1. Introduction

Endangered Languages Documentation Extension and Revival System, or ELDERS, is a product being developed to assist in restoring the Nottoway language. ELDERS is the web application that users can access to learn about the Nottoway tribe history, language, play games, and access a dictionary of words belonging to the Nottoway.

The Nottoway, a tribe local to the Tidewater area, is the basis of the product because their language is classified as endangered. Early documentation of the tribe in 1650, notes that there were only 400-500 Nottoway, a comparably small number of Nottoway speakers to begin with.
The tribe was further challenged by forced relocation due to hostile tribes, and in the early 19th century, it was dangerous to identify as a Native American with many individuals hiding their ancestry for personal safety. This possibly is when the language started to disintegrate. Today, there are many tribal members cooperating and assisting with the project to help build the database of words.

There are thousands of languages around the world, and half of them are in danger of becoming extinct within the next century. ELDERS has been designed using the Nottoway as a prototype but the concept can be used for any language. When a language becomes extinct, it can have a devastating effect on the culture. Any society can use the ELDERS web application to restore their language just as the Nottoway are restoring theirs.

A database will be built that includes all the words and definitions that are known and documented, and will also include pronunciations, syllables, sentence structure, and other grammatical tips associated with the words. The goal of ELDERS is to include everything in the database so that the user can learn the history and vocabulary of the Nottoway.

2. **Product Description**

ELDERS is a product which is to be used to enhance endangered languages. Its main focuses will be storing the original language, expanding the language, and help teach the language. It will do this by obtaining input from the community that will be using the language to both encourage the use and facilitate the expansion of the language. ELDERS will also provide tools to help teach the language and the history of the language’s people. The main interface with ELDERS will be a website to help navigate ELDERS. This is to provide an easier
method of access, compared to physical documents and CDs.

2.1 Key Product Features and Capabilities

ELDERS is a tool built to help endangered languages expand and grow. A community will be able to take an endangered language and then store it in ELDERS. Doing this will create a record of the original language in a dictionary format to preserve the language for future generations of linguists to study. After storing the original language, a separate dictionary will be made. This dictionary will contain a copy of the original language initially, however, this new dictionary will be able to be modified by a committee chosen from the group trying to revive the language. The main point of this is to help the community, who in the past spoke the language, have a say in what happens to their language.

In addition to being a tool to store and expand the language, ELDERS is also able to be used to teach the language to those who are trying to learn the language. This means that there will be a section containing tools to help people learn the language. The section will contain educational games and history lessons in addition to more standard language lessons, to help maximize the learning capability.

In addition to the expansion, storage and teaching of the language, ELDERS will provide a forum for users of ELDERS to communicate with each other. This should help promote use of the language by giving somewhere the language can be used.

2.2 Major Functional Components (Hardware and Software)
The ELDERS project utilizes several open source, commercial out-of-the-box software components collectively known as a LAMP stack. Specifically in the project’s domain, this stands for Linux, Apache, MySQL, and PHP. Linux refers to the operating system for the ELDERS server. The Ubuntu 12.04 distribution will be used since it is the latest LTS release, also known as Long Term Support. This will be crucial since maintenance will be ensured for at least five years. Additionally, Apache will be used as the web server, MySQL as the relational database management system, and PHP as the scripting language responsible for dynamic web pages. Fortunately for the administrators, each of these are provided as up-to-date packages in Ubuntu and offer user-friendly interfaces, such as phpMyAdmin for example.

ELDERS is made up of two major functional hardware components. Simply put, our project will make use of a client and a server. The server will be hosted on a Computer Science departmental machine. Recommended specs for the server is about 2 to 4 GB of RAM and at least 30 GB of hard drive space. As for the client, the hardware involved includes but is not limited to desktop computers, laptops, smartphones, and tablets. For the mobile devices, an application will be developed. However, as long as a device has a web browser, then the content will still be accessible.

Since an overview of the backend hardware and software has been established, it is important to identify the components interfacing between them and the users. For the database, there will be two separate instances created. In order to preserve the Nottoway language as much as possible, one will include everything currently documented by the Tribe. The other will deal with the removal, modification, and addition of words into the language. The database will also store the alphabet.
Access control is essential for a number of reasons. For example, the Nottoway people do not want ELDERS open to the public. Therefore, authentication must be used in order to give registered users access to the information. LDAP is one implementation of this strategy. Not only is this used for authentication, but it can also be setup for authorization and user provisioning. For example, users can be split up into different groups, such as Administrators, Tribal Members, and Council Members.

There are several parts of the website that compose other major aspects of the project too. The first is a page that allows registered users to view the alphabet and the dictionary. These components can be applied to educating the users through a historical background of the Nottoway Tribe and a list of simple video games and video lectures. For communication and discussion for these topics, a chat system and forum will be incorporated. Also, there will be the ability to propose new words into the language. This will be done through an interface which will lead to a council vote. Afterward, members of the council will have access to managing the dictionary. If a change occurs, registered users will be notified.

3. **Identification of Case Study**

As was mentioned in the introduction, ELDERS is aimed at revitalizing the Nottoway language. We have not set upon this project alone, rather we have been working with Professor Morris and the Nottoway Indian Tribe of Virginia. The final product will be designed for initial use by the Nottoway Indian Tribe of Virginia. Over the last few years, Morris has become close with the leaders of the tribe, allowing us to have an understanding of their desires and expectations for the product. The idea for this project spurred from Morris after hearing about their tragic past.
Recorded history of the Nottoway Indians began when Edward Bland, an explorer, first met a Nottoway Tribe in 1650 and recorded their status in his journal. At that time, the Nottoway were not numerous. Edward Bland recorded that only about four to five hundred Nottoway were in the tribe (Lewis). In 1681, the tribe was located in today’s Sussex County were threatened by hostile tribes and the Nottoway tribe was forced to relocate. The majority of the tribe moved to Surry County but it is believed that some moved north and established a tribe in New Jersey (Parramore 1-5). Much later, in 1820, Thomas Jefferson requested documentation of the Nottoway language. John Wood was sent to talk with the tribe’s chief at the time, Chief ‘Queen’ Edie Turner. During this meeting, two hundred and fifty words were recorded. It was also noted that at that time only three Nottoway speakers remained, all of them elderly. The language was declared extinct by the end of the 19th century. Today, there are two Nottoway tribes recognized by the state of Virginia; the Nottoway Indian Tribe of Virginia and the Cheroenhaka (Nottoway) Indian Tribe. The Nottoway Indian Tribe of Virginia is located in Surry County and the Cheroenhaka (Nottoway) Indian Tribe is located in Southampton County. The tribe we are working with, the Nottoway Indian Tribe of Virginia, has only around 200 members remaining none of which are able to speak their own language. Our mentor, Jay Morris, learned about the story of the Nottoway and their language while he was studying Cherokee over the past eight years. He then took it upon himself to help the Nottoway restore their ancient language.

Jay Morris is a highly educated man. He graduated from University of Missouri in 1983 with a Bachelor of Arts. He then proceeded to get two Masters Degrees at Yale in 1996 and 1994. The two masters were in Philosophy and Mechanical Engineering, respectively. Morris now teaches Computer Science at Old Dominion University. His interest in American Indians sprouted from his Cherokeean ancestry. As mentioned previously, he has been studying the
Cherokee over the past eight years. Over the last two years he has been honored with the title of “State Plan Chief.”

It has taken Morris a long time to gain the trust of the Nottoway Indian Tribe of Virginia. Now he is in regular contact with the tribe chief. The idea for this project and the specifications of the product have been relayed and discussed with the Nottoway.

4. Prototype Description

The prototype will be tailored to the Nottoway language and community while still being general enough to allow for other communities to easily adapt it for their language. It will attempt to provide the most functionality in the time allotted and given the current limitations of the Nottoway language. The prototype will focus on documenting and archiving the language as it currently exists and on the features necessary to enable language expansion. It will also provide cultural information and features to encourage and facilitate communal participation.

The prototype will be built with user access and restrictions in place so as to allow the community to protect their privacy and ensure that only permitted members have the ability to make changes and decisions about the Nottoway language. The dictionary feature will have the basic functionalities required for recording and displaying the Nottoway language, as well as minimal implementation of the language’s alphabet, grammar, and idiomatic phrases.

4.1 Major Functional Components (Hardware and Software)

The components for the prototype and product will overlap in many ways but there are some differences. For the hardware, the prototype’s server will not be a physical machine. It will still be hosted on a departmental computer but the actual server will be a virtual machine.
Therefore, the hardware specs recommended before will be adjustable to whatever is given to the group for the implementation of the project. Also, for the educational aspects, video lectures will be absent from the prototype. The main goal is to make sure that the database is created and populated so that digital documentation exists for the Nottoway language. That said, unfortunately due to time constraints, viewing that information from a mobile application will not be possible since its development is out of the project’s current scope of work.

Most of the software components will remain the same. The LAMP stack will still be required as well as all of the parts of the website previously described. There will also be two algorithms in place. The first is about voting for a new word. The database is searched to see if a word in the language exists. If it doesn’t, then voting options are opened. The council can then vote for a similar word from a different language, vote for a suggested word, suggest their own word, or do nothing. If their own word is suggested, the it is added to the suggested word list. The next process involves the list and having to approve the words. If a word hits a certain number of votes, the council gets to decide if the word is acceptable. If it is, then the word is added to the new dictionary and a notification is sent to the registered users. If it isn’t accepted, then it gets removed from the voting pool.

4.2 Features and Capabilities

ELDERS will feature an online website in which anyone can look at. They will be able to login or register on it. Inside the site the user has options of the major features from choosing “Dictionary”, “Community”, “Games”, and “History”. It will utilize in getting more people involved with trying to revive the language. The prototype will allow the users and community will view the old and new dictionary upon words and basic grammar usage. There will be a
voting section that is used by the council only to decide which new words are acceptable for
the new dictionary. History will provide anyone the understanding of the Nottoway tribe and
language. Under the game section users have the choice upon games to learn new words.

Customer and technical risks are also important. There is a very small probability of the
lack of acceptance from the community, but if this happens the this will cause a dangerous
impact on the ELDERS. There is a need for administrative responsibility upon the site and
authentication service. This can be resolved if the Nottoway counsel train people within their
tribe. The sources within the site can be used offline with the use of exportable content.

References

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Parramore, Thomas C. Southampton County, Virginia. Charlottesville: Published for the