



Wearable Computing Based on Voice Control

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Introduction

Computers and digital devices have moved to smaller, and more personal form factor. Despite that, even with recent wearable devices, we are still using Graphic User Interface (GUI), a 30 years old technology, as the gateway of most interaction. However, while GUI enables users interact with the device in a familiar way, it requires a screen and graphic processing unit, which limit the design on the device, and its battery life.

The current alternative is Voice User Interface (VUI), or “digital assistance” included in many smartphone nowadays. However, by the design of modern VUI, the digital assistances requires a stable Internet connection, and still relying on GUI on detail setting on query.

This project is focus on designing and testing the feasibility of using VUI as sole channel of interaction, by using the traditional, command-based voice assist, with third party extensions, user notification and dynamic programming language, to reduce the energy consumption in graphics and networking aspect in future wearable device design.

What Uses Energy?

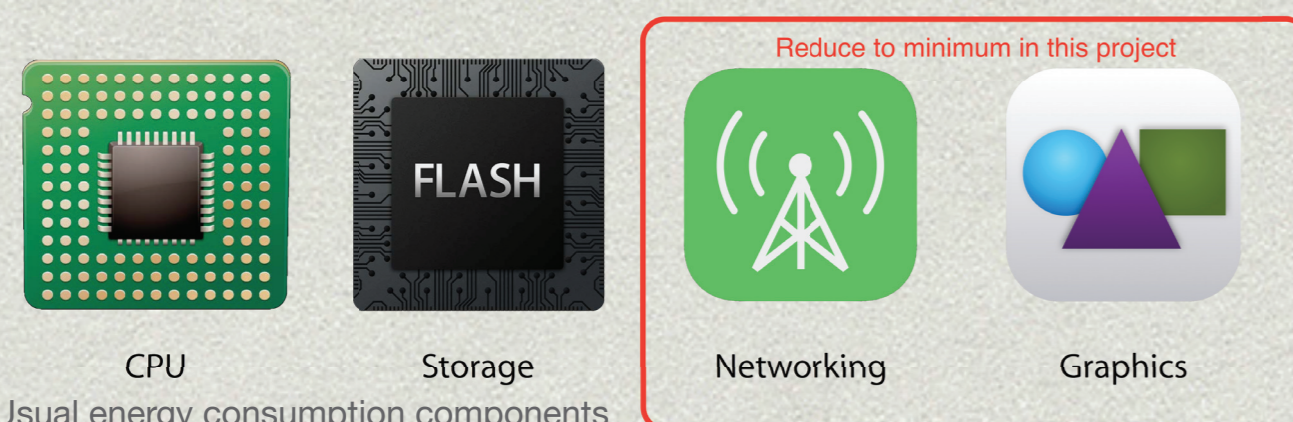


Figure 1: Usual energy consumption components in digital device

Design

This project contains four different components

• Gigantic Central

The core component of the project. It accepts user input from text or voice recognition, converts it into special designed tags, and send the result into Grammar Engine to “understand” the query. Then, it would use the result from the Grammar Engine, to track down what the user is ask for, perform the actions, and formulate a output response to the VoiceUI.

On the other hand, Gigantic will also accept extensions to load and unload in the background, which provide flexibility to the user interface.

• Grammar Engine

Grammar Engine analyzes and parses the received sentences of tags, using basic English grammar, then figure out the type of query (statement, command, question, etc.), objects referenced in the sentences, actions used, etc. Then, it will send the result back to Gigantic.

Design (cont.)

• Extension Library

Extensions Library is a set of Application Programming Interface (API), which enables any program to attach to the Gigantic, provide vocabulary, their definition, data and services to Gigantic. This enables infinite possibility to the developers and users.

• Voice UI

Voice UI is the output end of the VUI. Every dialogues generated by Gigantic, notifications sent by extensions, and audio playback initiated by the music player extension are coordinate, and consolidate in the Voice UI. Voice UI will synthesis speech from the dialogues and notifications, adjust the volume of the audio playback, to provide a seamless, uninterrupted user experience to the user.

Implementation

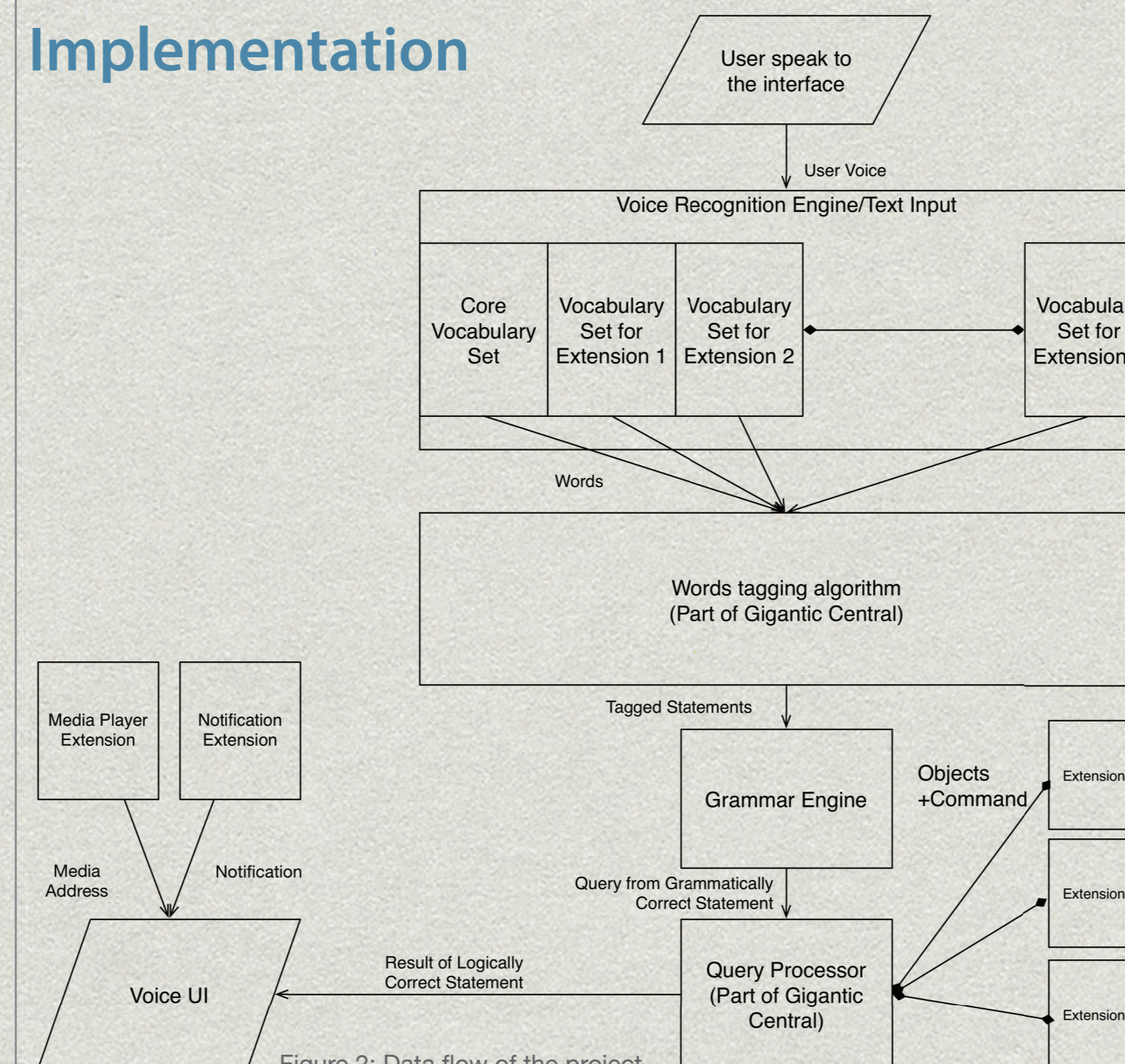


Figure 2: Data flow of the project

Results Dialogue

Transcript

Audio

User: Who am I
Gigantic Central (GC): You are <the username>



User: Where am I
GC: Now searching for your location
<When the device has found current location>
GC: Your GPS coordinate is <GPS coordinate>



User: Play Taylor Swift newest single
GC: Now playing, New Romantics by Taylor Swift



User: What is its lyric
GC: The lyric is display on your tablet

(The user’s tablet will shown the lyric)



User: Find a Chinese restaurant for my Japanese friends
GC: I found <a list of restaurant suitable for the constraints>

