

The universality of the Conversational UI Interface with media in UX design

Anil Kumar Bheemaiah, Director of Low Code Solutions, AB

anilkumarbheemaiah@gmail.com, 8/14/2018 9:49 AM

Abstract

This publication proves the equivalence of an animated or non-animated conversational UI with Html 5 canvas to any UX design. The universality of the interactive voice interface is proven by the enumeration of the UX widgets and the proof of equivalence to interactive voice response with visual display.

What: The proof of the equivalence of conversational UI with or without media to a visual interface based on mouse or keyboard or other interactions.

How: An enumeration of widgets and other UI and equivalence in the conversion to conversational UI with media.

Why: Accessibility is natural in conversational UI, necessitating the

conversion and equivalence. Conversational UI is hands-free and natural.

Introduction

UX design is a 10 billion dollar industry, there is thus the possibility of automation of atleast 30% of this development (“Website” n.d.)[1].

At AB we have developed a basket of tools and a portal called low-code-solutions for the automation of UX development. Since the primary UX development we do is conversational, we want to prove that any UX development is equivalent to interactive voice with a display, much like Alexa ECHO display.

Synopsis UX JavaScript past and present

JavaScript

Initially only implemented client-side in web browsers, JavaScript engines are now embedded in many other types of host software, including server-side in web servers and databases, and in non-web programs such as word processors and PDF software, and in runtime environments that make JavaScript available for writing mobile and desktop applications, including desktop widgets.

Although there are strong outward similarities between JavaScript and Java, including language name, syntax, and respective standard libraries, the two languages are distinct and differ greatly in design;

JavaScript was influenced by programming languages such as Self and Scheme.

The result was a proliferation of comprehensive frameworks and libraries, improved JavaScript programming practices, and increased usage of JavaScript outside Web browsers, as seen by the proliferation of Server-side JavaScript platforms.

The terms Vanilla JavaScript and Vanilla JS refer to JavaScript not extended by any frameworks or additional libraries.

JavaScript supports much of the structured programming syntax from C. One partial exception is scoping: JavaScript originally had only function scoping with var.

A JavaScript engine is an interpreter that interprets JavaScript source code and executes the script accordingly.

A JavaScript Web server would typically expose host objects representing XMLHttpRequest and response objects, which a JavaScript program could

then

interrogate and manipulate to dynamically generate Web pages.

Because JavaScript is the only language that the most popular browsers share support for, it has become a target language for many frameworks in other languages, even though JavaScript was never intended to be such a language.

Because JavaScript runs in widely varying environments, an important part of testing and debugging is to test and verify that the JavaScript works across multiple browsers.

"JavaScript hijacking" is a type of CSRF attack in which a <script> tag on an attacker's site exploits a page on the victim's site that returns private information such as JSON or JavaScript.

This makes JavaScript a theoretically viable vector for a Trojan horse, although JavaScript Trojan horses are uncommon in practice.

Late Night Software's JavaScript OSA is a freeware alternative to AppleScript for OS X. It is based on the Mozilla JavaScript 1.5 implementation, with the addition of a MacOS object for interaction with the operating system and third-party applications.

Enyo JS is a framework to develop apps for all major platforms, from phones and tablets to PCs and TVs. WinJS provides a special Windows Library for JavaScript functionality in

Windows 8 that enables the development of Modern style applications in HTML5 and JavaScript.

In addition to the native computer software, there are online JavaScript IDEs, debugging aids that are themselves written in JavaScript and built to run on the Web.[]

jQuery is a popular JavaScript library designed to simplify DOM-oriented client-side HTML scripting along with offering cross-browser compatibility because various browsers respond differently to certain vanilla JavaScript code.

JS is a subset of JavaScript that can be run in any JavaScript engine or run faster in an ahead-of-time compiling engine.

Objective-J, a superset of JavaScript that compiles to standard JavaScript.

Unlike handwritten JavaScript, Elm-generated JavaScript has zero runtime exceptions, a time-traveling debugger, and enforced semantic versioning.

As JavaScript has unusual limitations - such as no explicit integer type, only double-precision binary floating point - languages that compile to JavaScript and do not take care to use the integer-converting shift and bitwise logical operators may have slightly different behavior than in other environments.

Java and JavaScript both first appeared in 1995, but Java was developed by James Gosling of Sun Microsystems, and JavaScript by Brendan Eich of Netscape Communications.

Definition of UX in JS

The Definition Of User Experience

Summary:

"User experience" encompasses all aspects of the end-user's interaction with the company, its services, and its products.

The first requirement for an exemplary user experience is to meet the exact needs of the customer, without fuss or bother.

True user experience goes far beyond giving customers what they say they want, or providing checklist features.

In order to achieve high-quality user experience in a company's offerings there must be a seamless merging of the services of multiple disciplines, including engineering, marketing, graphical and industrial design, and interface design.

It's important to distinguish the total user experience from the user interface, even though the UI is obviously an extremely important part of the design.

Even if the UI for finding a film is perfect, the UX will be poor for a user who wants information about a small independent release if the underlying database only contains movies from the major studios.

Again, this is very important, and again total user experience is an even broader concept ("The Definition of User Experience (UX)" n.d.).[2]

Equivalence of UX

Universality of the conversational UI interface.(Keenan 1976; Janarthanam 2017; Batish 2018; Shevat 2017; Pearl 2016; Masood and Hashmi 2019)

Much research on best practices of the design of conversational interfaces with or without conversational modeling is part of UI design psychology and user interfaces.(Janarthanam 2017, Shevat 2017, Hashmi 2019). The universality is proven in the equivalence of the two approaches in usability.

A UX design can be proven equivalent to an interactive voice response system with visual output much like Alexa Echo with video.

In the rest of the paper, we enumerate the widgets that form the elements of a UX design and prove the equivalence of each widget to a persistable interactive voice interface design with visual output.

The user interface of a messenger of Facebook is an example of a UX design that is universal and is proven equivalent to every widget that a UX design contains.

Enumeration of widgets

Equivalence of each widget to a model of html 5 canvas and conversational UI.

The web and UX accessibility proof.

Given the existence of a text, image and UX accessibility in voice response systems, the chat-bot interface is yet another

improvement in accessibility and proves the possibility of an exact equivalence of a chat-bot IVS interface with a UX design.

Given the following widgets:

Audio: Audio clips can be played on the canvas in either a Facebook messenger type of chat interface or the animated conversation and html 5 canvas interface.

Given the existence of an audio Widget, UX.A, it is proven that an equivalent conversational Design CH, CH.canvas.A is equivalent to UX.A.

Proof : The widget UX.A is equivalent to a html 5 widget as it plays the same content as an MP3 or any other format.

Video: Video's can similarly be played in both the user interface types.

The widget equivalence is defined as above for audio.

Animation: An animation can be simulated using a widget.

The widget equivalence is as defined above for audio.

In the messenger interface and directly on the html5 canvas.

Radio menu: The radio menu choices can be indicated on the messenger interface as clickable alternatives, alternatively it can be

listed out in a conversation and the choice indicated in the conversation and stored to a self, AIML or JavaScript data structure.

Given the existence of a radio menu UX.RM, for a conversational interface CH, let there exist a conversation C, so we have to prove the equivalence of UX.RM and CH.C, given that CH.C is persisted and also available for data mining.

Proof: There exists an unfolding in natural language for the label and the choices of UX.RM, which can be written as a natural language sentence. The response would indicate the choice for the radio button. thus CH.C has two parts CH.C.Question and CH.C.Response, the response if converted to a data structure gives the same data structure as UX.RM.

Nested dropdown menu

The choices in a nested drop-down menu can be unfolded into an interactive text with numbered choices and used in an interactive messenger like the interface of using semantic maps can be mined from interactive voice systems.

Proof as similar to radio button as described above.

Text box

Text box input is directly renderable as a response in IVS or messenger type interfaces.

Proof is axiomatic

Text area

The text area is a larger text response, which like a text box is directly renderable.

Proof is axiomatic

Status bar: this can be indicated in both the interfaces using a variety of formats.

Proof is axiomatic

Buttons

Buttons are directly addable to the messenger interface and replaced by yes/no or natural language responses in IVS systems. There exists UX.B a button with an action A, we have to prove that the same action is possible on a response CH.C.Response to CH.C.Question. The Question is a natural language framing of the action.

Proof: The function that can be called by the Action UX.B.A() can also be aliased through the function `semantic_map(CH.C.Response)`, proof for this is that a yes or no Boolean response for a question is equivalent to the executing of the action function or no action.

Conclusion

We have thus proven by enumeration of widgets and accessibility arguments that a conversational interface is equivalent to any UX design. The chat-bot is more pertinent to UX as it represents a mascot and serves as an interactive channel for an organizations PR. Chat-bots can be extended to do more

than just UX, they can even serve as RPA bots, helping in reducing the monotony of most tasks.

Future work would be the description of the automation of the conversion of UX requirements to automated shell scripting and training of conversational.

References.

- Batish, Rachel. 2018. *Voicebot and Chatbot Design: Flexible Conversational Interfaces with Amazon Alexa, Google Home, and Facebook Messenger*. Packt Publishing Ltd.
- Janarthanam, Srini. 2017. *Hands-On Chatbots and Conversational UI Development: Build Chatbots and Voice User Interfaces with Chatfuel, Dialogflow, Microsoft Bot Framework, Twilio, and Alexa Skills*. Packt Publishing Ltd.
- Keenan, Elinor Ochs. 1976. "The Universality of Conversational Postulates." *Language in Society*. <https://doi.org/10.1017/s0047404500006850>.
- Masood, Adnan, and Adnan Hashmi. 2019. *Cognitive Computing Recipes: Artificial Intelligence Solutions Using Microsoft Cognitive Services and TensorFlow*. Apress.
- Pearl, Cathy. 2016. *Designing Voice User Interfaces: Principles of Conversational Experiences*. "O'Reilly Media, Inc."
- Shevat, Amir. 2017. *Designing Bots: Creating Conversational Experiences*. "O'Reilly Media, Inc."
- "The Definition of User Experience (UX)." n.d. Nielsen Norman Group. Accessed

July 29, 2019.

<https://www.nngroup.com/articles/definition-user-experience/>.

"Website." n.d. Accessed July 29, 2019. The Future of UX Design Is Automation :: UXmatters <https://www.uxmatters.com/mt/archives/.../the-future-of-ux-design-is-automation.php>.

Volunteer Circle: Web and UX accessibility arguments, private communication, Volunteer circle.