Automatic annotation of plant diseases symptoms from digital images

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2 ABSTRACT

3 **Keywords: computer vision; plant diseases; machine learning; ontologies**

1 INTRODUCTION

4 The future of global agriculture and its impact on food security is one of the most urgent issues in todays
5 world. Farmers must prepare for changes in the climate that is likely to feature more erratic weather patterns
6 that will necessarily have an effect in the emergence and re-emergence of plant diseases. Early and accurate
7 diagnosis systems on local, regional, and global scales are necessary to predict pest and disease outbreaks
8 and allow valuable time to formulate and develop mitigation strategies. Forecasting the appearance and
9 development of a disease is difficult, as many environmental and other factors influence the complex
10 interactions between pathogen, host, and vector.

11 Fortunately, Internet access and mobile phone technologies have much improved during the last few
12 years and are becoming increasingly accessible. This provides a new opportunity to communicate crop
13 pathology information more widely. Containing the spread of plant diseases in a profoundly interconnected
14 world requires active vigilance for signs of an outbreak, rapid recognition of its presence, and diagnosis
15 of its cause, in addition to strategies and resources for an appropriate and efficient response. Due to
16 the rapid spread of plant diseases across the world, disease surveillance and monitoring systems based
17 on multi-country, multi-institution partnerships are necessary to predict pest and disease outbreaks and
18 allowing a valuable time to formulate and develop mitigation strategies.

19 Early detection is essential for the control of emerging, re-emerging, and novel infectious diseases,
20 whether naturally occurring or manually introduced as a result of human mobility. Containing the spread
21 of such diseases in a profoundly interconnected world requires active vigilance for signs of an outbreak,
22 rapid recognition of its presence, and diagnosis of its cause, in addition to strategies and resources for
23 an appropriate and efficient response. Considerable time often elapses between the introduction of an
24 agricultural pathogen and its detection. Given sufficient warning prior to the introduction of a new plant
25 disease threat, researchers can reduce the impact of disease by identifying chemical control measures or by
26 breeding resistant crop varieties [11].

2 MATERIAL & METHODS

2.1 Ontology

[**todo:** Ammar could add all the information about the onotlogy here]

[**todo:** Perla and I will add the information about the algorithm]

3 RESULTS

4 DISCUSSION

DISCLOSURE/CONFLICT-OF-INTEREST STATEMENT

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

AUTHOR CONTRIBUTIONS

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REFERENCES

FIGURES