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Hindi / Marathi Text Messenger for Android

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Abstract*— *with the recent advent of Messenger apps, it has become easier to communicate with people in fraction of second using low cost data plans. They are much cheaper as compared to traditional SMS. Some of the examples of messenger which took internet messaging to great extent are WhatsApp, We Chat, Hike, Viber, Plustxt. On good side they support additional features such as file transfer, location sharing, and voice/video messaging, still certain flaws exist in these messengers. One of the biggest disadvantages of these messengers is that they don't allow typing in Hindi/Marathi (Devanagari script), so only youngsters in India can use these apps as they can transliterate in Hindi- English but older generation people and rural people find it hard to use most messenger apps because of this shortcoming. With our project, we aim to solve this problem, and propose to develop an app with Hindi/Marathi script touch keypad where typing will be in Hindi/Marathi script itself. Also security being most important in online communication, we propose to use MULET for secure data communication with the app.

Keywords— android soft keypad, optimized keypad, message sharing. Hindi keypad design

I. Introduction

As per Gartner, mobile phone usage has been increasing dramatically over the last few years. Globally, if a usage comparison be carried out between PCs and mobile devices; mobile devices have approximately 3.5 times more usage then PCs. [1]

Some messaging apps:

Whatsapp: WhatsApp Messenger is a proprietary, cross-platform instant messaging application for smart phones. In addition to text messaging, users can send each other images, video, and audio media messages. The client software is available for Android, BlackBerry OS, BlackBerry 10, iOS, Series 40,Symbian (S60), and Windows Phone. Competing with a number of Asian-based messaging services (like Hike and We Chat), WhatsApp was handling ten billion messages per day as of August 2012, growing from two billion in April 2012 and one billion the previous October. On 13th June, 2013, WhatsApp announced on Twitter that they had reached their new daily record of processing 27 billion messages. According to what Skype did to international calling on landlines." As of August 6, 2013, WhatsApp has over 300 million active users, and 325 million photos shared each day. [4]

Problem faced in using WhatsApp:

1. This service is free for the first year then costs $0.99/Yr.

2. This messenger doesn't allow actual typing text in Hindi/Marathi.

Percentage of people using Mobile phones in India: As per survey of world Fact book people using mobile phones in our country India is around 70.72% till April 2013. [5]

Percentage of people speaking Hindi/Marathi: Hindi is the most widespread language of India, Pakistan, and Bangladesh. The Indian census takes the widest possible definition of "Hindi" as a broad variety of "Hindi languages". The native speakers of Hindi account for about 41% of Indians according to the 2001 census. Also the native speakers of Marathi accounts for 18% of total Indian population. Both the languages are written in Devanagari script.

Communication: Android is poised to become second worldwide mobile operating system in the nearer future. Using the technology – smart phone and internet, people are sharing information to other people but they are not sure if their information is securely transmitted or not.

After survey: What we noticed after the above survey is that there is no single app for text communication in Hindi/Marathi/Devanagari script which is native script for 50% people of world's second most populous country.

There is some work on published on optimal keypad design for Hindi by Priyendra S. Deshwal[6]. In this paper, the author has claimed an improvement of 50% performance over traditional Hindi keypad. Although this design is aimed at computers at large, we can tweak it to use on mobiles.

The main drawbacks with the existing apps: Google Play (Android market) has around 2500 messenger apps for low cost Internet communication in English, but no app supports messaging in Hindi / Marathi typing keypad. Some of them support transliteration from English to Hindi/Marathi, but none supports typing in Devanagari itself. Nearly 45% of Indian population doesn't understand English alphabets and most of them are comfortable in Devanagari script.

In this paper, we introduce following:

1.1 Touch Keypad:

- To analyze the optimality of the current standard Hindi touch keypad with respect to various arrangements possible.
- To find (if it exists) a keypad arrangement that is better than the current Hindi keypad in terms of typing convenience and efficiency.
- This proves need of a genuine Hindi/Marathi text messenger; where typing happens in Devanagari script itself.

1.2 Security:

Security is an important aspect of data communication over the Internet. Traditional encryption algorithms couldn't solve the problem of our Multilanguage approach. One of the globally recognized algorithms for multi-language encryption is MULET [7]. MULET provides best in class performance for fast and efficient encryption of multilingual text.

II. Material and Methodology

BACKGROUND

2.1 Hindi /Marathi Keypad:

Hindi is written in Devanagari script. The *Bureau of Indian Standards* has standardized the characters for the Devanagari script. The standard is named the Indian Script Code for Information Interchange (ISCII). With our project, we aim to solve this problem, and propose to develop an app with Hindi/Marathi script touch keypad where typing will be in Hindi/Marathi script itself. To develop a messenger app in which user can type message in Hindi/Marathi script.

2.2 Google Android:

The Android Platform [2] is a software stack for mobile devices including an operating system and key applications. Developers can develop applications for the platform using the Android SDK [3]. Applications are written using the Java programming language and run on emulator, a custom virtual machine designed for embedded use, which runs on top of a Linux kernel.

2.3 PHP and MySQL:

PHP [9] stands for (PHP*: Hypertext Pre-processor*) is a widely-used open source general-purpose scripting language that is especially used for web development and can be embedded into HTML. Instead of lots of commands to output HTML, PHP pages contain HTML with embedded code that do "something". The PHP code is enclosed in special start and end processing instructions <? php and ?> that allow you to jump into and out of "PHP mode." MySQL [10] is a relational database management system that runs as a server providing many user accesses to a number of databases. The SQL phrase stands for Structured Query Language. MySQL is a key part of (Linux, Apache, MySQL, PHP / Perl / Python), the fast-growing open source enterprise software stack.

2.4 MULET : A Multilanguage Encryption Technique

In this paper we used an algorithm that focuses on encryption of plain text over a range of languages supported by Unicode. It will facilitate the localization of Cryptographic Software tools. Although, a wide variety of techniques have been employed for encryption and decryption, the use of a multilingual approach for the same is not prevalent. Motivated by this, here, we used a novel algorithm that focuses on encryption of plain text over a range of languages supported by Unicode [11]. The use of these techniques makes the algorithm fast, efficient and easier to implement. The *replacement strategy* used ensures better security.

3 RELATED WORK

The proposed application will be consisting of an Android client and a PHP server with MySQL database. The server will be able to store data about user registration and usage. Its main objective is to forward the messages from one user to another. The server will also maintain a live note of online and offline users in ones friends list. The client app will be completely developed in Android. It will have a keypad for Devanagari script which will enable users to type in Hindi/Marathi. The message thereafter will be encrypted using MULET before sending it to the server. Any received message will be first decrypted using MULET and then processed to display.

4 DESIGN AND OPERATION

4.1 Keypad design:

The analyze of optimality of the current standard Hindi touch keypad with respect to various arrangements possible is done. But all of these designs were meant for computers and not mobiles. A mobile screen is way too small as compared to computer display. Hence the ergonomic design is necessity.

- To find (if it exists) a keypad arrangement that is better than the current Hindi keypad in terms of typing convenience and efficiency.

- This proves need of a genuine Hindi/Marathi text messenger; where typing happens in Devanagari script itself.
- The ergonomic design of our keypad makes it easy to type directly in Hindi characters also the fermentation.
- As Shown in below figures:

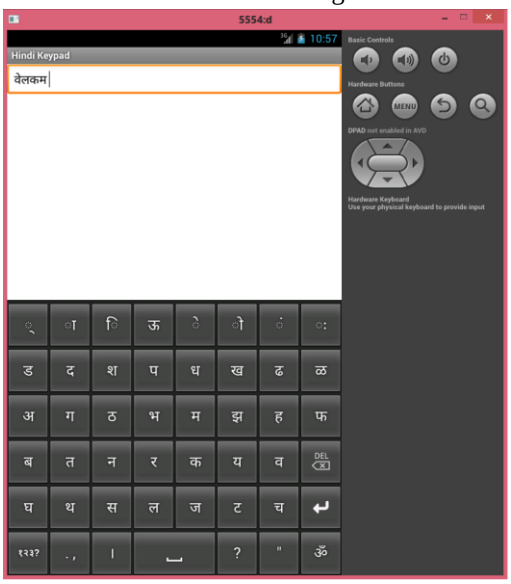

Fig.1: Hindi Alphabets

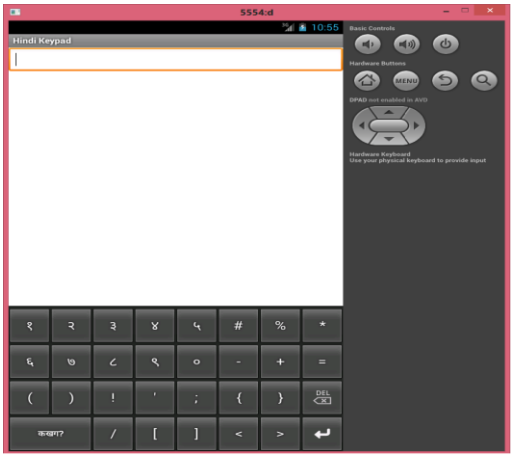

Fig.2: Hindi Number

Fig.3: Popup Menu

4.2 Security module:

As algorithm [7] have described, the MULET algorithm is capable of encrypting messages from different languages. We believe to be the characteristic feature of this algorithm which paves way for the localization of software in cryptographic domain. It is interesting to note that when we have successive repetition of characters, then replacement strategy can be applied. This mechanism effectively helps in hiding the number of characters in the cipher text making it difficult for the intruders to find the message size. Security can further be enhanced if we have a mapping array of characters taken from different languages in Unicode. In case of insertion of alien language characters in the array, the intruder of this encryption method requires the aid of a language expert.

4.3 Message Communication Module:

Most of the messenger apps today are English oriented there are plenty of messenger app of android platform, the Whatsapp, hike, wechat, live but none of them built-in support for Hindi keypad.
The keypad functionality is provided by android platform on its latest Operating Systems only. Other versions of android Operating Systems like gingerbread, honeycomb doesn't support the Hindi keypad. This messenger app solves this problem by novel approach.

4.3.1 High level design

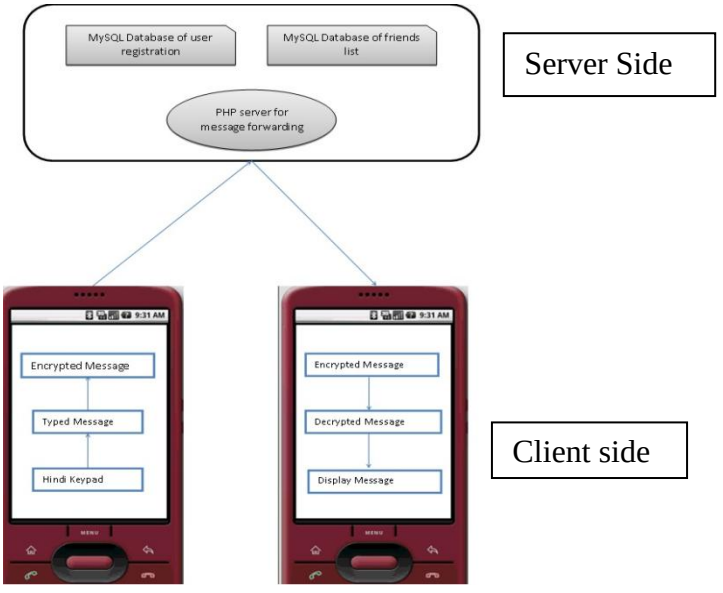

Fig. 4: Actual communication

In server side, we maintain the data in two ways as users and friends. In client side, we have maintaining the Hindi massage typing and encryption, decryption. For linking of both client side and server side is made by PHP pages in server side.

III. Results and Tables

Client side: Android platform 2.3, ADT plug-in, Java platform 7.25, Eclipse Helios 3.5, Android Emulator.
Server side: PHP5, MySQL 5.
The Operating System for smart phone is Android 2.3, Programming languages are Java (version: 1.6.0_25) and PHP (version 5). MySQL (5) is used as the database. We have used Eclipse (version: Helios3.5) for java programming, Macromedia Dreamweaver (version: 8) for PHP programming. We first used an android emulator to run client application and local server as web server for conducting an experiment.

Speed of our touch keypad is higher than the any other Hindi keypad and easy to use.

Algorithms	Accuracy	Level of security
Substitution Cipher	99%	20%
Columnar	85%	30.5%
AES	89%	35%
DES	99.3%	54%
Mulet	**99.5%**	**89%**

Table: Comparisons of Algorithm

IV. Conclusion

In this paper, we have presented a keypad design for a new Hindi keypad that is better than the current standard Hindi keypad in terms of typing convenience.
The message thereafter is encrypted using MULET before sending it to the server. Any received message will is first decrypted using MULET and then processed to display with 99.5% accuracy.
This paper has given novel approach to develop a secured android based and message sharing system. We have tested the system in emulator and finally tested the system successfully in the real life scenario using android smart phone. We were able to send the message through web server and android device and vice-versa. The messages are unintelligible to other apps; only our app could decipher it.

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