HCI Project Conference Template

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***Abstract*—Physically disabled people are an important part of our society that who have not yet received the same opportunities as the others in using various computer applications and games. Therefore, it is necessary to develop easily accessible systems for computers to achieve those people's involvement in using these applications and games. This paper presents you a two players game using Human Computer Interaction Concepts wherein the players use voice commands or mouse to play the game. Interaction through voice commands requires the following aspects - speech to text component, pattern matching of the text, processing the game rules, and performing the corresponding operation. Aim of this game is to destroy opponent's arena as mush as possible where the arena is a 2-dimensional grid of cells which are in either of the states - live or dead. The game ends when there are no moves left for any of the players and player whose arena is destroyed the most loses and his or her opponent wins. This paper aims to be shown as an example of how physically challenged people achieve their involvement within various application and games.**

I. Introduction

Humans usually communicate with computers through additional input devices such as keyboard and mouse. To allow a simple communication environment, many researchers have studied human-computer interaction (HCI). The most natural way of communication between humans is through speech. It also provides an efficient means of communication between human and computers.Instead of typing, human can speak more quickly. And also speech becomes a prime mode of communication with machines especially for differently abled people.

Speech interfacing provides the ways to these issues. Speech interfacing involves speech synthesis and speech recognition. A technology that allows the computer to identify and understand words spoken by a person using a microphone is Speech Recognition. It allows a computer to interpret any sound input (through either a microphone or audio file) to be transcribed or used to interact with the computer. [3] Due to these advantages we use Speech Recognition as a mode of interaction with the game

The area of gaming looks promising with respect to ubiquitous computing, since due to the entertaining nature of the social interactions, users are willing to explore innovative metaphors, modalities and hardware even when they are not as apparent or fluid as the designers might have hoped. [2]

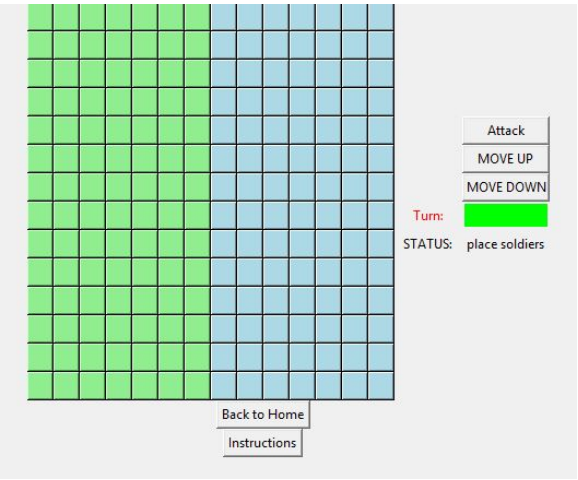

Fig. 1. Initial Arena

In contrast to developing new games around the abilities of the available technology, we took the opposite approach by augmenting a simple game with IT functionality. The game is equipped with Speech Recognition and Speech Synthesis where a user play the game by giving voice commands and get corresponding spoken outputs.

The remainder of the paper presents a first prototype of the Digiwar application, followed by the requirements this application makes on a supporting software infrastructure.

II. Game Plot

In this paper we are making a two player game wherein they fight against each other on the arena which is a two dimensional grid. This grid is made up of cells which are basically buttons. The arena is divided into two zones- color coded by green and blue as shown in Fig.1. The cells can either be an empty space(light green or light blue); or occupied by a soldier(green or blue) or a king(dark green or dark blue); or destroyed space(black). Initially the cells in these zones represent only empty spaces. To place a soldier, user has to click on the empty space cell. To bring out a king, user has to click on the soldier to upgrade him. See Fig. 2 which shows the placed soldier and kings in the sample gameplay. Each user

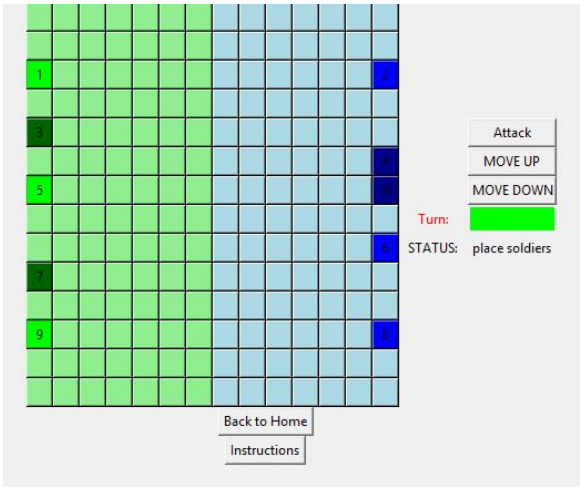

Fig. 2. Soldiers and Kings placed in their respective zones

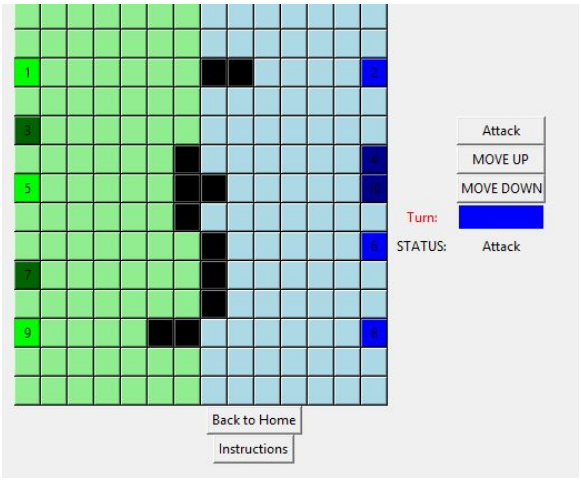

Fig. 4. Working of King's Attack

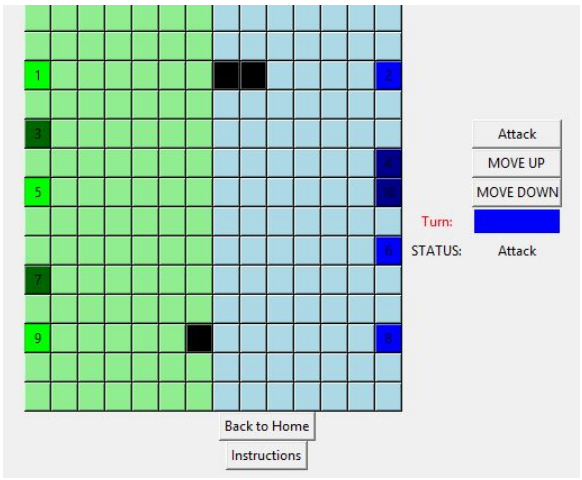

Fig. 3. Working of Soldier's Attack

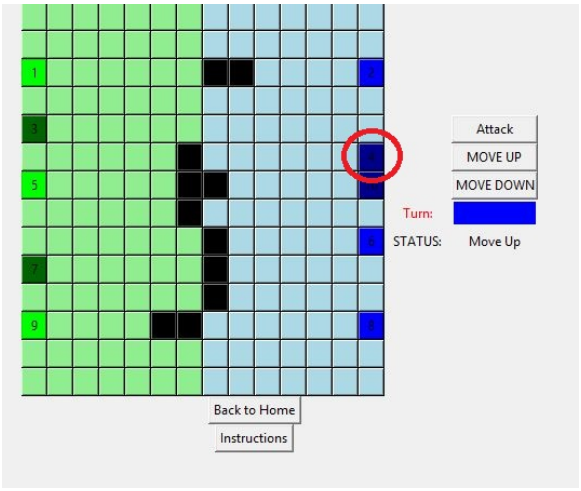

Fig. 5. Working of Move Up mode - 1

gets a chance turn by turn where he/she can place a soldier or upgrade an existing soldier to a king. Both players can place a maximum of 5 soldiers including a maximum of 2 kings and each of them gets numbered in an order. After placing them in the desired location, user gets turn by turn chance to perform any of the following action:

A. Attack

To attack the opponent, the user must click on the Attack Button or can say "Attack" to get into the Attack Mode. Once the game goes into the attack mode, then each player gets a turn to attack the opponent's zone. This is done by clicking on a particular soldier or king or by calling out the number assigned to them. Now the key diferrence between a king and a soldier is that when a soldier attacks only one cell of the opponent's zone present in the same horizontal line of the soldier gets destroyed if not destroyed previously(as shown in Fig. 3) whereas when a king attacks, three cells of the opponent's zone gets destroyed: one present in the same horizontal line of the king, which was not previously destoyed, including one above and one below it(as shown in Fig. 4).

B. Move Up

In this mode, the users can move their soldiers or kings vertically up in the arena. This comes in handy when the user wishes to attack at a different place in the opponent's zone or to save their soldier or king from the opponent's attack (as shown in Fig. 5 and Fig. 6). Again this operation can be performed one step at a time when the user gets his/her turn.

C. Move Down

Similar to Move Up, the user can also move his/her soldiers or kings vertically downwards one cell at a time when he/she gets his/her turn when intending to change the place of attack on the opponent's zone or to save their soldiers or kings (as shown in Fig. 7 and Fig. 8).

The game ends when there are no moves left for any of the players and the player whose arena is destroyed

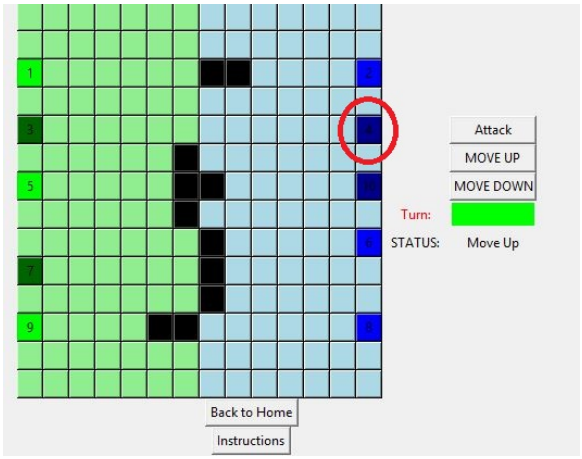

Fig. 6. Working of Move Up mode - 2

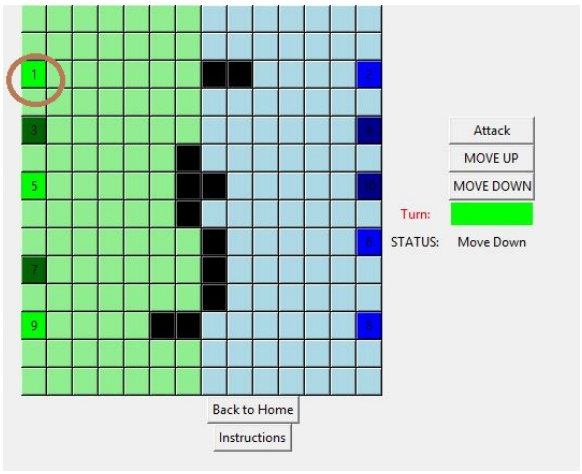

Fig. 7. Working of Move Down mode - 1

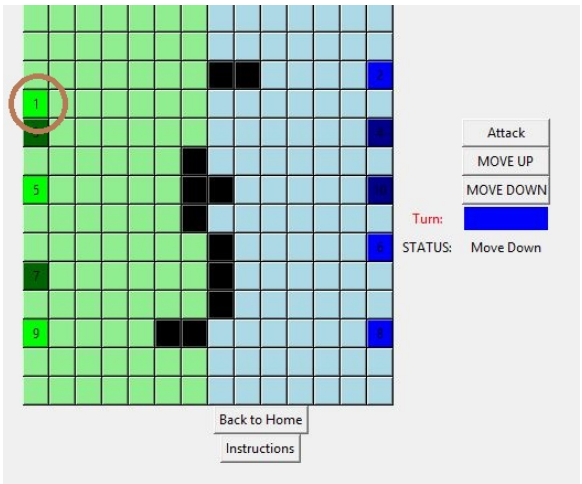

Fig. 8. Working of Move Down mode -2

the most, loses; and his/her opponent wins. See Fig. 9 as an example for how the game can end. Here the sample game-play ended because green zone doesn't have any soldier

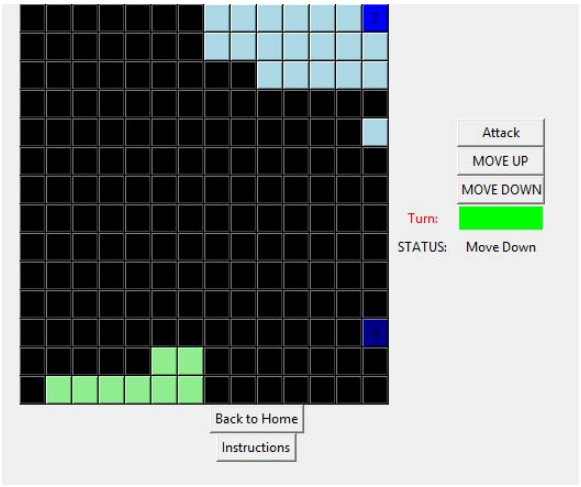

Fig. 9. At the end of the sample game-play

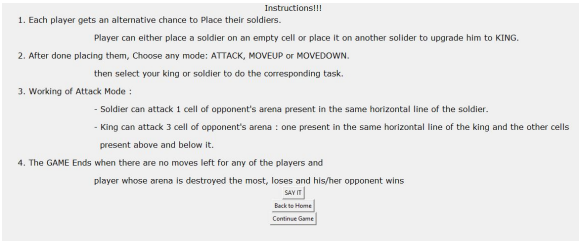

Fig. 10. Instructions page

or king remaining in their arena and green side player lost the game and blue side player became the winner.

The user can at any of point of time read the instructions or listen to them by clicking on 'Instructions' button or by saying "Instructions". The instructions are as shown in Fig.10.

III. Problem Statement

To create a game application as an example of using Human Computer Interaction technologies like Speech Recognition which comes in handy for usage by people who are differently abled so that even they get equal opportunities as the others in IT society.

IV. Implementation

The game has been implemented using python GUI named Tkinter. [1] Tkinter is the standard GUI library for Python. Python when combined with Tkinter provides a fast and easy way to create GUI applications. [4] Tkinter provides a powerful object-oriented interface to the Tk GUI toolkit.

A two dimensional array has been used to represent the arena where each element represents the button on the game's GUI. These buttons can be 4 states depending upon the element where -1 and +1 represents a zone's empty space, -2 and +2 represents soldiers, -3 and +3 represents a

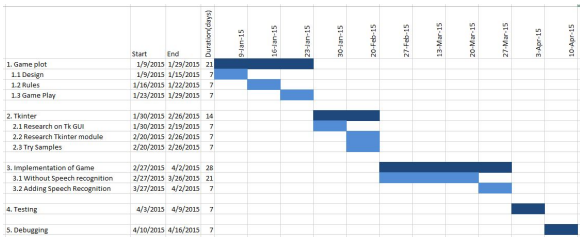

Fig. 11. Gantt Chart of Gopinath's Contribution

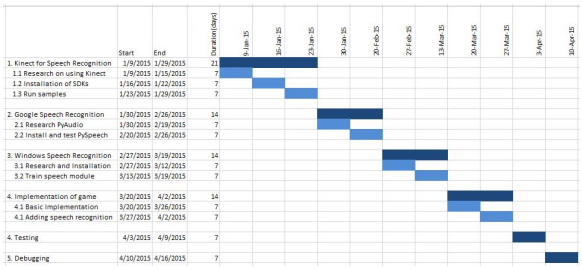

Fig. 12. Gantt Chart of Vinay's Contribution

king and finally -5 and +5 represents destroyed (or attacked) cell. Here, the negative numbers represents the green side and positive numbers represents the blue side. Moreover, the modes also depend upon a flag value set during the game. This flag value is initially set to zero which allows the player to set the soldiers and kings. During 'Attack' mode, the flag value gets set to one; and two and three in 'Move Up' and 'Move Down' modes respectively.

V. Conclusion

A simple two player game has been created wherein the user can play the game using speech recognition. This is especially useful for people differently abled. This game is an example how even differently abled people can be involved in various application and games using the current technologies.

Acknowledgment

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Induvidual Contribution

Individual Contributions of the authors are shown in Gantt Charts in Fig.11 and Fig.12.

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[4] John W Shipman. Tkinter reference: a gui for python. Technical report, Technical report, New Mexico Tech Computer Center, 2005.