

# **Parkinson's Disease Detection through Drawings**

**Team:** DE pt.2 (James, Abby, Lisa, Srisha)

## **Introduction and Background:**

Parkinson's Disease is a neurological disorder that affects millions of people worldwide. Typical symptoms of Parkinson's Disease include uncontrollable tremors, impaired balance and coordination, and rigidity in the muscles. Early detection of the disease can lead to better management and treatment, which is why there is a growing interest in developing accurate and efficient methods for diagnosis. The early diagnosis of Parkinson's Disease is a challenging task, as it involves subtle changes in the patient's motor and cognitive abilities.

Currently, diagnosing Parkinson's disease relies heavily on genetic indicators, but only 15% of those with Parkinson's have a family history of the disease. Traditional diagnostic methods for Parkinson's involve invasive procedures, such as spinal taps or PET scans, making testing difficult and costly. However, a new project that detects Parkinson's from drawings offers a non-invasive and potentially cost-effective alternative to these methods, making testing more accessible. The project could address the subjectivity of traditional diagnostic approaches, which can lead to misclassification due to subtle movements that are difficult to evaluate. Additionally, early non-motor symptoms of Parkinson's can be mild and overlooked, making early diagnosis a challenge.

## **Current ML Research:**

Diagnosing Parkinson's disease is subjective and can vary, leading to misdiagnosis or delayed diagnosis. Tests like neuroimaging and genetic testing are costly and not universally available, and a lack of definitive biomarkers makes diagnosis and tracking challenging. According to the United Kingdom National Health Service, "a number of genetic factors have been shown to increase a person's risk of developing Parkinson's disease, although exactly how these make some people more susceptible to the condition is unclear." Current detection methods can't predict disease course or treatment response, hindering personalized treatment planning.

## **Project Proposal:**

This project aims to develop a Parkinson's Disease detection system using drawings of circles, spirals, meandering, and waves. The system will utilize Computer Vision techniques, specifically OpenCV, to analyze and identify patterns in the drawings that are indicative of Parkinson's Disease. We plan to use Neural Networks as our model, and we will create a simple website in which a user will first download an image to trace and then upload the tracing to be assessed for potential Parkinson's symptoms. The dataset we will utilize is [HandPD](#), which contains drawings by both healthy subjects and those with Parkinson's. By utilizing this non-invasive and cost-effective approach, the system will make Parkinson's Disease testing more accessible to people who may not otherwise have access to expensive diagnostic tests. Ultimately, this project will benefit people by providing a quicker and more accurate way to diagnose Parkinson's Disease, leading to earlier interventions and improved patient outcomes.

**Works Cited:**

<https://www.kaggle.com/datasets/kmader/parkinsons-drawings>  
<https://www.kaggle.com/datasets/claytonteybauru/spiral-handpd>  
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