BETSIE

A Virtual Assistant for Dementia Affected Ones....

Overview

Not a specific disease, dementia is a group of conditions characterised by impairment of at least two brain functions, such as memory loss and judgement.

Globally, dementia affected about 46 million people in 2015. About 10% of people develop the disorder at some point in their lives. It becomes more common with age and There is no known cure for dementia. One in every 3 seconds a new person someone somewhere is affected by dementia. It’s not the disease of age, it’s a disease of the brain and patients may show Symptoms like loss of memory, difficulty in finding the right words or understanding what people are saying, difficulty in performing previously routine tasks and personality and mood changes

Betsie, the virtual assistant , will listen and detect what the user says and responds to user's requests in a friendly, effective manner via voice in a manner of a conversation. There are four main components of the system; the voice recognition module, the natural language processing module, conversational agent and the content extraction module. This is a much faster and interactive solution than regular assistive software for the patients affected with dementia.

A Proposed Effective Framework for Elderly with Dementia Using Data Mining

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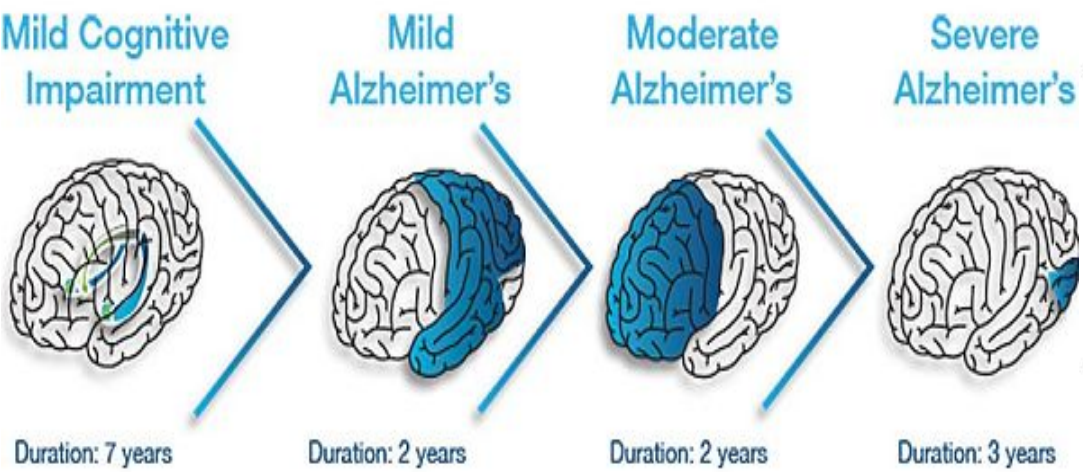
This paper reports an ongoing research project of for elder people. The core of this research is to apply intelligent techniques to meet particular needs of cognitive deficits patients and assess interplay adjustments based totally on his or her behavior in diverse disease stages. The aim of this paper is to provide an effective and usable framework for elderly; the proposed framework is divided into three main phases, evaluation phase, data mining phase and assistance phase.

It starts with little symptoms and gradually increases.
These are the main stages of dementia diseases like Alzheimer

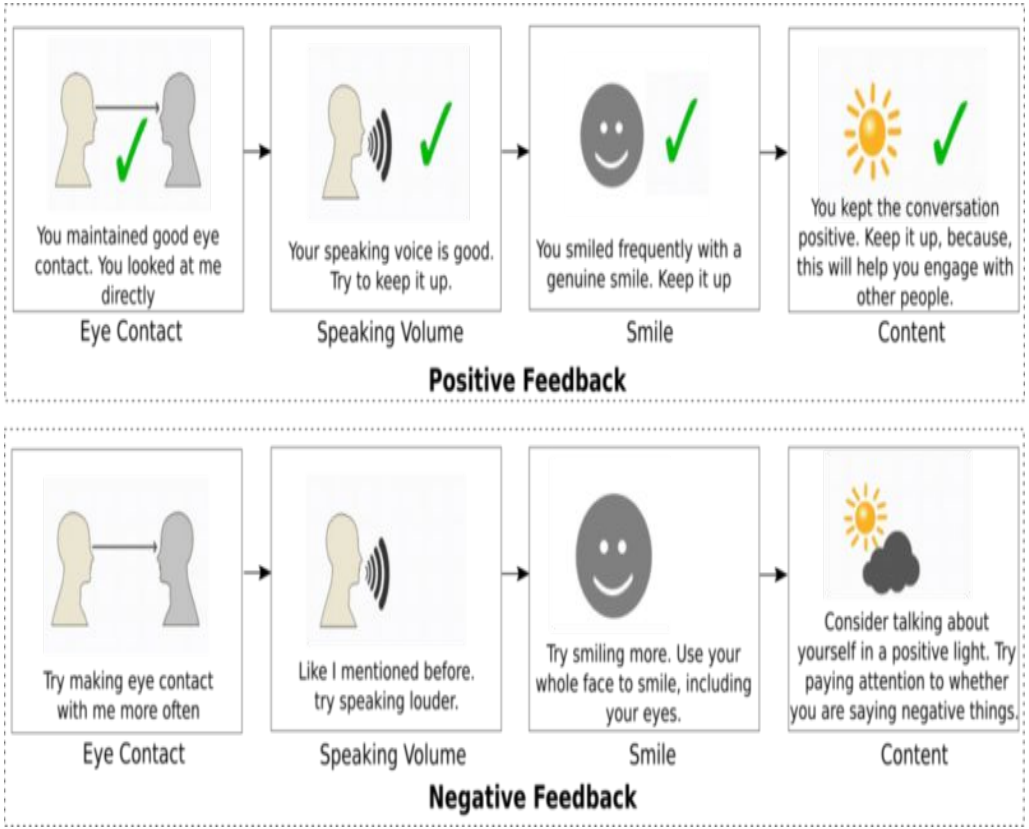


Stage	Duration	Symptoms	Requirements
Mild-cognitive	7 years	Diseases begins in medial temporal lobe	- Short-term memory loss
Early-stage	2 years	Diseases spread to lateral temporal & parietal	- Previous stage problems - Reading problems - Poor object recognition - Poor direction sense
Moderate-stage	2 years	Disease spread to frontal lobe	- Previous stage problems - Poor judgment - Impulsivity - Short attention
Serve-stage	3 years	Disease spread to occipital lobe	- Previous stage problems - Visual problems

HCI -Human-Computer Interaction

Assistive technologies that based on HCI models are facilitators that can be utilized to improve the quality of life for patients, disabled, and elderly.

It can assist human in a more natural way to interact with his environment.



INTERACTION DESIGN

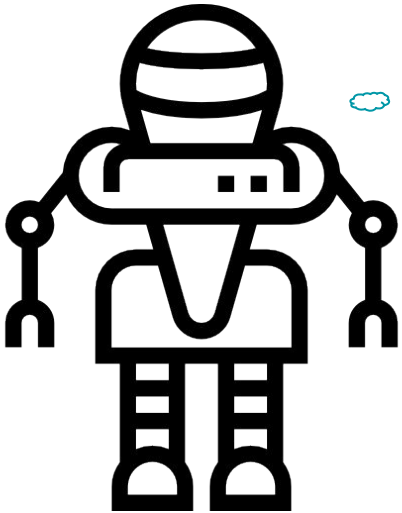
HCI points out the design and implementation of computer-based systems that different types of people interact with.

3. The sequence of using the system over time and its impacts on the society, group, and individual

1.The user interface between computer and user for designing of the menus and screens,

2. The dialectics for building the functionality into the system.

System provide facilities to caregivers and doctors to monitor patient and deal with his needs
symbio music,symbio games..



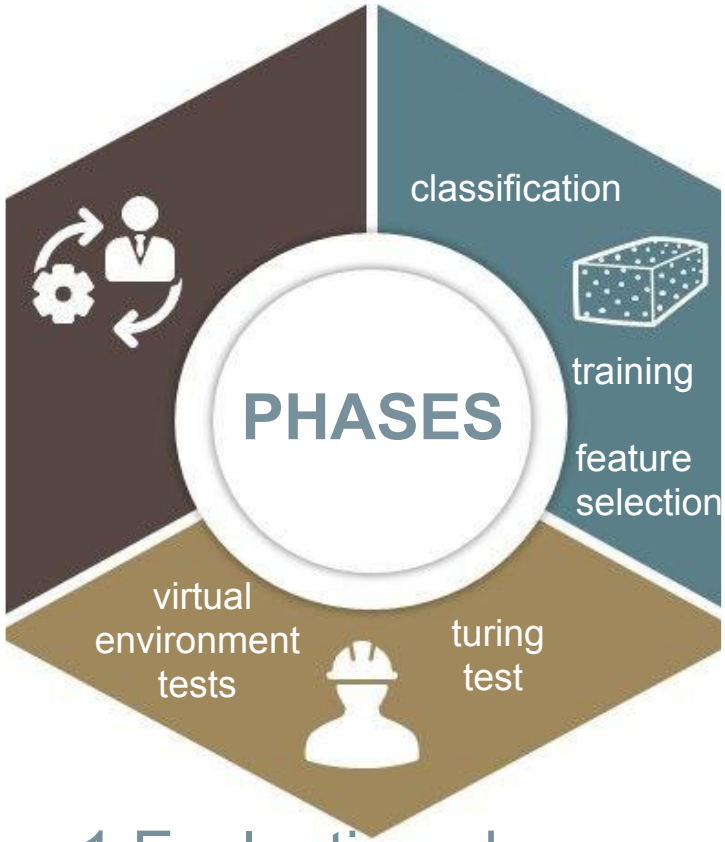
speech and gesture

extract features for emotional patterns

Extreme machine learning (ELM)

predict emotions

3:Assistance phase



2: Data mining phase

1.Evaluation phases and Acronyms

Phase 1: Evaluation phases and Acronyms

This phase will focus on the evaluation of cognitive abilities using games and tests that evaluate short-term memory, attention, and concentration, the proposed test will focus in the evaluation of memory functions which related to recent events and conversations.

Proposed cognitive evaluation test based on turning test and virtual environment tests. This stage will be considered as an input to the third stage. System in the third stage will vary and dynamically change according to cognitive abilities.

Phase 2: Data mining phase

In this phase, the system will try to capture data from patient sensors and analyze it in the real time with the clinical and the in a middle data mining layer. Physiological and vital data will be analyzed, and key features will be extracted using feature selection techniques, then training and on time classification. This stage has a great importance in understanding and developing of usable and accessible HCI interface that will assist in improving cognitive abilities of the patient.

Phase 3: Assistance phase

This phase is the most important phase of proposed system. It provides the following possibilities:

-Use data mining from the previous step to predict patient needs.

- Provide mental activities to develop awareness and recognition.

- Make periodically assessment to the patient.

- Provide feedback and automatically adapt system according to patient status.

An Introduction To

Natural Language Processing

Components of NLP

Natural Language Understanding

Mapping the given input in the natural language into a useful representation.

Different level of analysis required:

- **morphological analysis,**
- **syntactic analysis,**
- **semantic analysis,**
- **discourse analysis, …**

Natural Language Generation

Producing output in the natural language from some internal representation.

Different level of synthesis required:

- **deep planning (what to say),**
- **syntactic generation**

Let’s Converse with The Machine

Raw speech signal

Speech recognition

Sequence of words spoken

Syntactic analysis using knowledge of the grammar

Structure of the sentence

Semantic analysis using info. about meaning of words

Partial representation of meaning of sentence

Pragmatic analysis using info. about context

Final representation of meaning of sentence

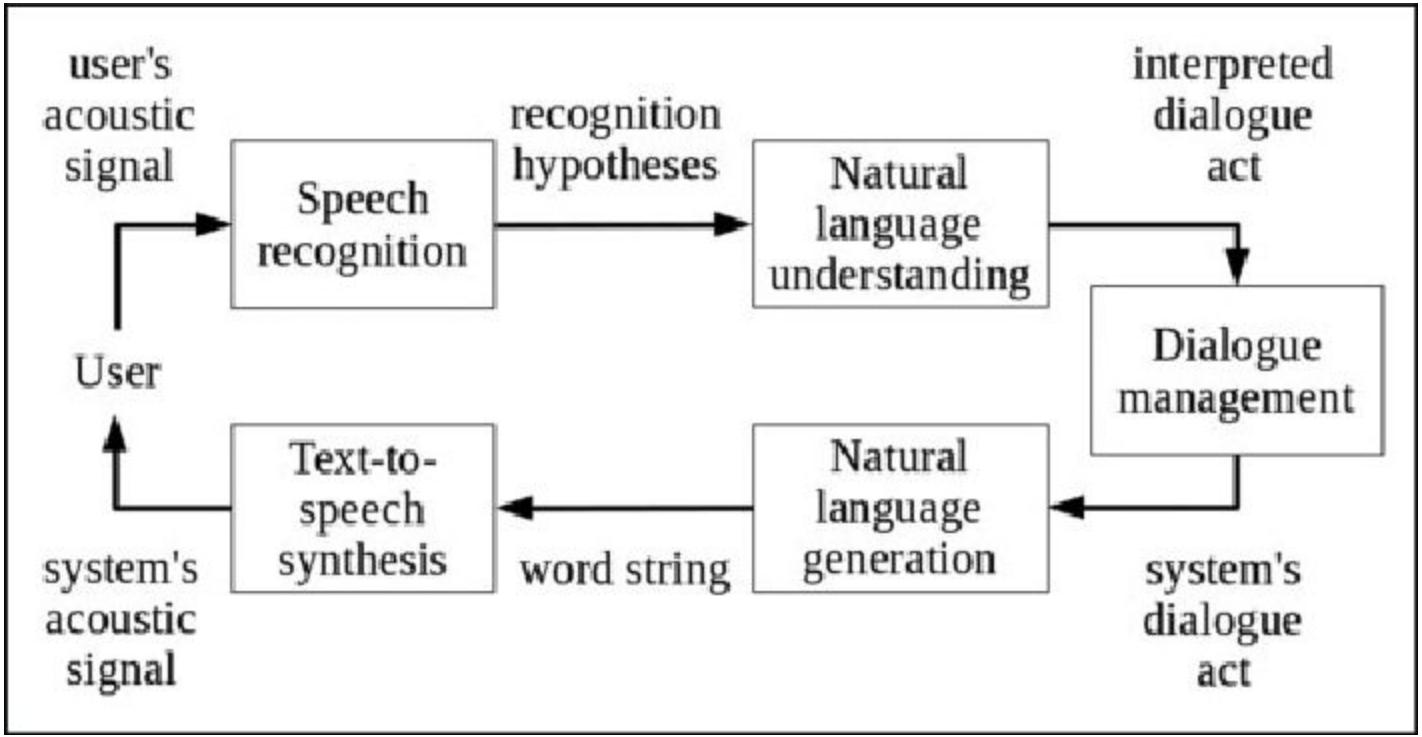
Natural Language Understanding

- Input/Output data

	Processing stage	Other data used
Frequency spectrogram		
	speech recognition	freq. of diff. sounds
Word sequence		
"He loves Mary"	**syntactic analysis**	grammar of language
Sentence structure		
	semantic analysis	meanings of words
He loves Mary		
Partial Meaning		
	pragmatics	context of utterance
Ξx loves(x,mary)		
Sentence meaning		
loves(john,mary)		

Architecture of the components of a conversational agent

- It has six components.
- The speech recognition and understanding components extract meaning from the input.
- The generation and TTS components map from meaning to speech.
- The dialog manager controls the whole process, along with a task manager which has knowledge about the task domain (such as air travel).


user's acoustic signal
Speech recognition
recognition hypotheses
Natural language understanding
interpreted dialogue act
Dialogue management
User
Text-to-speech synthesis
word string
Natural language generation
system's acoustic signal
system's dialogue act

CONCLUSION

Elderly people constitute a significant percentage of the population all over the world. The aim of the study is to explore needs of patients with cognitive deficits and understand the need to help in patient’s daily activities.This paper reports an ongoing research project of for elder people. The core of this research is to apply intelligent techniques to meet particular needs of cognitive deficits patients and assess interplay adjustments based totally on his or her behavior in diverse disease stages.

THANK YOU

Useful Links :

https://www.researchgate.net/publication/328145920_A_Proposed_Effective_Framework_for_Elderly_with_Dementia_Using_Data_Mining_Technique/link/5c5c752fa6fdccb608af35fb/download