

JJAIBOT TO DETECT EARLY ONSET OF MENTAL ILLNESS

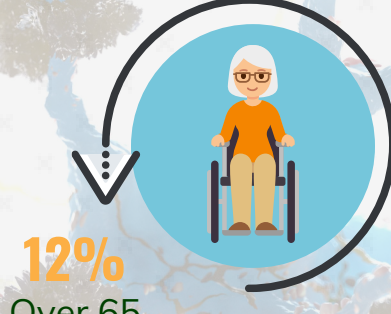
CASE STUDY: ALZHEIMER'S DISEASE

Leveraging JJAIBOT's V-ARC and PAE engines to analyze and classify large sets of visual data to identify early onset of Alzheimer's disease.

FACTS



Worldwide are living with dementia in 2015. The number is expected to reach 74.7M in 2030 and **131.5M in 2050.**



Alzheimer's disease affects 12% of people over 65 and **25% of the people over age 85+.**



Cost of Alzheimer's disease in US may be **\$100 Billion each year.**

Alzheimer's Disease

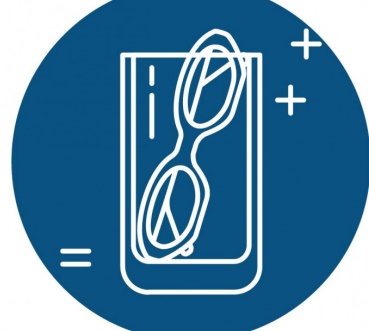
Alzheimer's Disease (AD) is a neurological disorder in which the death of brain cells causes memory loss and cognitive decline. It is chronic in nature. Symptoms usually develop slowly and worsen over time, becoming severe enough to interfere with day to day activities.

Early Onset of Alzheimers

There are no definitive ways to diagnose early-onset Alzheimer's thus it may be difficult to point out. Currently the only known risk factor for early-onset Alzheimer's is family history. Most common symptoms are forgetfulness of important details, asking same information repeatedly, losing track of date or year, trouble in communications or forgetting the right words to use in conversation, poor judgement, etc.

While diagnosing early-onset Alzheimer's doctors may ask about family history, cognitive tests, problem testing and other mental skills. Depending on results to above tests further tests such as blood tests, urine tests, CT and PET scans of brains may be required to give closer look and the damage level if any. These changes are subtle and thus may prove difficult to diagnose early-onset Alzheimer at its early stages and though it is not treatable patients can be advised on how they can adjust their lifestyles better, thus need for better diagnostic methods. Through deep learning and AI could come handy in diagnostic procedures thus helping avoid invasive diagnostic procedures and late detection.

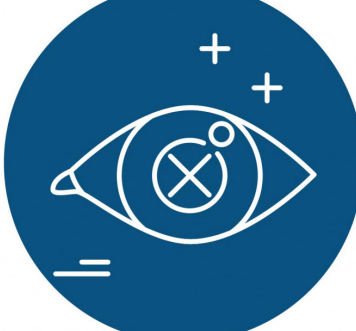
ALZHEIMER SYMPTOMS



MISPLACING THINGS



MEMORY LOSS



VISION PROBLEMS



WANDERING



SOCIAL WITHDRAWAL



CONFUSION WITH TIME OR PLACE



DIFFICULTY COMPLETING FAMILIAR TASKS



IRRITABILITY



TROUBLE PLANNING



POOR JUDGEMENT



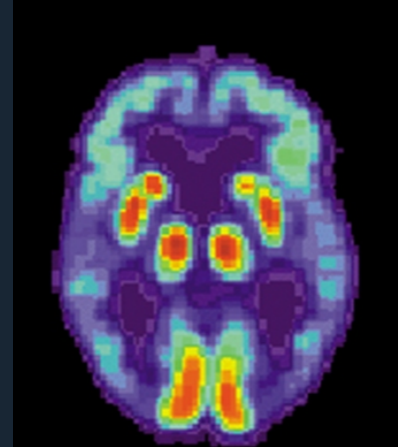
MOOD CHANGES



TROUBLE IN CONVERSATION

1 Adoption

Julian Jewel's Artificial Intelligence Bot (JJAIBOT) is an artificial intelligence bot that was created by Julian Jewel Jeyaraj in January 2019 as an initiative to help people understand the effects of climate change, mental illness and wildlife conservation through an interactive, emotion-based artificial intelligence bot's perspective. When deploying JJAIBOT, its components were tailored based on health provider's systems needs and environment to aid in the detection of early-onset Alzheimer's in its early stages. The components were tailored and trained to be able to identify cases of early-onset Alzheimer's.



2 Deployment

Predictive Analytics Engine (PAE): PAE identifies patterns through predictive analytics to determine if each pattern is of immediate value. With both new and historical data, PAE applies statistical techniques, analytical queries and automated machine learning algorithms to data sets for clustering. Large amount of data are collected from tests as Alzheimer's can be detected by presence or buildup of amyloid plaque and tau protein and also glucose levels in brain which are subtle to note. Utilizing PAE's clustering algorithm our AI is able to identify and cluster the test results into three classes i.e. cognitively normal, mild cognitive degenerative and those with Alzheimer's disease by using the biomarkers provided.

Visual & Acoustic Recognition Component (V-ARC): JJAIBOT uses AI and deep learning software to detect images (e.g., brain scans) in still or video images. By using machine learning V-ARC was able to cluster and classify a large amount of data.

Positron emission tomography (PET) scans to measure levels of specific modules like glucose and protein in brain. Glucose is the main source of energy for cells hence the more active cell is the more glucose it uses and vice versa. Thus, presence of more glucose in the brain indicates more active brain cells and less level of glucose indicates dead brain cells which is a pointer to Alzheimer's. Glucose PET scans were used as they are cheap and more common thus it was easy to deploy the AI.

PET scans were split into two training and testing sets. By using the clusters provided V-ARC engine was fed with PET scans for the three clusters (cognitively normal, mild cognitive degenerative and those with Alzheimer's disease) all labelled as the training set. With such the algorithm was able to learn on its own that could be used to identify the presence of Alzheimer's disease. when training was complete, testing data is presented and the algorithm was able to correctly classify the testing data to a high degree of accuracy.

3 Results

Health providers are able to accurately identify and classify cases of early-onset Alzheimer's by leveraging on JJAIBOT V-ARC and PAE engines which use machine learning to analyze and classify large sets of visual data.

Early detection is always the best in case of Alzheimer's and by being able to detect such cases early and the likelihood of patients developing Alzheimer's early the facility is able to timely intervene and help stem advancement of Alzheimer's.