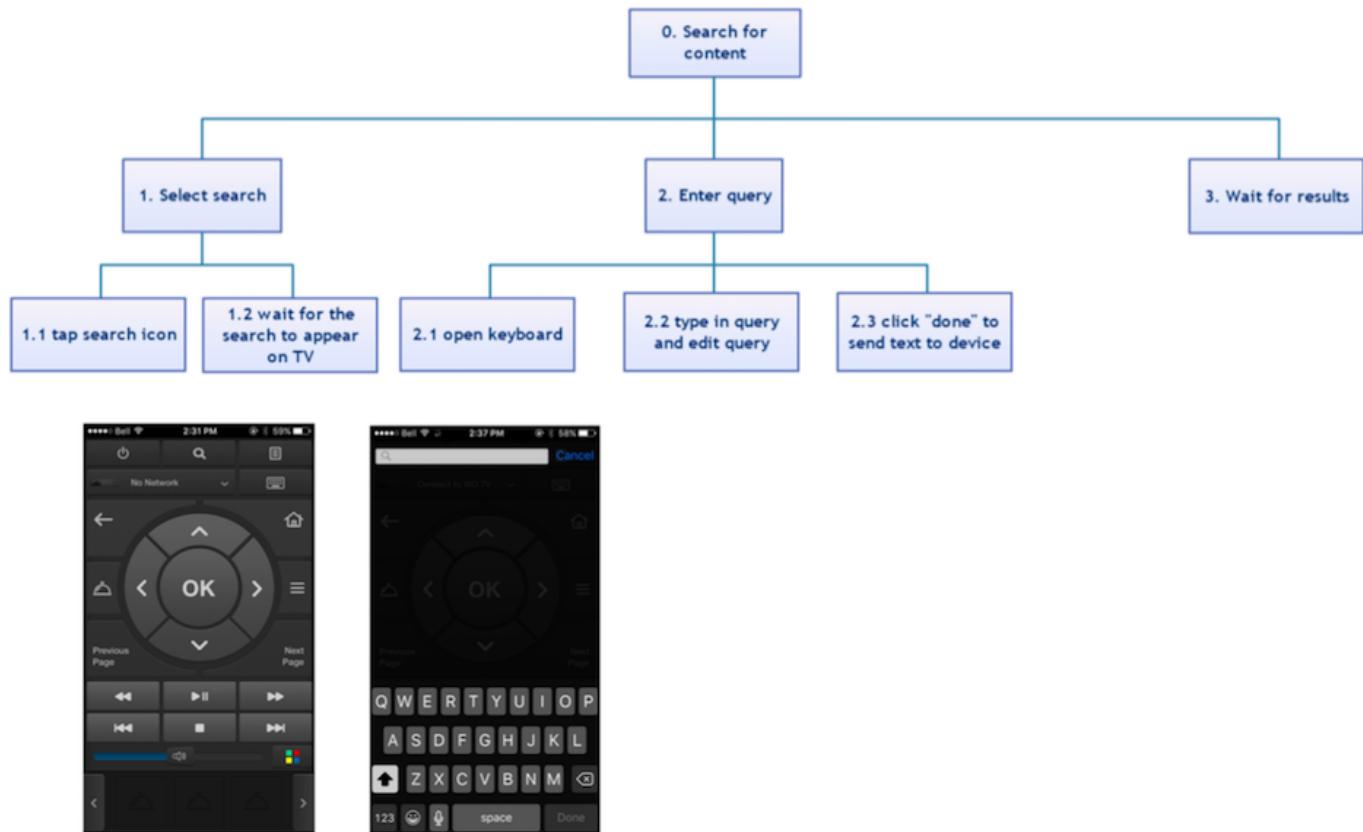


Figure 14. HTA 3: WD TV

WD TV: HTA 2

0. Play media
1. Retreive list of videos
 - 1.1. Search (see HTA above)
 - 1.2. or navigate to files
 - 1.2.1. Press home button
 - 1.2.2. Navigate to desired folder using direction pad
2. Select file
 - 2.1. Navigate through multiple pages using the “Next Page” and “Previous Page” button
 - 2.2. Go up and down through files using directional pad
 - 2.3. Click center button to see file summary
3. Play selection
 - 3.1. Press center button again

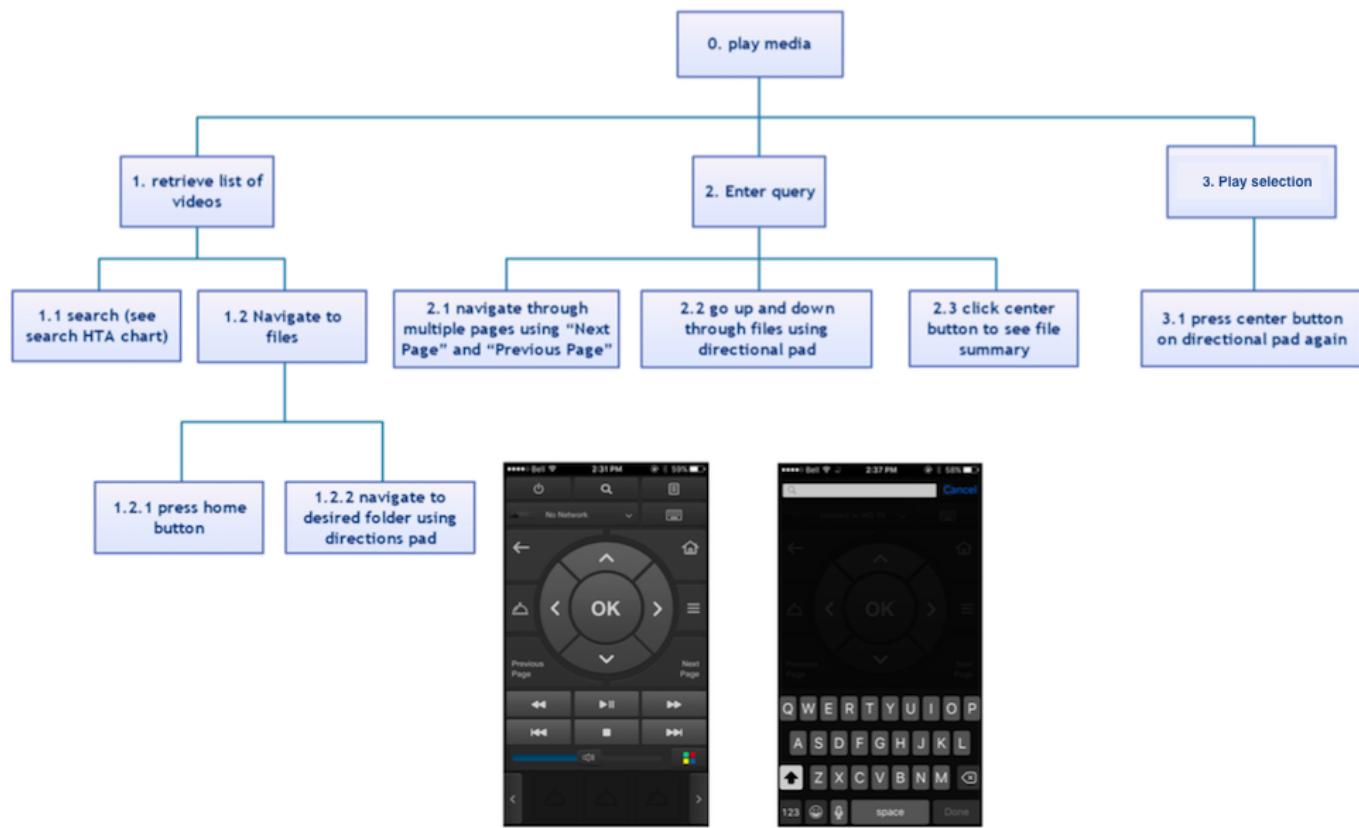


Figure 15. HTA 4: WD TV

Apple TV: HTAs

Apple TV: HTA 1

0. Play a movie
 - 0.1. Got to main menu
1. Click on movie
 - 1.1. Navigate by trackpad
 - 1.2. Select by clicking the “Play/Pause” button
2. Press play from an available list of media providers

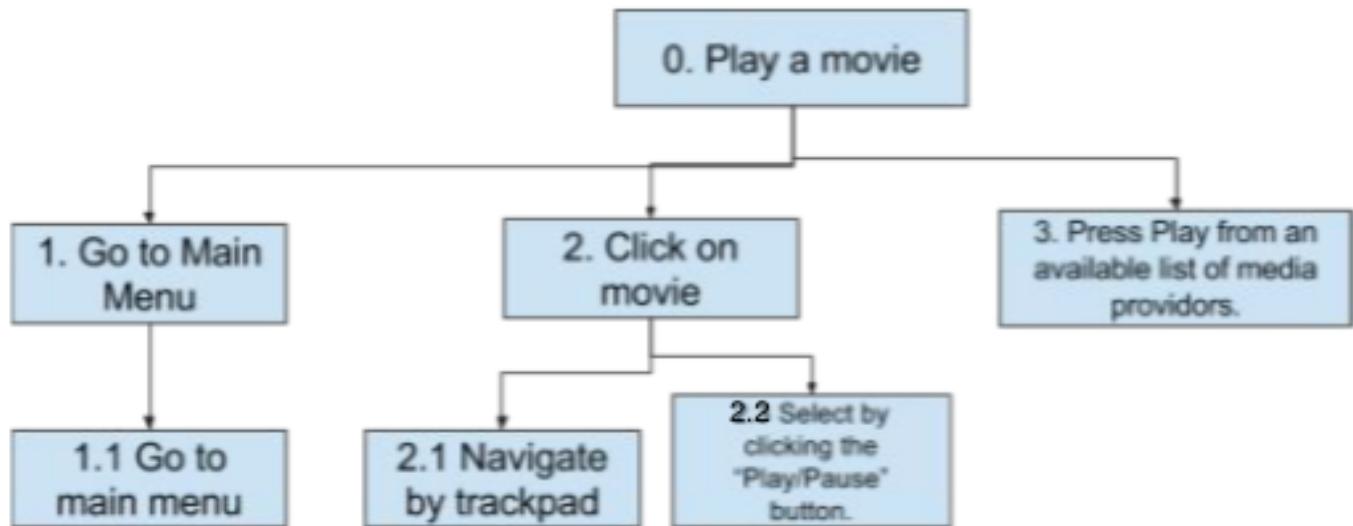


Figure 16. HTA 5: Apple TV

Apple TV: HTA 2

0. Select movie using Siri
1. Invoke Siri
 - 1.1. Tell her which movie to watch
2. Watch movie

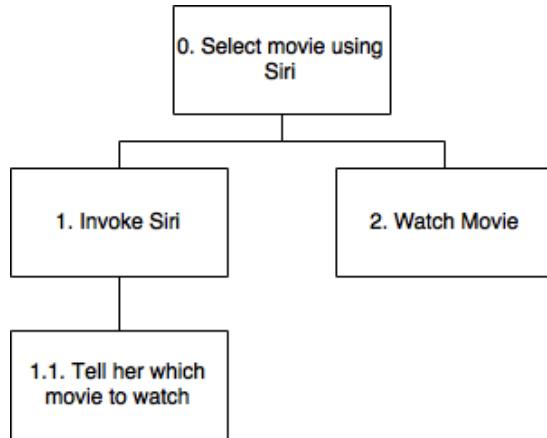


Figure 17. HTA 6: Apple TV

WatchOn: HTAs

0. Turn on TV
1. Open WatchOn
2. Tap on the top right icon
3. tap on the power button

WatchOn: HTA 1

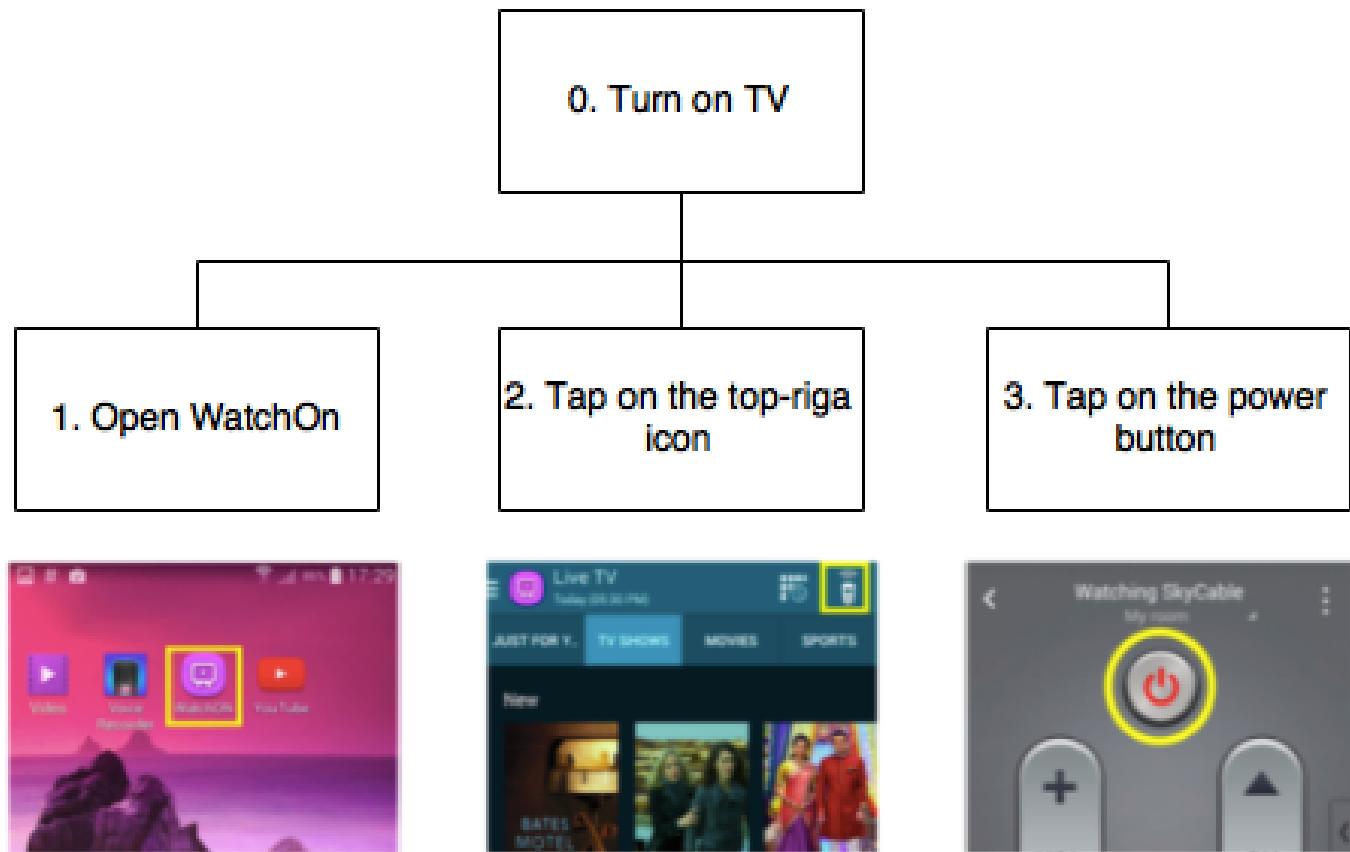


Figure 18. HTA 7: WatchOn

WatchOn: HTA 2

0. Select a show to watch
1. Open WatchON
2. Select the show
 - 2.1. If not on the home screen, swipe from right to bring the menu
 - 2.2. Tap on search
 - 2.3. Search for the desired show
3. click “Watch Now”

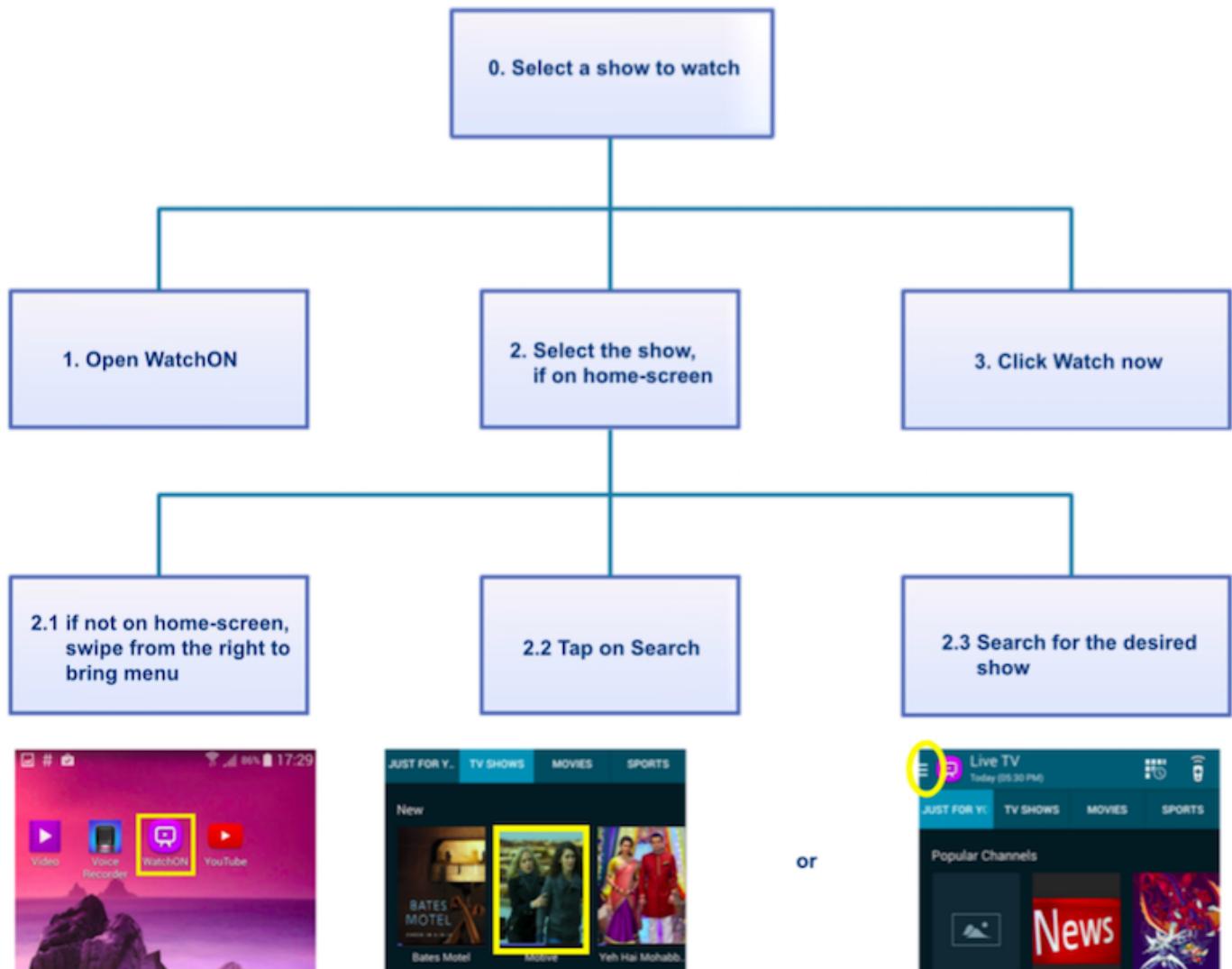


Figure 19. HTA 8: WatchOn

APPENDIX B: MILESTONE 2 1ST DESIGN ITERATIONS

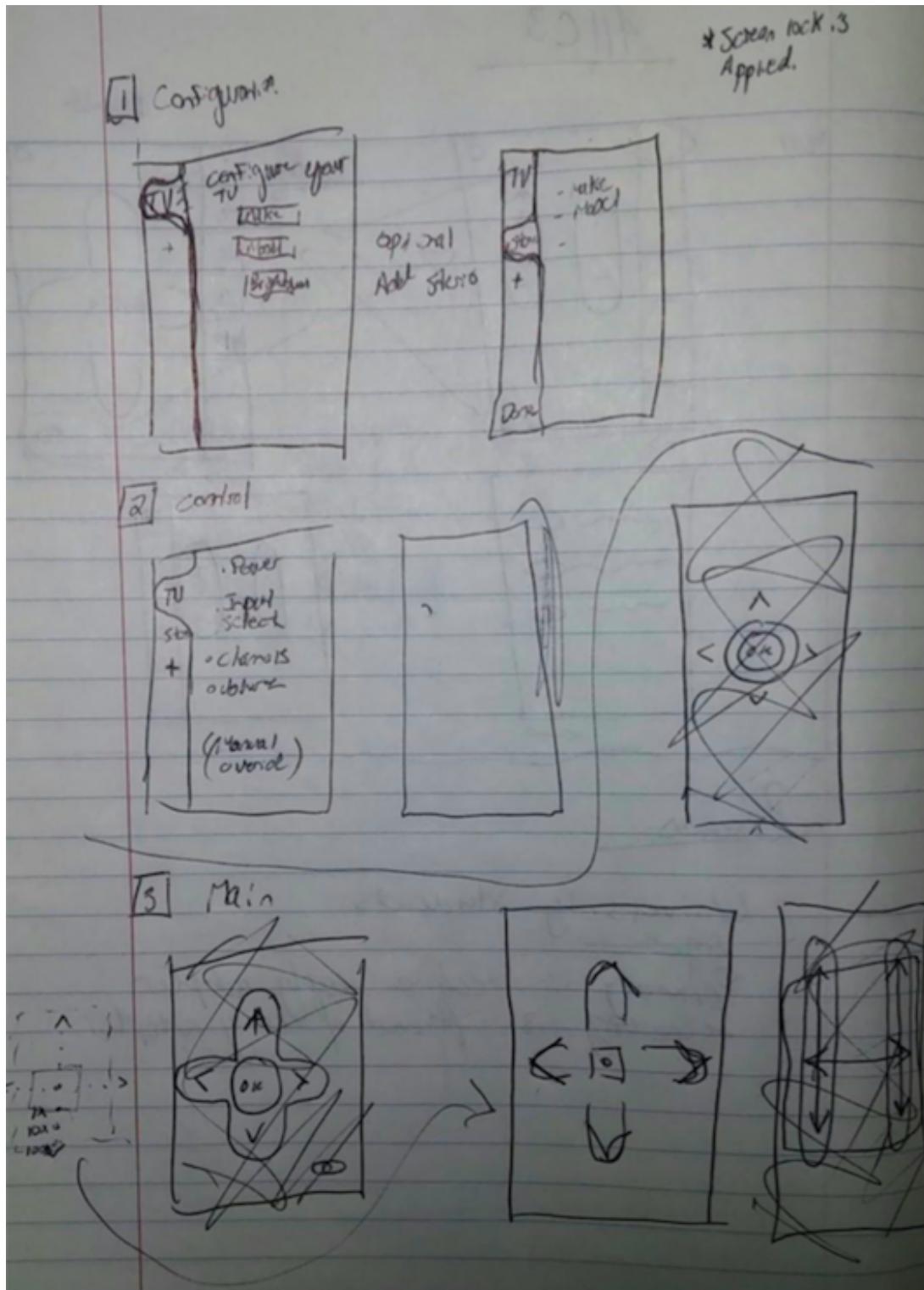


Figure 20. Early Iteration of the UI Design

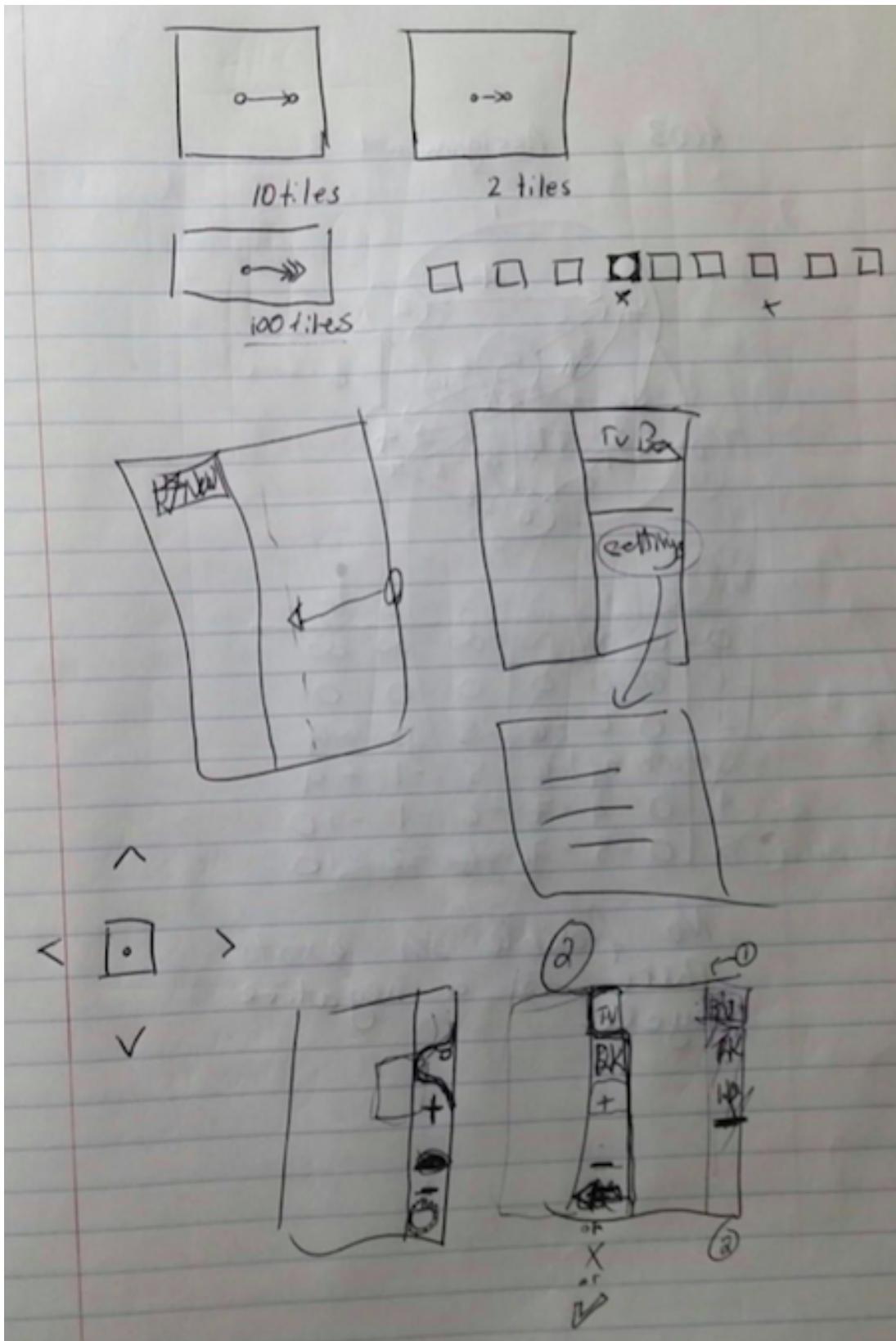


Figure 21. Early Iteration of the UI Design

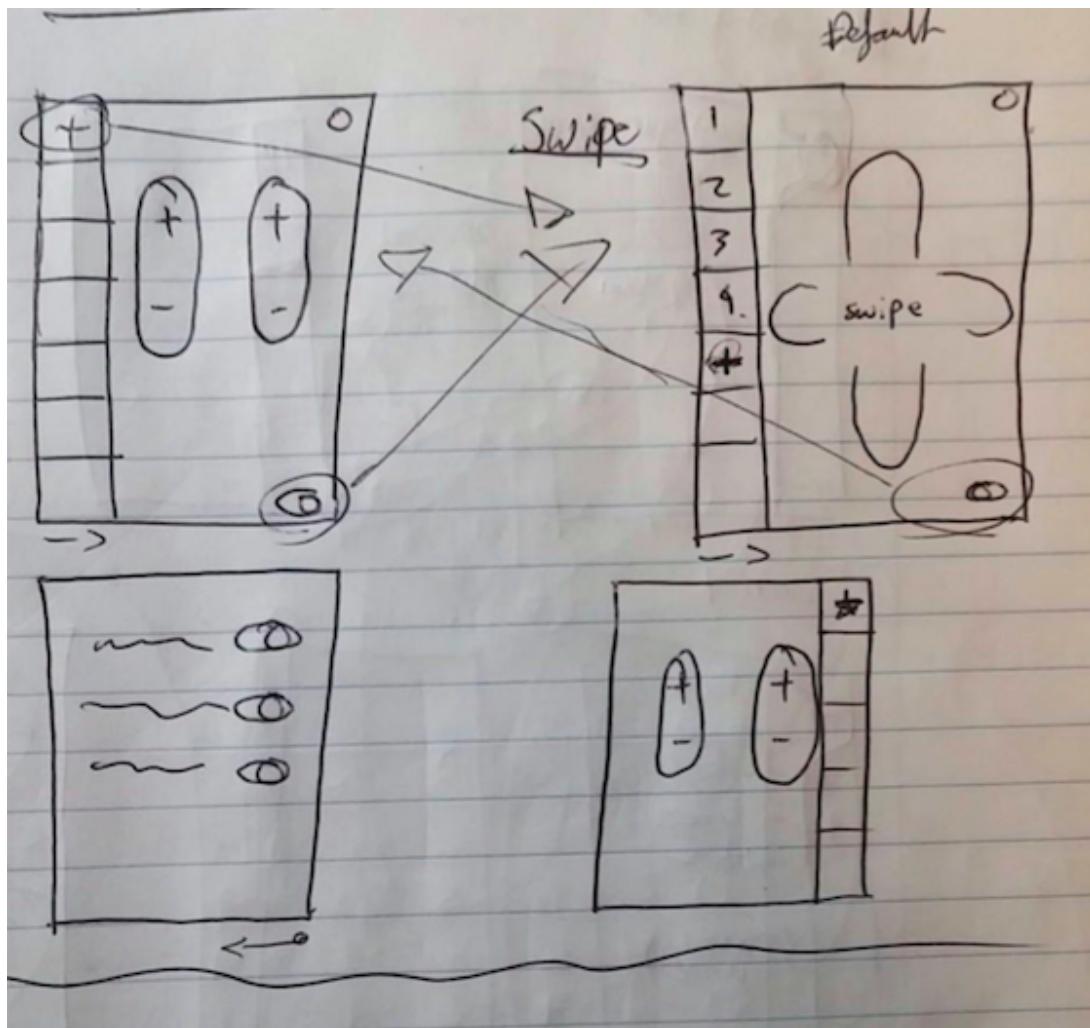


Figure 22. Early Iteration of the UI Design

APPENDIX C: MILESTONE 2 PROPOSED DESIGN HTAS

HTA 1: Play Media

0. Play Media
 1. Retrieve list of videos
 - 1.1. search (global)
 - 1.2. or navigate local files
 2. Select a file
 - 2.1. Navigate through multiple files
 - 2.2. center button to select
 3. Play Selection
 - 3.1. With a selected file press the center button to play

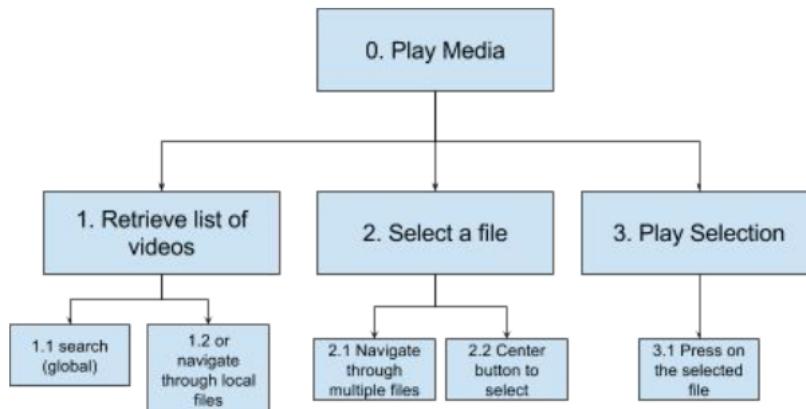


Figure 23. HTA 1

HTA 2: Media Search

0. Search for Media
 1. Open search field
 2. Keyboard Entry
 3. Select from a list of results
 - 3.1. Tap on the media with finger

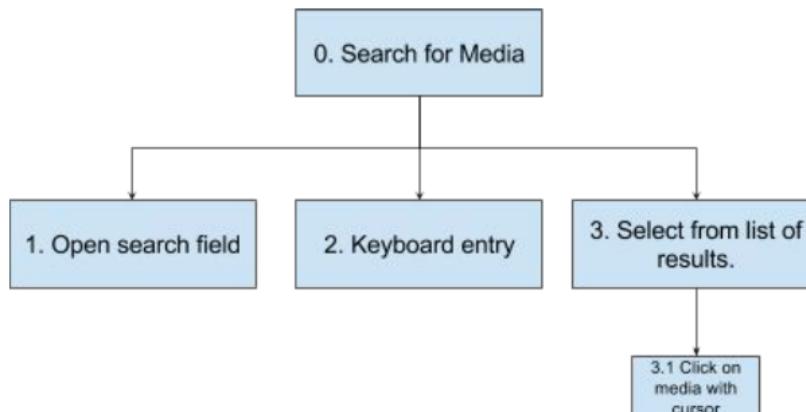


Figure 24. HTA 2

HTA 3: Adjust Volume

0. Adjust volume
 - 0.1. Press '+' and '-' buttons on side of phone or press translucent '+' and '-' buttons on bottom right of screen
1. adjust with volume slider
 - 1.1. Move knob left or right
 - 1.2. Wait for slider to disappear after a few seconds of inactivity

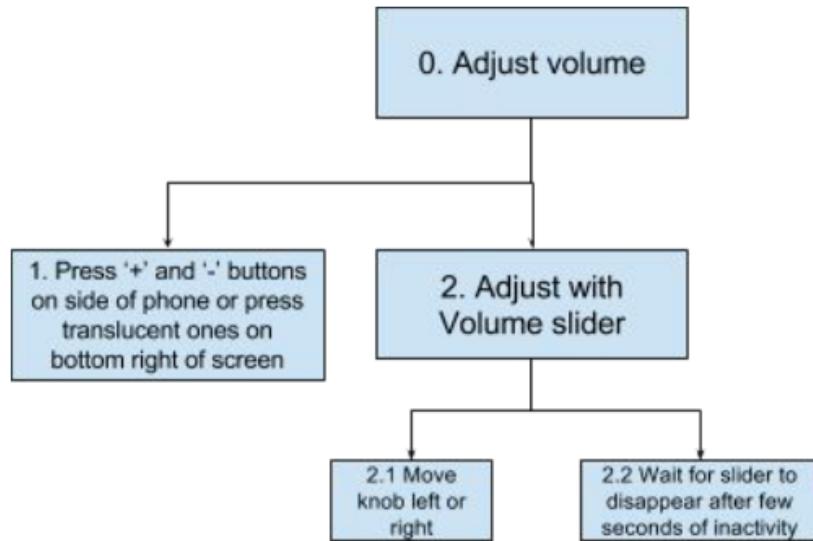


Figure 25. HTA 3

HTA 4: Change Video Source

0. Change video source
1. Open Menu
 - 1.1. Slide right or left from screen
2. Choose source (ie. Netflix)
 - 2.1. Tap on the icon

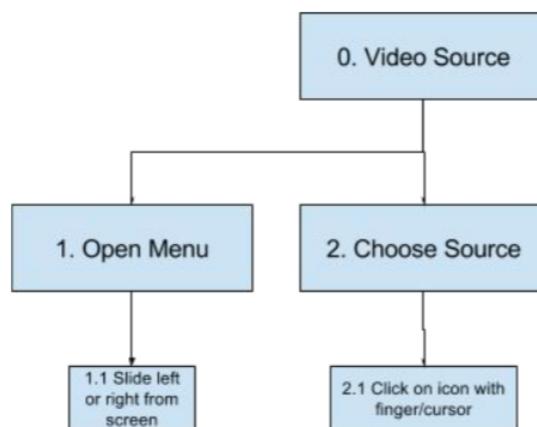


Figure 26. HTA 4

APPENDIX D: USER PERSONAS

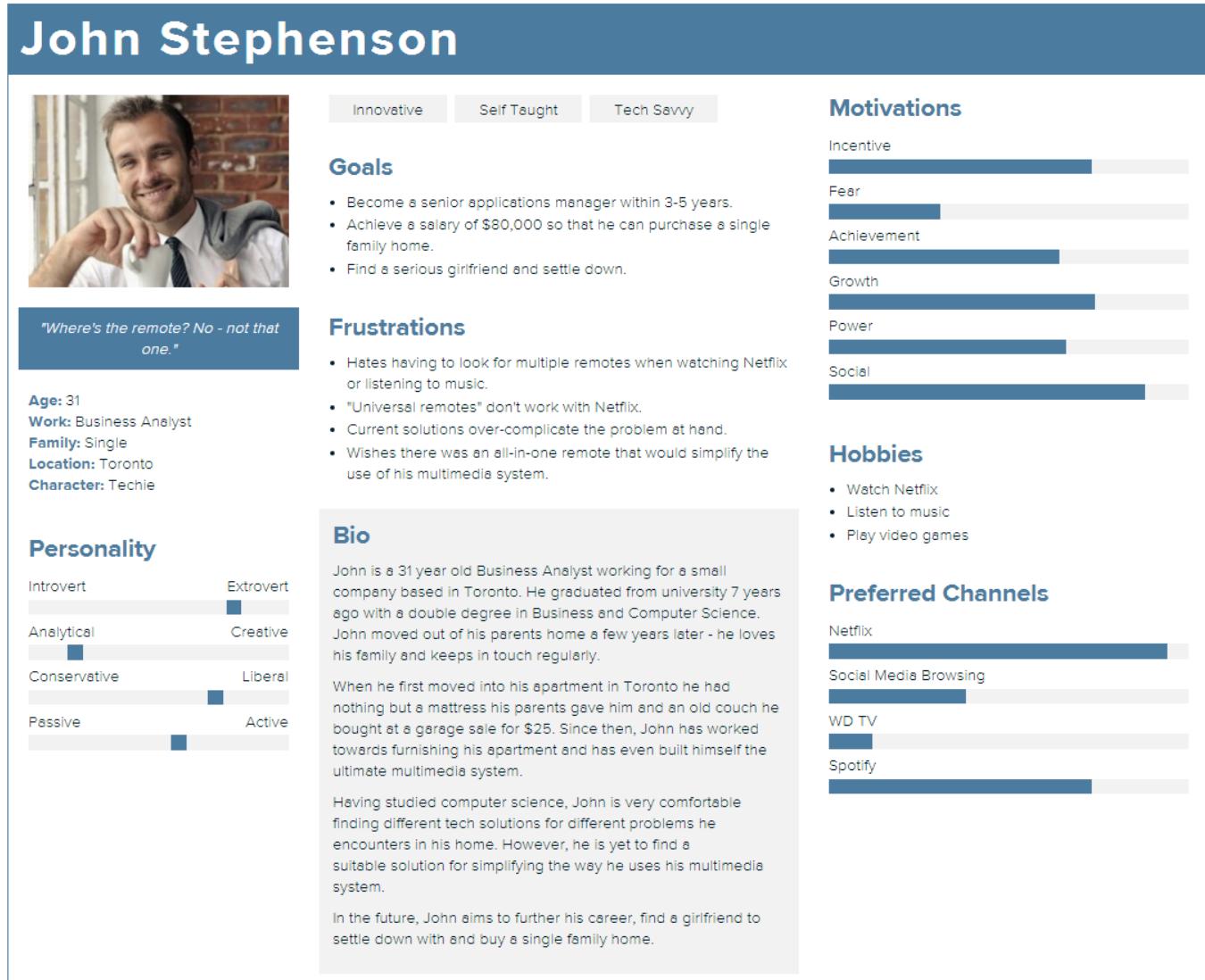


Figure 27. Persona 1: John Stephenson (Primary Persona)

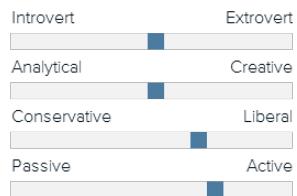
Tanya Gonzalez



"Much to learn, you still have."
—Yoda

Age: 18-23
Work: Student
Family: Student
Location: Burlington, ON
Character: Millennial

Personality



Millennials Digital Native

Goals

- Tanya would love to be a lawyer in the future, although she's not sure if her marks will get her to law grad school.
- As for her life-term goals, it is still undecided.
- From technology, she is always looking for it to "just work" - as expected - as she doesn't have the time or interest in fixing it.
- The remote would need to get her to her shows as quickly and conveniently as possible, without taking away from her normal smartphone usage/experience.

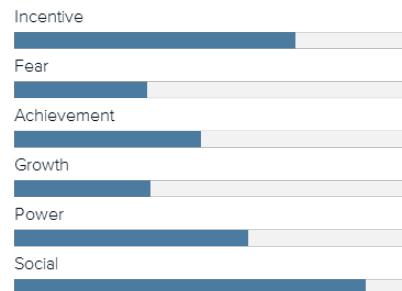
Frustrations

- If the technology doesn't work as expected, then that is when it really frustrates her; as she now can't get to her goals of using that gadget.
- When the smartphone or laptop does not allow her to multitask.

Bio

Tanya is a millennial university student, who is completely comfortable with most digital gadgets even though she may not necessarily understand them all. In other words, she is totally comfortable using a lot of digital products like Netflix, but not an engineer or software developer. She's in her 3rd year university, where her marks are around a B- and has been involved in a couple of student clubs. She's often social, going out with friends in the weekends, and family on the holidays. She would love to be a lawyer or a social worker after done her undergraduate degree.

Motivations



Brands

A collection or list of the user's favourite brands.

- Snapchat
- Apple
- Google
- Instagram
- Starbucks

Preferred Channels

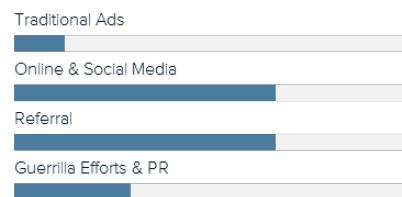


Figure 28. Persona 2: Tanya Gonzalez

Frank Costanza



Conservative Loving Wise

Goals

- Become relevant in the eyes of the younger generation.
- Get experience with new technology.
- Consolidate his remote controls.
- Facilitate his TV watching routine.

Frustrations

- Not understanding the younger generation.
- Moving around to find the correct remote.
- Confusion when operating a GUI.

Bio

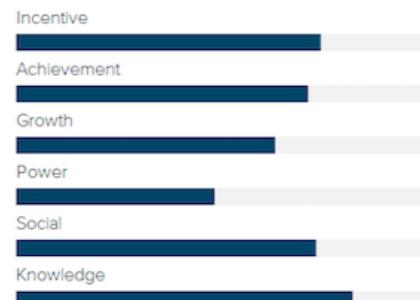
Grandpa has been watching television for longer than anyone. He knows what can go wrong if you come unprepared and sometimes reacts appropriately. He now believes there is technology out there that can alleviate most of his frustrations typically associated with accessing his favourite media. In addition, this technology will make him look cool in front of his grandchildren!

Age: 73
Work: Retired
Family: Son, Grandson
Location: Nashville, Tennessee
Character: Laggard

Personality



Motivations



Brands

Dell, Panasonic, Sony, Xperia, Samsung, Toshiba, Kodak

Preferred Channels

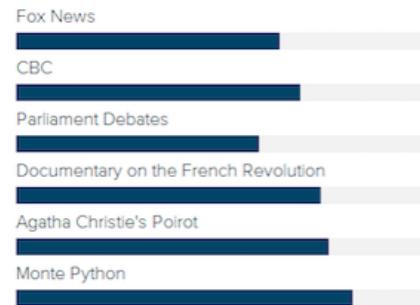


Figure 29. Persona 3: Frank Costanza

Susan Stephenson



"Time spent with family is worth every second."

Loyal Family Oriented
Good Listener Likes to try new things
Minimalist

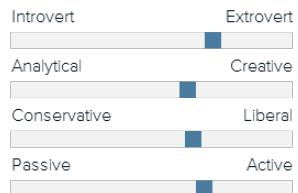
Goals

- Wants to maintain strong family ties.
- Desires to be involved in her children's lives.
- Does not want anything to be more complicated than they need to be.
-

Frustrations

- Does not like looking for remotes between couch cushions.
- Frustrated by new technology that does not improve over past technology.
- Does not want 3 controllers involved in media consumption on the television.

Personality



Bio

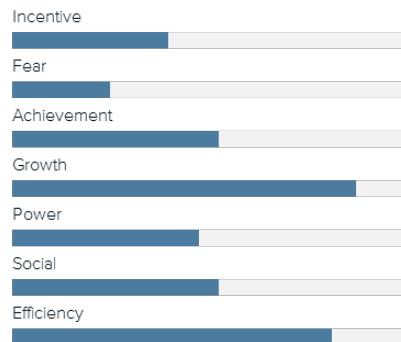
Susan is a 49 year old mother of 2, John and Stacy. John and Stacy have both moved away from home but still return on the odd weekend and for holidays. Susan likes to keep her home nice for when they visit and likes to keep things the same so that John and Stacy are comfortable and will visit often.

In her spare time Susan likes to do yoga in the park, and go for morning runs with her various groups. During these times they like to talk about recent changes in their lives; what their kids are up to and the recent news.

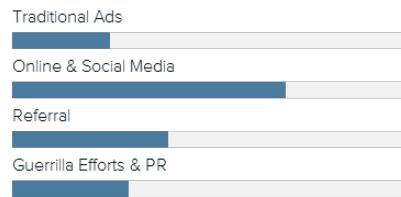
Susan likes to strive for a simpler life and likes to share these with her friends. She is an avid google-er whenever she is faced with a problem. She is not afraid to change but she has many ways of doing things that she believes are the best.

On a recent visit by her son Susan was introduced to a new app for her phone that will eliminate the need of any remote other than her phone. Her son set it up on her phone and she has begun using it.

Motivations



Preferred Channels



APPENDIX E: USER TESTING RESULTS

Participant Info				Task Info	Test Conditions			
Participant	Age (in years)	Gender	Job	Task	Task Completion Time (S)	Accuracy (# of errors)	Task Retries	Confusion (# of questions asked)
Participant 1	21	M		Task #1	2	0	0	0
Participant 1	21	M		Task #2	3	0	0	0
Participant 1	21	M		Task #3	15	1	1	2
Participant 1	21	M		Task #4	5	0	0	0
Mean					6.25	0.25	0.25	0.5
SD					5.965177	0.5	0.5	1
Paticipant 2	35	M		Task #1	12	0	0	1
Paticipant 2	35	M		Task #2	39	2	2	0
Paticipant 2	35	M		Task #3	15	0	0	0
Paticipant 2	35	M		Task #4	3	0	0	0
Mean					17.25	0.5	0.5	0.25
SD					15.37043	1	1	0.5
Paticipant 3	56	F		Task #1	5	0	0	0
Paticipant 3	56	F		Task #2	16	0	0	0
Paticipant 3	56	F		Task #3	9	3	3	4
Paticipant 3	56	F		Task #4	16	0	0	0
Mean					11.5	0.75	0.75	1
SD					5.446712	1.5	1.5	2
Participant 4	18	F		Task #1	2	0	0	0
Participant 4	18	F		Task #2	2	0	0	0
Participant 4	18	F		Task #3	6	0	1	1
Participant 4	18	F		Task #4	4	0	0	0
Mean					3.5	0	0.25	0.25
SD					1.914854	0	0.5	0.5

Figure 31. User Testing Survey Results