Chapter 1

Introduction

1.1 The State of Mental Health

Burden of mental disorders had risen over last few decades. Mental health is a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community. WHO estimated that globally over 450 million people suffer from mental disorders. Currently mental and behavioural disorders account for about 12 percent of the global burden of diseases. Major proportions of mental disorders come from low and middle income countries.

1.2 The Rise of Chatbots

Chatbots have seen a huge rise in the recent markets and have primarily been used in the fields of service, question and answering and quite recently, home automation. They have proven to be very useful in the field of automation and have successfully replaced menial jobs that couldv́e cost a lot of money for major corporations. Current commercial chatbots are capable of understanding simple sentences through pattern matching techniques, and search for questions asked in a repository of answers. This works out well in a closed scenario where the kind of questions the user may ask are limited, but not in a real life scenario.

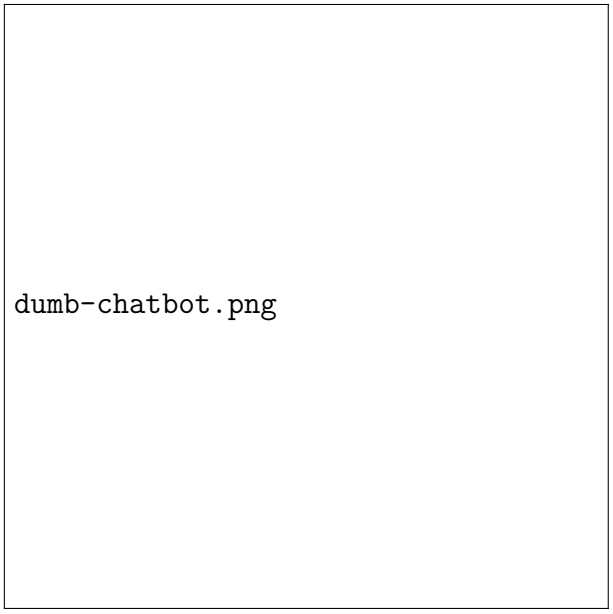

Figure 1.1: Dumb Chatbots

Chapter 2

Problem Statement and Proposed Solution

2.1 Problem Statement

The relevant elements necessary for a basic psychotherapy reading, is:

- What the main problem is (for example depression or anxiety).
- What triggers it (what makes the patient feel that way on a day to day basis).
- Examples of patient's symptoms, changes in patients behaviours and thinking.
- What consequence the problem has on patient's life.

An example with all the relevant elements needed, is: "My main problem is feeling ...".

Chapter 3

Literature Survey

3.1 Base Papers

Engineering Base Paper

Weighted Word2Vec Based on the Distance of Words *Authors:* *Chia-Yang Chang, Shie-Jue Lee and Chih-Chin Lai*

Word2vec (Chang, Lee, and Lai, 2017) is a novel technique for the study and application of natural language processing (NLP). It trains a word embedding neural network model with a large training corpus. After the model is trained, each word is represented by a vector in the specified vector space. The vectors obtained possess many interesting and useful characteristics that are implicitly embedded with the original words. The idea of word2vec is that there are relations between the words if they appear in the neighborhood.

Chapter 4

Experimentation & Results

4.1 Responses

Number of Epochs	Loss Incurred	Accuracy
500	0.23467	0.9614
1000	0.08742	0.9802
1500	0.08140	0.9740
2000	0.15286	0.9686
2250	0.20507	0.9544
2456(2500)	0.27993	0.9525

Table 4.1: Number of Epochs vs. Accuracy

The outcome (see table **??**) any DNN model is two things. First, it should return the desired response precisely. Second, the loss at each iteration during training must be optimized. From the above table, it is evident that by increasing the batch size the losses are reduced.

4.2 Chatbot

./code/index.js

```
// Requirements
const express = require('express')
const serveIndex = require('serve-index')
const bodyParser = require('body-parser')
require('dotenv').config()
```

4.3 Machine Learning

./code/model.py

```
# things we need for NLP
import nltk
from nltk.stem.lancaster import LancasterStemmer
stemmer = LancasterStemmer()
```

References

Chang, Chia-Yang, Shie-Jue Lee, and Chih-Chin Lai (2017). "Weighted word2vec based on the distance of words". In: *2017 International Conference on Machine Learning and Cybernetics (ICMLC)*. Vol. 2. IEEE, pp. 563–568.