

Artificial Intelligence in Mental Health and Psychological Practice

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Abstract— This conference paper reviews about, how we use Artificial Intelligence for stabilizing the mental health of any patients in effective manner rather than in conventional manner. Those are some vital assisted activities incorporating such as Clinical Training, Psychological Assessment and Clinical Decision Making. Artificial Intelligence concept has been innovated for numerous patients. Due to these phenomena, the potential job loss has to be occurred among Mental Health Professionals. The advancement of Artificial Intelligence Technologies and their application Psychological Practice have important implications that can be expected to transform the mental care field. In development of ethical use of AI technologies, Psychologists and other mental health care professionals play vital role.

Key words: Artificial Intelligence, Expert Systems, Mental Health

I. INTRODUCTION

The multidisciplinary field of science that is related with the development and study of this technology which is referred as “Artificial Intelligence”. The Computer Scientist “John McCarthy” had given its name as “AI”. AI technology can be used in various platforms such as physical machines, standalone computer software which is distributed across networks, robotics. The Artificial Intelligence incorporates neural networks, machine learning as well as natural language processing.

A. Machine Learning:

The ability of computers to understand without being explicitly programmed is known as “Machine Learning”.

B. Neural Networks:

It is a mathematical, computational, or technological model that mimic the logic and learning functions of neurons in a brain.

C. Natural Language Processing:

It is concerned with how computers process human natural languages. The focus of this conference paper based upon the applications of AI technologies that are applicable to methods of Psychological practices. The implications of the advancements of AI technology for patients, mental health, health experts and the field of Psychology are discussed. The computer had been more and more used in the psychology and psychiatry research or treatment. All medical experts is not considered that the level of implications must be positive.

In previous times, a classical approach has been used while dealing with any patients through the direct human to human interaction during the treatment. AI had been applied to activities in the field of medicine since the 1970s, particularly in the areas of expert systems for clinical decision making and in biomedical research (Morelli, Bronzino & Goethe, 1987; Patel et al., 2009; Shortliffe, 1993; Szolovits(1982).

II. METHODOLOGY

The field of study that focuses on the interactions between human language and computers is called Natural Language Processing, or NLP for short. It sits at the intersection of computer science, artificial intelligence, and computational linguistics.

“Natural Language Processing is a field that covers computer understanding and manipulation of human language, and it’s ripe with possibilities for newsgathering,” Anthony Pesce said in *Natural Language Processing in the kitchen*. “You usually hear about it in the context of analyzing large pools of legislation or other document sets, attempting to discover patterns or root out corruption.”

NLP is a way for computers to analyze, understand, and derive meaning from human language in a smart and useful way. By utilizing NLP, developers can organize and structure knowledge to perform tasks such as automatic summarization, translation, named entity recognition, relationship extraction, sentiment analysis, speech recognition, and topic segmentation. “Apart from common word processor operations that treat text like a mere sequence of symbols, NLP considers the hierarchical structure of language: several words make a phrase, several phrases make a sentence and, ultimately, sentences convey ideas,” John Rehling, an NLP expert at Meltwater Group, said in “By analyzing language for its meaning, NLP systems have long filled useful roles, such as correcting grammar, converting speech to text and automatically translating between languages. Natural language processing is used to analyze the text, allowing machines to understand how human’s speak. This human-computer interaction enables real-world applications like automatic text summarization, sentiment analysis, topic extraction, named entity recognition, parts of speech tagging, relationship extraction, stemming and more.

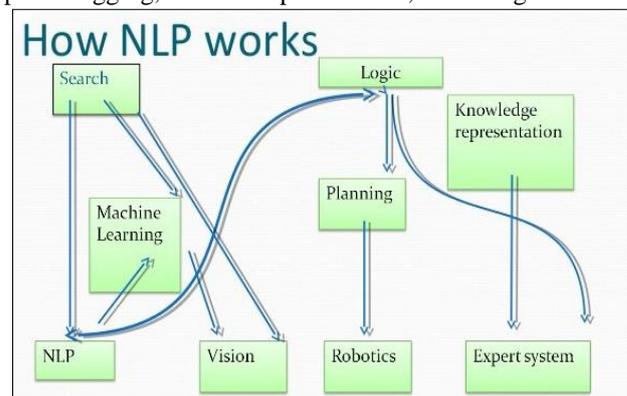


Fig. 1: Phases of NLP

III. PRIOR APPROACH

A. Open Source NLP Libraries

These libraries provide the algorithmic building blocks of NLP in real-world applications. Algorithm provides a free

API endpoint for many of these algorithms, without ever having to setup or provision servers and infrastructure.

- 1) Apache Open NLP: a machine learning toolkit that provides tokenizers, sentence segmentation, part-of-speech tagging, named entity extraction, chunking, parsing, coreference resolution, and more.
- 2) Natural Language Toolkit(NLTK): a Python library that provides modules for processing text, classifying, tokenizing, stemming, tagging, parsing, and more.
- 3) StanfordNLP: a suite of NLP tools that provide part-of-speech tagging, the named entity recognizer, coreference resolution system, sentiment analysis, and more.
- 4) MALLET: a Java package that provides Latent Dirichlet Allocation, document classification, clustering, topic modeling, information extraction, and more.

IV. OUR APPROACH

NLP algorithms are typically based on machine learning algorithms. Instead of hand-coding large sets of rules, NLP can rely on machine learning to automatically learn these rules by analyzing a set of examples (i.e. a large corpus, like a book, down to a collection of sentences), and making a static inference. In general, the more data analyzed, the more accurate the model will be.

- Summarize blocks of text using Summarizer to extract the most important and central ideas while ignoring irrelevant information.
- Create a chat bot using ParseMyParseface, a language parsing deep learning model made by Google that uses Point-of-Speech tagging.
- Automatically generate keyword tags from content using AutoTag, which leverages LDA, a technique that discovers topics contained within a body of text.
- Identify the type of entity extracted, such as it being a person, place, or organization using Named Entity Recognition.
- Use Sentiment Analysis to identify sentiment of a string of text, from very negative to neutral to very positive.
- Reduce words to their root, or stem, using PorterStemmer, or break up text into tokens using Tokenizer.
- Use Summarizer to automatically summarize a block of text, extracting topic sentences, and ignoring the rest.
- Generate keyword topic tags from a document using LDA (Latent Dirichlet Allocation), which determines the most relevant words from a document. This algorithm is at the heart of the Auto-Tag and Auto-Tag URL microservices.
- Sentiment Analysis, based on StanfordNLP, can be used to identify the feeling, opinion, or belief of a statement, from very negative, to neutral, to very positive. Often, developers use an algorithm to identify the sentiment of a term in a sentence, or use sentiment analysis to analyze social media.
- NLP algorithms can be extremely helpful for web developers, providing them with the turnkey tools needed to create advanced applications, and prototypes.

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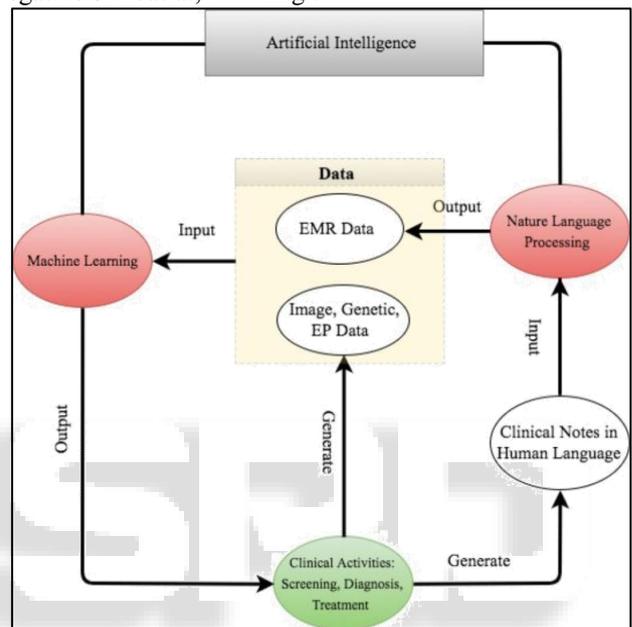


Fig. 3: Our Approach dealing with AI in Mental Health

V. CONCLUSIONS

Detection of mental health and providing remedies regarding to mental health of any person using concepts of Artificial Intelligence and Machine Learning. This system aims to simplify the task of identifying mental health.

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