Automatic Crossword Puzzle Generator

Guide:

Prof. Dr. M. L. Dhore

Computer Engineering

Department ,VIT

PUNE

Amit Vijay Ghodke

RollNo:59

Gr.No:1710731

Div:C

Upendra Sunlirao Kadre

RollNo:37

Gr.No:1710505

Div:C

Saurav Sunilrao Kendre

RollNo:66

Gr.No:1710219

Div:C

Lingayat Tulshidas Namdev

RollNo:71

Gr.No:1710370

Div:C

*Abstract*—*This paper is about the automatic generation of crossword puzzles . It will create different crossword puzzles using different words each time. This paper is about dynamic crossword puzzle generation.*

# **I)INTRODUCTION**

We all solve crossword puzzles or have solved them in our childhood. We all know how it works. We have to fill an appropriate word for the given meaning at specific location.

We can also see some blank spaces in there. These puzzles are made in such a way that some of the letters of words overlap. Using those half made words and meaning of that word as hint we have to guess the actual word. Manually it takes much time to create crosswords because we have to see which letters are overlapping which are not and according to that place the words. We go on filling the words In the crossword till it completes, there should be no blank spaces other than black colored blanks.

**II) LITERATURE SURVEY**

Printable .pdf output file was created using simple python script and LaTeX . The technique receives a list of words, in .txt file. 1000 words are chosen randomly from the list that is given, and these are the words that will be used thereafter. This creates the possibilities, connected possibilities and eventually grid of crosswords. [1]

**III) PROPOSED SYSTEM**

In order to generate crosswords, 2d arrays are used. In which, blank spaces are left to insert the answers for give n set of words. A .txt file is used to take input of words from word dictionary used as database. Proposed algorithm is used to generate crosswords from these words.

# **IV) WORKING**

The crossword Puzzle generator uses .txt file as a input sample with help of python scripting and by using latex package in python it is converted into .pdf format.

Algorithm:

* The technology receives a list of words in a .txt file.
* Number of words are chosen randomly from the list of words given and these are the words that will be used hereafter.
* The algorithm expands a list of words into a list of possibilities, where each possibility encodes a possible starting location of word; as well as direction. This essentially constitutes all possible words that can be placed into the grid. Basically , possibility is a structure having a word ,location & its direction.
* Words that are read from “words.txt” file are added to list of possibilities. Where possibility is randomly generated by function which has a location & direction associated with it.
* Words from list of possibilities are checked whether they are valid or not.
* New words created during this are also checked whether they belong to original set and are added to grid.
* Test for disconnected words is also taken by ‘is\_disconnected’ function. I.e. Whether the word is connected to other word or not.
* After checking validity of possibility , new words and disconnected words are added to grid and this process continues until the occupancy goal is reached or timeout occurs.
* This creates the crossword of desired dimensions which can be given as command line argument.
* The end result of this sequential execution of commands lead us to a grid which is collection of words in crossword having direction and also it gives words this is the list of words with which crossword was created.
* This crossword puzzle is then converted into “.pdf” file by using LaTeX package in python. Both words and grid are printed on pdf file.

**V) Terminologies**

* The functions, structures and terminologies used in the crossword generator are as follows:
* Structure of possibility: The word in the crossword has 3 main attributes. Those are Word string, location of word and direction of word.
* Possibility{“word” Words[random.randint(0,len(words)-1)]}, “Location” [random.randint(0,dim[0]-1)], ‘D’,’S’ if random.random()>o.e else “E”}}
* Functions used are mentioned below:
* Generate\_grid(words,timeout,dimension,occ\_goal)
* Read\_word\_list(filename)
* Generate\_grid\_function()
* Generate\_single\_possibility(words,dim)
* Is\_valid(possibilityy,grid,words)
* Is\_disconnected(possibility,grid)
* Add\_word\_to\_grid(possibility)
* Write\_grid(grid,screen=false,our\_file=”table.txt”,out\_fie=”out.pdf”,words).

**VI) TOOLS**

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* Programming languages: We have used python as programming languages.latex package was also used to create pdf file.

**VII) FUTURE SCOPE**

The database of words will be huge in the case of real time application and we are also planning on giving the user authority of choosing words in the database and creating the puzzles

# **VIII) ADVANTAGES & APPLICATIONS**

* puzzle makes ones’ mind sharp. Also, it makes the player solve the problems more efficiently.
* This application is of best use for old aged people,and can be used for infotainment purpose. Infotainment applications are latest trends which are combination of Information and Entetrtainment.
* Crossword Puzzle solving increases our Vocabulary and problem solving skills.
* According to a UC- Berkeley study crossword puzzles may help to ward off Alzeimer’s Disease.
* Researchers Found that the more often someone is engaged in mentally stimulating activities such as crosswords , the less buildup of beta-amyloid they were likely to have in their brain.

# **IX) ACKNOWLEDGEMENT**

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# **X) REFERENCE**

* Different crossword examples in newspapers.
* Online Word collection.

(http://www.gwicks.net/dictionaries.htm)

* [Https://edu.bitbucketacademy.com](https://edu.bitbucketacademy.com/)[1]