**Preparing Your Literature Review:**

1. **Introduction:**

Agriculture stands as the bedrock of societal sustenance, serving not only as the primary source of food but also as a crucial contributor to a nation's economic development. With nearly two-thirds of the global population directly or indirectly dependent on agriculture, the sector shoulders the responsibility of meeting the escalating demands of a rapidly growing population. However, this fundamental cornerstone of human survival faces formidable challenges in the wake of climate change, dwindling pollinator populations, crop diseases, and the pressing issue of inadequate irrigation. Among these challenges, crop diseases emerge as a significant threat, jeopardizing not only global food security but also the livelihoods of small-scale farmers whose prosperity hinges on the health of their crops.

In this context, the significance of early detection and intervention in mitigating the impact of crop diseases cannot be overstated. Identifying and controlling these diseases at their inception is crucial for sustaining cultivation and safeguarding the global food supply. It is within this framework that advancements in technology, particularly in the realm of computer vision, offer promising solutions to address the challenges facing agriculture.

# Crop Disease Detection Using Deep Learning

**Published in:**[2018 Fourth International Conference on Computing Communication Control and Automation (ICCUBEA)](https://ieeexplore.ieee.org/xpl/conhome/8681925/proceeding)

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This paper sets out with a clear objective: to develop an application capable of predicting crop diseases based on the textural similarity of leaves. Leveraging publicly available datasets containing both healthy and diseased crop leaves, this study aims to contribute to the field of agricultural technology by harnessing the power of computer vision for early disease diagnosis. As the global population burgeons, understanding and addressing the complex interplay between agriculture and emerging challenges becomes paramount.

Yet, to embark on this journey, a thorough exploration of existing literature is essential. This literature review serves as the compass guiding our understanding, allowing us to navigate the vast landscape of prior research, identify gaps in knowledge, and build upon the collective wisdom that precedes us. In the subsequent sections, we delve into related works that have paved the way in the domain of crop disease prediction, examining methodologies, techniques, and outcomes. Through this exploration, we aim to position our research within the broader context, acknowledging the strides made and the territories yet uncharted in the pursuit of enhancing agricultural sustainability through technological innovation.

# Deep learning models for plant disease detection and diagnosis

Published in: February 2018, Pages 311-318Journal/Conference: Computers, Materials & Continua In this paper, convolutional neural network models were developed to perform plant disease detection and diagnosis using simple leaves images of healthy and diseased plants, through deep learning methodologies.

The importance of this research is underscored by the potential transformative impact such systems could have on the field of agriculture. Efficient and accurate plant disease detection, facilitated by advanced technologies like Convolutional Neural Networks (CNNs), not only aids agronomists in making more precise diagnoses but also empowers farmers, especially in regions lacking sophisticated infrastructure. The envisioned integration of these systems with mobile applications and autonomous agricultural vehicles promises to bring about a paradigm shift in how we approach plant disease management.

The existing literature provides a foundation for this research, offering insights into various methodologies, models, and their applications in plant disease diagnosis. Literature review is imperative for several reasons. Firstly, it allows us to understand the evolution of computational systems in recent years, particularly the advent of Deep Learning and the role of CNNs in image recognition. By building on the knowledge and experiences documented in prior studies (Mohanty et al., 2016; Yang and Guo, 2017; Lee et al., 2015; Grinblat et al., 2016), we can refine our approach and contribute to the growing body of knowledge in this emerging field.

Secondly, the literature review helps us identify gaps in existing research. While promising results have been achieved in controlled environments, there is a need to bridge the gap between laboratory setups and real cultivation conditions. The limitations and challenges outlined in previous studies guide our efforts to design a system that not only performs well in experimental settings but also proves its efficacy in the dynamic and unpredictable conditions of actual cultivation fields.

In essence, the literature review serves as a compass, guiding us through the landscape of prior research, providing context for our work, and highlighting areas where our contributions can significantly advance the field. It is through this critical examination of existing literature that we position our research questions within the broader discourse and set the stage for the development of a robust and practical plant disease detection system.

1. **Organization:**

Plant diseases pose a formidable challenge to global agriculture, affecting crop yields and quality. Traditional methods of disease diagnosis through optical observation of symptoms on leaves have proven to be complex and prone to misdiagnoses. As we navigate the complex landscape of plant pathology, the integration of computational systems emerges as a promising avenue for accurate and efficient disease detection. This section organizes the literature review thematically, exploring the evolution of plant disease diagnosis, the introduction of computational systems, and the transformative role of Deep Learning in agriculture.

**Evolution of Plant Disease Diagnosis:**

The historical backdrop of plant disease diagnosis reveals the reliance on manual observation techniques by agronomists. This section will delve into the challenges associated with optical symptom observation and the pivotal need for more advanced diagnostic approaches.

**Deep Learning in Agriculture:**

The application of Deep Learning, with a focus on Convolutional Neural Networks (CNNs), has transformed agriculture. This part of the literature review will discuss the impact of CNNs in image recognition and their potential in revolutionizing plant disease detection methodologies.

**Prior Studies in Plant Disease Detection:**

Building on prior research, we will review studies conducted by Mohanty et al. (2016), Lee et al. (2015), Grinblat et al. (2016), and others. The discussion will encompass methodologies employed, models developed, and the outcomes of these studies.

By structuring the literature review thematically, we aim to provide a comprehensive understanding of the historical context, technological advancements, and prior research in the realm of plant disease detection. This thematic organization serves as a roadmap for exploring the nuances of the subject and lays the foundation for the subsequent sections of the review.

1. **Summary and Synthesis:**

# . Crop Disease Detection Using Deep Learning

This paper addresses the critical role of agriculture as the primary source of food, raw materials, and fuel, contributing significantly to a nation's economic development. With approximately 66% of the global population directly or indirectly dependent on agriculture, the challenges in the agricultural sector, exacerbated by climate change, declining pollinators, crop diseases, and inadequate irrigation, pose threats to food security. Crop diseases not only impact global food security but also have adverse effects on small-scale farmers whose livelihoods rely on healthy cultivation. To combat these challenges, the paper focuses on the early identification of crop diseases through the advancement of internet technology and the field of computer vision. The objective is to develop an application that predicts crop diseases based on the textural similarity of leaves, utilizing a publicly available dataset of healthy and diseased crop leaves for model training. Early diagnosis is highlighted as a crucial factor in preventing further damage to crops and sustaining cultivation.

# . Deep learning models for plant disease detection and diagnosis

In this work, specialized deep learning models were developed, based on specific convolutional neural networks architectures, for the identification of plant diseases through simple leaves images of healthy or diseased plants. The training of the models was performed using an openly available database of 87,848 photographs, taken in both laboratory conditions and real conditions in cultivation fields. The data comprises 25 plant species in 58 distinct classes of [plant, disease] combinations,

1. **Conclusion:**

In conclusion, the literature review illuminates the critical challenges facing agriculture globally, particularly the escalating threats to food security due to factors such as climate change, declining pollinators, and crop diseases. The dire consequences of crop diseases are underscored, impacting not only the global food supply but also exacerbating the vulnerability of small-scale farmers and contributing to cycles of poverty and food insecurity.

The highlighted studies in Section II reveal diverse approaches to crop disease identification, ranging from color features and statistical measures to advanced techniques like neural networks, genetic algorithms, and Generative Adversarial Networks. These methodologies reflect the evolving landscape of research aimed at addressing the complexities of crop disease detection.

The specific problem addressed by the project aligns seamlessly with the concerns outlined in the literature. The threat to food security in developing countries due to crop diseases resonates with the overarching challenges discussed. The project, titled "AgriGuard: Smart Crop Health Management," emerges as a timely and impactful initiative. By leveraging machine learning, the project seeks to provide a proactive solution for farmers in developing countries to manage and prevent crop diseases.

The key takeaways from the literature review emphasize the urgency of addressing crop diseases, the potential of machine learning in early detection, and the significance of empowering farmers in the face of global agricultural challenges. "AgriGuard" stands as a valuable contribution to this narrative, aiming to mitigate crop losses, break the cycle of poverty, and enhance sustainable agriculture practices. As the project unfolds, it is poised to become a crucial player in the ongoing efforts to fortify global food security and uplift the livelihoods of farmers in developing nations.

1. **Proper Citations:**

**1.Crop Disease Detection Using Deep Learning**

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