



Maestría en Ingeniería en Sistemas y Cómputo Inteligente

System for the automatic diagnosis of diabetic retinopathy

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Master in Systems and Intelligent Computing

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1. Introduction

Retinopathy is an eye disease that usually occurs in people with diabetes, due to high levels of blood sugar that cause damage to blood vessels. Particularly, in the diagnosis of diabetic retinopathy, they patients are required to perform the entire fundus exploration with a digital camera.

With the development of new technologies in different areas, there are methods that analyze and diagnosing various diseases in an automated way. Some of these areas the deep learning.

2. Objectives

2.1. General objective

Develop a system to diagnose diabetic retinopathy based on deep learning.

2.2. Specific objectives

- Train and refine a model based on deep learning to classify the disease.
- Develop a prototype for the diagnosis of the disease.
- Apply a usability test to validate the prototype.

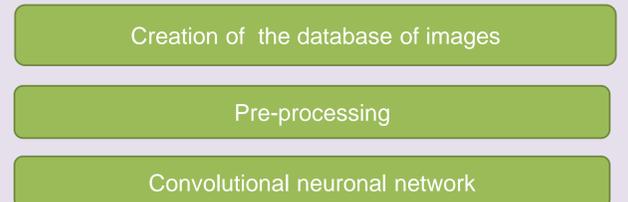


Figure 1. Methodology used in this research.



Figure 2. Created data sets.

Pre-processing

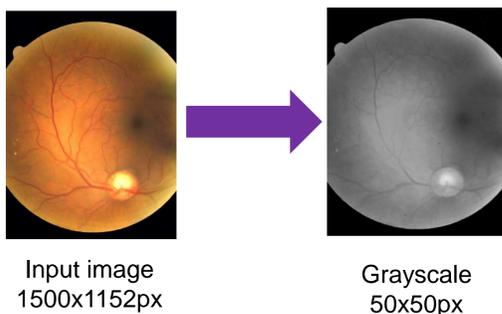


Figure 3. Pre-processing of the image

Convolutional neuronal network

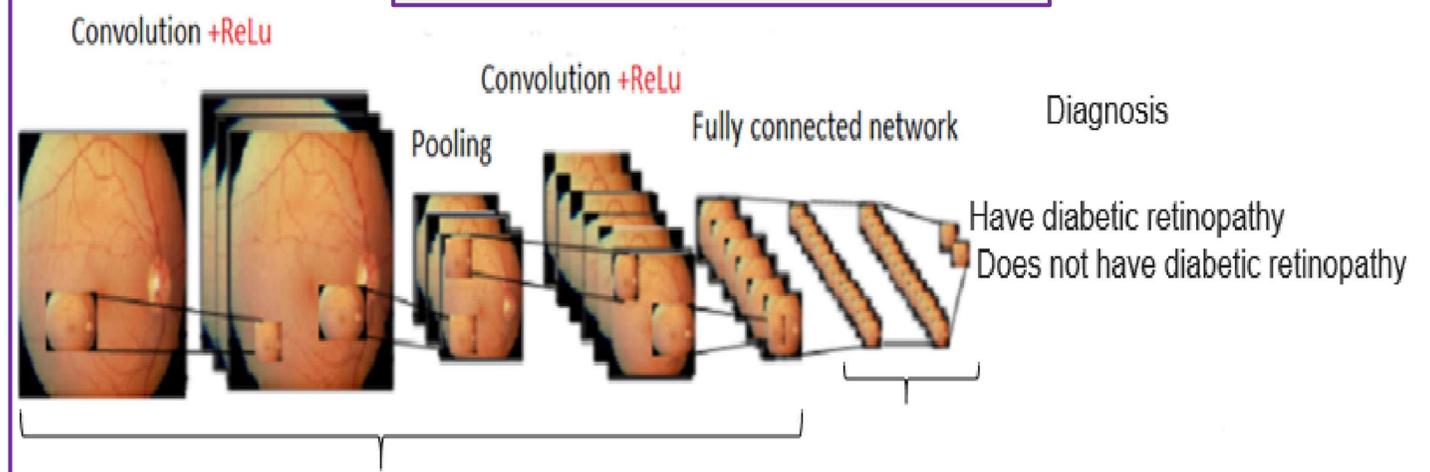


Figure 4. Complete model of a convolutional neuronal network

4. Results

The result of the integration of the model to the prototype.

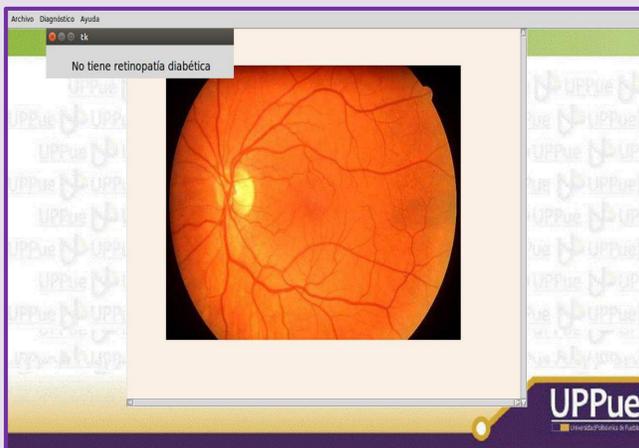


Figure 5. Healthy image.



Figure 6. Diagnosis of an image without the disease.

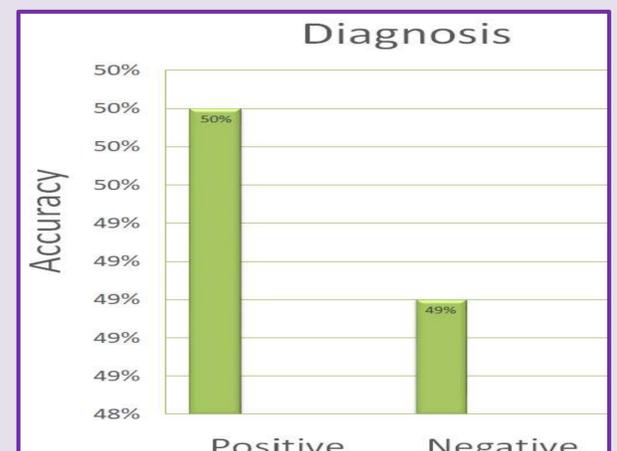


Figure 7. Diagnosis accuracy.

5. Conclusion

A system has been developed to diagnose diabetic retinopathy disease by fundus images. It was developed with the python tool and the implementation of the TensorFlow library. According to the experiments performed, an accuracy of fifty percent obtained from the images showed that the disease is present unlike the other forty nine percent obtained that did not show the disease.

Acknowledgements

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