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Project Name:

DETECTING PARKINSON'S DISEASE USING MACHINE LEARNING

Literature Survey

General

A literature review is a body of text that aims to review the critical points of current knowledge on and/or methodological approaches to a particular topic. It is secondary sources and discuss published information in a particular subject area and sometimes information in a particular subject area within a certain time period. Its goal is to bring the reader up to date with current literature on a topic and forms the basis for another goal, such as future research that may be needed in the area and precedes a research proposal and may be just a simple summary of sources. Usually, it has an organizational pattern and combines both summary and synthesis.

A summary is a recap of important information about the source, but a synthesis is a re-organization, reshuffling of information. It might give a new interpretation of old material or combine new with old interpretations or it might trace the intellectual progression of the field, including major debates. Depending on the situation, the literature review may evaluate the sources and advise the reader on the most pertinent or relevant of them.

Literature Survey 1

A survey of Parkinson's disease patients: most bothersome symptoms and coping preferences.

Lisa A Uebelacker 1, Gary Epstein-Lubow 1, Trevor Lewis 2, Monica K Broughton 2, Joseph H Friedman 1

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Abstract: Background: Treatment for Parkinson's disease (PD) is symptomatic. Health professionals must therefore understand which of the many motor and non-motor problems that patients experience are the most troublesome, and what types of assistance patients believe would best help them cope with these problems.

Objective: To identify and understand potential issues of importance to patients with Parkinson's Disease.

Methods: We conducted surveys with 75 patients with PD in a Movement Disorders Program. We asked about: the two most bothersome PD-related problems, methods for coping with these problems, what motor and non-motor PD-related problems patients needed the most help with, and what a comprehensive assistance program for PD patients and caregivers should include. We used qualitative data analysis techniques to summarize responses.

Results: The most bothersome problems cited were: tremors, lack of mobility, pain, imbalance, lack of energy/fatigue, having to give up previously enjoyed activities, dysarthria, and anxiety or depression. Frequently cited ways to cope with different types of problems included medications, physical activity, instrumental or practical support, and emotional support. When asked specifically about which non-motor problems elicited the most need for help, respondents most mentioned depression and anxiety, "nothing," or cognitive problems.

Participants suggested that a comprehensive assistance program for people with PD and their caregivers should include education, physical activity, and emotional support.

Literature Survey 2

A survey on computer-assisted Parkinson's Disease diagnosis

Author links open overlay panelClayton R.PereiraaDanilo R.PereirabSilke A.T.WebercChristianHookdVictor Hugo C.de AlbuquerqueeJoão P.Papaf

•To present a very recent systematic review about Parkinson's Disease.

•To highlight a number of enabling technologies to aid Parkinson's Disease.

•To discuss some of the most used datasets for experimental purposes.

Abstract

Background and objective: In this work, we present a systematic review concerning the recent enabling technologies as a tool to the diagnosis, treatment and better quality of life of patients diagnosed with Parkinson's Disease (PD), as well as an analysis of future trends on new approaches to this end.

Methods: In this review, we compile several works published at some well-established databases, such as Science Direct, IEEEXplore, PubMed, Plos One, Multidisciplinary Digital Publishing Institute (MDPI), Association for Computing Machinery (ACM), Springer and Hindawi Publishing Corporation. Each selected work has been carefully analyzed in order to identify its objective, methodology, and results.

Results: The review showed the majority of works make use of signal-based data, which are often acquired by means of sensors. Also, we have observed the

increasing number of works that employ virtual reality and e-health monitoring systems to increase the life quality of PD patients. Despite the different approaches found in the literature, almost all of them make use of some sort of machine learning mechanism to aid the automatic PD diagnosis.

Literature Survey 3

Parkinson's Disease: A Survey of Physicians, Patients, and Carepartners

Tara Rastgardani, Melissa J. Armstrong, Anna R. Gagliardi, Arthur Grabovsky and Connie Marras

Background: OFF periods impair quality of life in Parkinson's disease and are often amenable to treatment. Optimal treatment decisions rely on effective communication between physicians, patients and carepartners regarding this highly variable and complex phenomenon. Little is published in the literature about communication about OFF periods.

Methods: Informed by interviews with physicians, patients and carepartners we designed questionnaires for each group. We surveyed these parties using an online platform to investigate the frequency, content and ease of communication about OFF periods and barriers and facilitators of communication with physicians.

Results: Fifty movement disorder neurologists, 50 general neurologists, 442 patients and 97 Care Partners participated. A free-flowing dialogue is the mainstay of communication according to all parties. Motor aspects of OFF periods are discussed more frequently than non-motor aspects (90 vs. <50% according to both general neurologists and movement disorder neurologists). The most common physician-reported barriers to communication are patient cognitive impairment, patient difficulty recognizing OFF periods and poor patient

understanding of OFF periods' relationship to medication timing. The barriers most cited as major by patients were that they perceived OFF periods to be part of the disease (i.e., not a clinical aspect that could be improved by a physician), variability of symptoms, and difficulty in describing symptoms. The most described facilitator (by physicians) was the input of a caregiver. Positively viewed but less commonly used facilitators included pre-visit questionnaires or diaries, digital apps, and wearable devices to monitor fluctuations. Most patients and care partners identified a free-flowing dialogue with their physicians and having an agenda as helpful facilitators of communication about OFF periods which they already use. Most of both groups felt that keeping a diary and pre-visit questionnaires were potentially helpful facilitators that were not currently in use.

Literature Survey 4

Machine Learning for the Diagnosis of Parkinson's Disease: A Review of Literature

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Diagnosis of Parkinson's disease (PD) is commonly based on medical observations and assessment of clinical signs, including the characterization of a variety of motor symptoms. However, traditional diagnostic approaches may suffer from subjectivity as they rely on the evaluation of movements that are sometimes subtle to human eyes and therefore difficult to classify, leading to possible misclassification. In the meantime, early non-motor symptoms of PD may be mild and can be caused by many other conditions. Therefore, these symptoms are often overlooked, making diagnosis of PD at an early stage challenging. To address these difficulties and to refine the diagnosis and assessment procedures of PD, machine learning methods have been implemented

for the classification of PD and healthy controls or patients with similar clinical presentations (e.g., movement disorders or other Parkinsonian syndromes). To provide a comprehensive overview of data modalities and machine learning methods that have been used in the diagnosis and differential diagnosis of PD, in this study, we conducted a literature review of studies published until February 14, 2020, using the PubMed and IEEE Xplore databases. A total of 209 studies were included, extracted for relevant information, and presented in this review, with an investigation of their aims, sources of data, types of data, machine learning methods and associated outcomes. These studies demonstrate a high potential for adaptation of machine learning methods and novel biomarkers in clinical decision making, leading to increasingly systematic, informed diagnosis of PD.

Literature Survey 5

A Survey on Early Detection of Parkinson Disease Using Deep Learning Technique March 2022

Authors: Rahul Chakre R. H. Sapat College of Engineering, Management Studies and Research

Abstract

Parkinson’s disease (PD) is a chronic, disorder which results in a variety of motor and cognitive issues. PD diagnosis may be a challenging task since its symptoms are very almost like other diseases like normal ageing and tremor. Much research has been applied to diagnosing this disease. Parkinson's disease (PD) is a neurological movement disorder characterized by a modest tremor in one hand and a feeling of stiffness throughout the body that slowly worsens over time. It has an impact on over 6 million people all over the world. Vocal fold abnormalities affect most of the Parkinson's disease (PD) sufferers. Speech impairment is a warning sign of Parkinson's disease. This research focuses on the development of Deep Learning-based Early-Stage Parkinson's Disease Prediction. Various deep learning approaches are used to model the extracted

features. In this paper, an Artificial Neural Network (ANN)-based classification algorithm is employed to discriminate PD patient samples from healthy ones. Besides that, since different datasets may capture different aspects of this disease, this project aims to explore which PD test is easier within the discrimination process by analyzing different imaging and movement datasets contains Patno, Cohort, Subgroup, Enrlpd Enrlprod, Enrllrrk2, Enrlgba, Enrlsnca, Conpd, Conprod, Conlrrk2, Congba, Consnca, Comments, Condate. As a result, the approaches may be able to provide a primary good solution for detecting PD during the preliminary stages of the disease's prognosis and may be able to increase the life span of the afflicted patient with suitable treatments and drugs, resulting in a peaceful existence.