Inspire Create Transform

A REAL TIME MACHINE LEARNING SCHEME FOR EMOTION RECOGNITION FROM VIDEO

by:
Maria Camila Saldarriaga Ortega

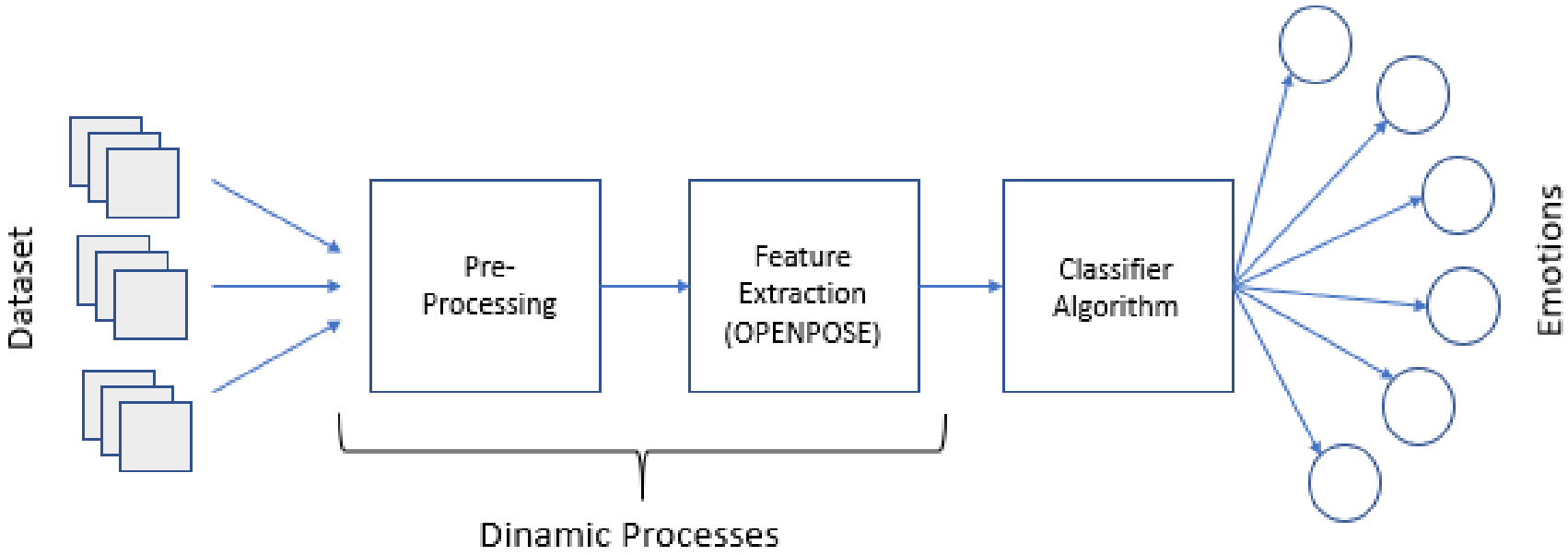
Coordinator:
Daniel Ignacio Velsquez

Tutor:
Olga Lucia Quintero Montoya

Content

1. Problem statement
2. Objectives
3. Advances
4. Methodology
5. Schedule
6. References

Problem Statement



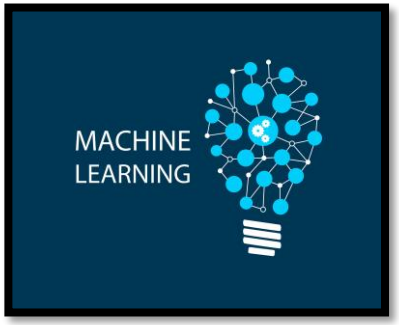
https://scielo.conicyt.cl/scielo.php?script=sci_arttext&pid=S0718-07642017000300021
https://www.youtube.com/watch?v=pW6nZXeWlGM

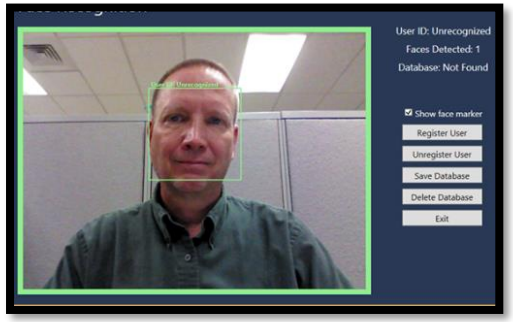
Objectives

GENERAL

Find and implement the best configuration of artificial intelligence algorithms that allows solving the problem of recognition of emotions in an unstructured environment.

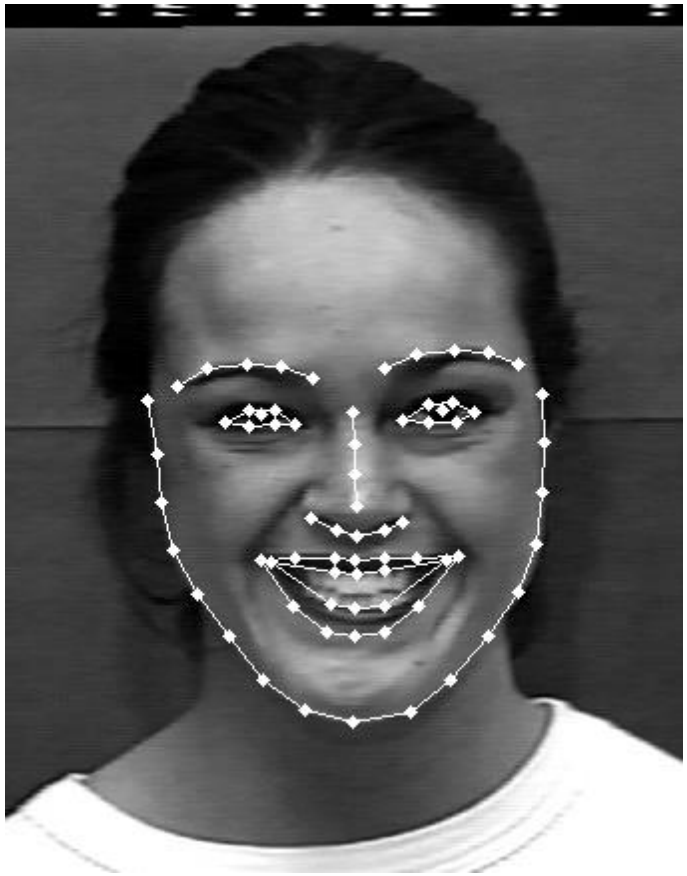
SPECIFIC



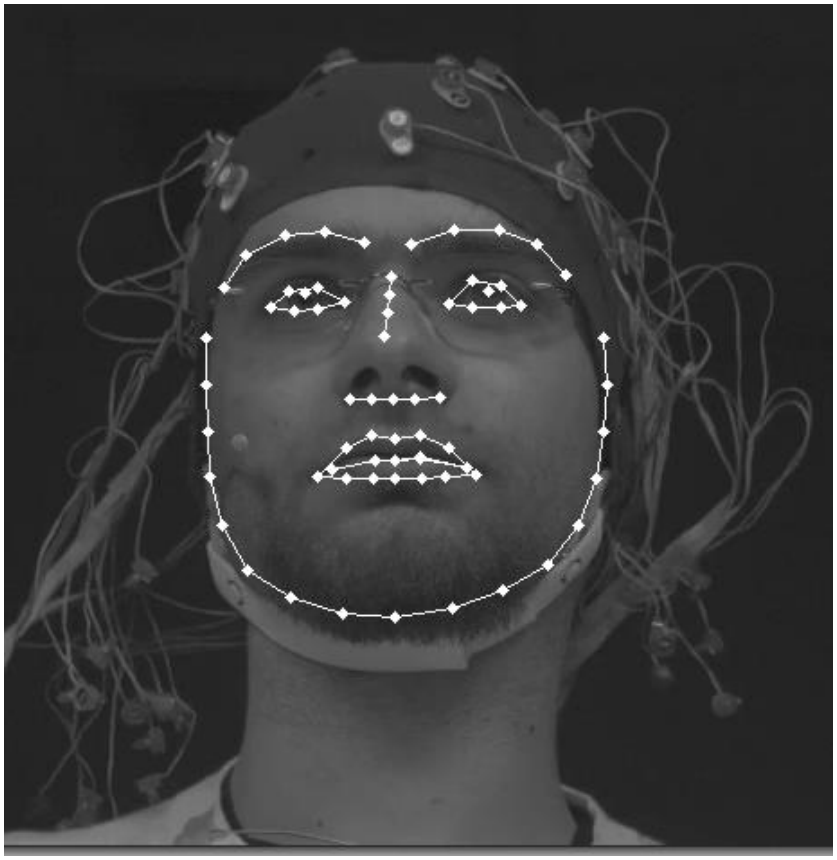


https://medium.com/@curiousily/tensorflow-for-hackers-part-iv-neural-network-from-scratch-1a4f504dfa8
https://www.zonatopandroid.com/aplicaciones-ejercitar-cerebro/
https://www.shutterstock.com/es/image-vector/database-123657808
https://www.youtube.com/watch?v=OpC3xC39fAc

Advances



CK+



HCI

Advances

Original

Gray

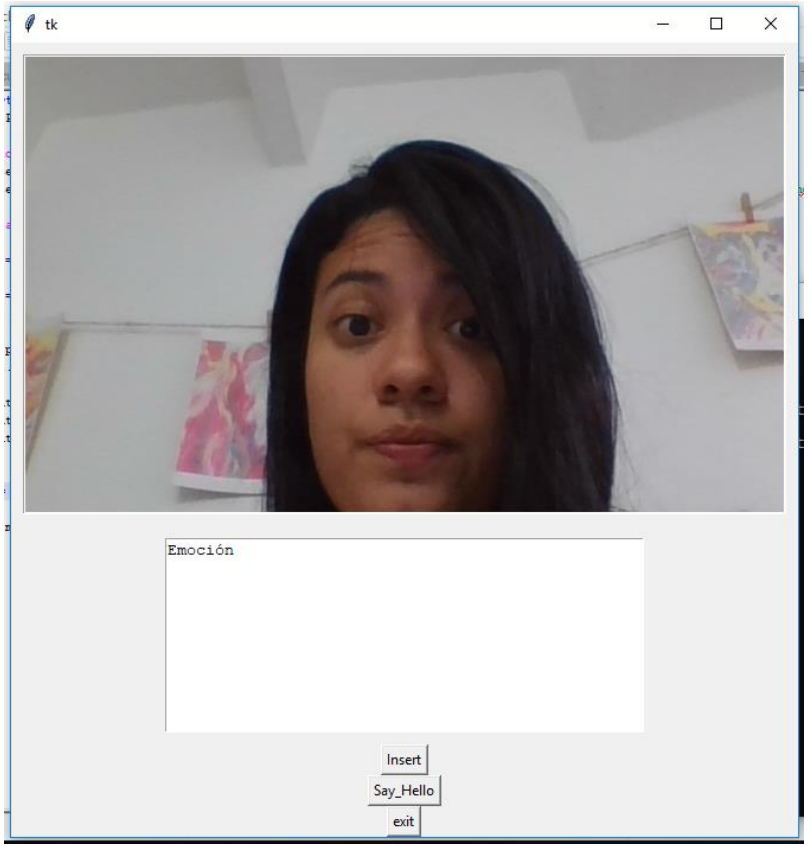
Sobel Filter

CLASSIFICATION ALGORITHMS		
	Advantages	Disadvantages
Naïve Bayes	Small amount of training data. Faster than other methods.	Bad estimation.
Gradient Descent	Easy implementation. Efficiency.	Requires a huge amount of data. Sensitive to feature scaling.
KNN	Simple implementation. Robust to noisy training data. Effective with large data.	Computation cost. Need to determine K.
Decision Tree	Simple to understand and visualize. Requires little data preparation. Can handle numerical and categorical data.	Unstable. Ambiguous.
Random Forest	Reduction in Over-fitting. Accuracy.	Slow real time prediction. Difficult to implement. Complex algorithm.
Neural Network	High performance. Non-linear model. Does not impose any restrictions on input variables.	Computationally expensive. Requires large amount of data.
SVM	Effective in high dimensional spaces. Memory efficience.	Does not provide probability estimates.

Advances

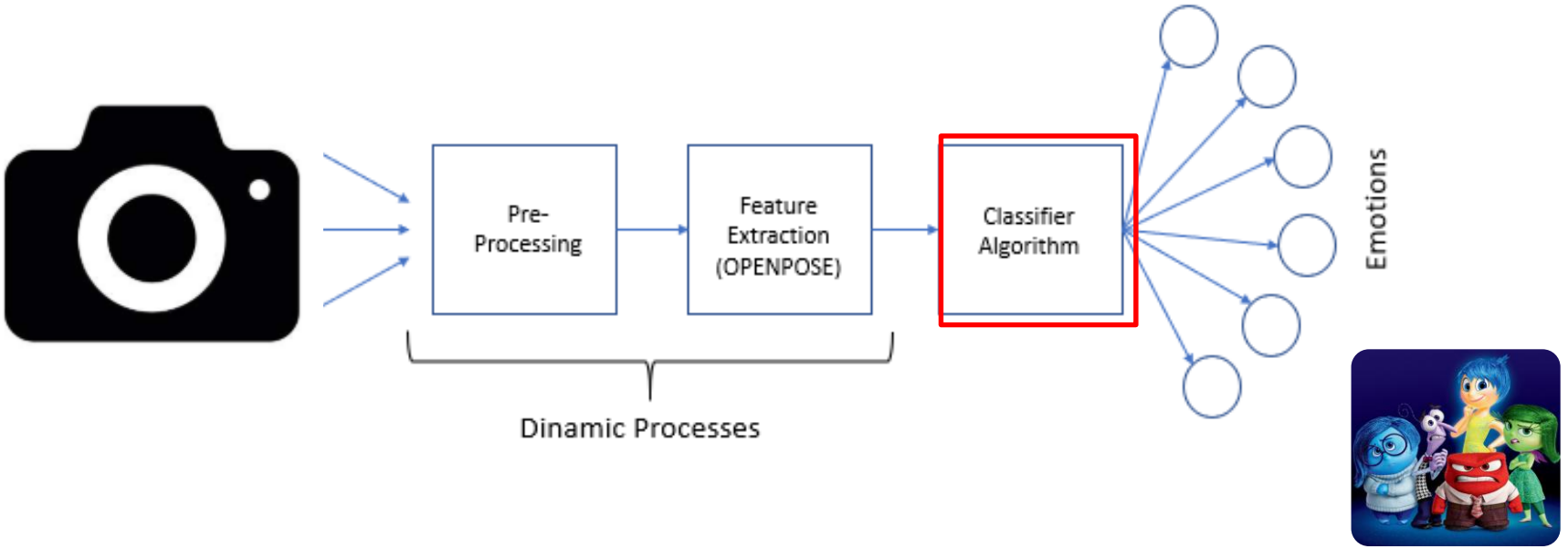
SVM

```
Avanzado II/Data Normalization')
(2141, 140)
[ 3. -1. -1. ...  7.  3.  2.]
[ 3.  6. -1. ...  7.  3.  2.]
Accuracy: 93.36758524054l8%
```



Scope

At the end of the Project, an algorithm should be presented that allows the detection and classification of diferent emotions by collecting facial micro-expressions, making use of OpenPose libraries, in addition, this algorithm must be implemented by testing with real people.

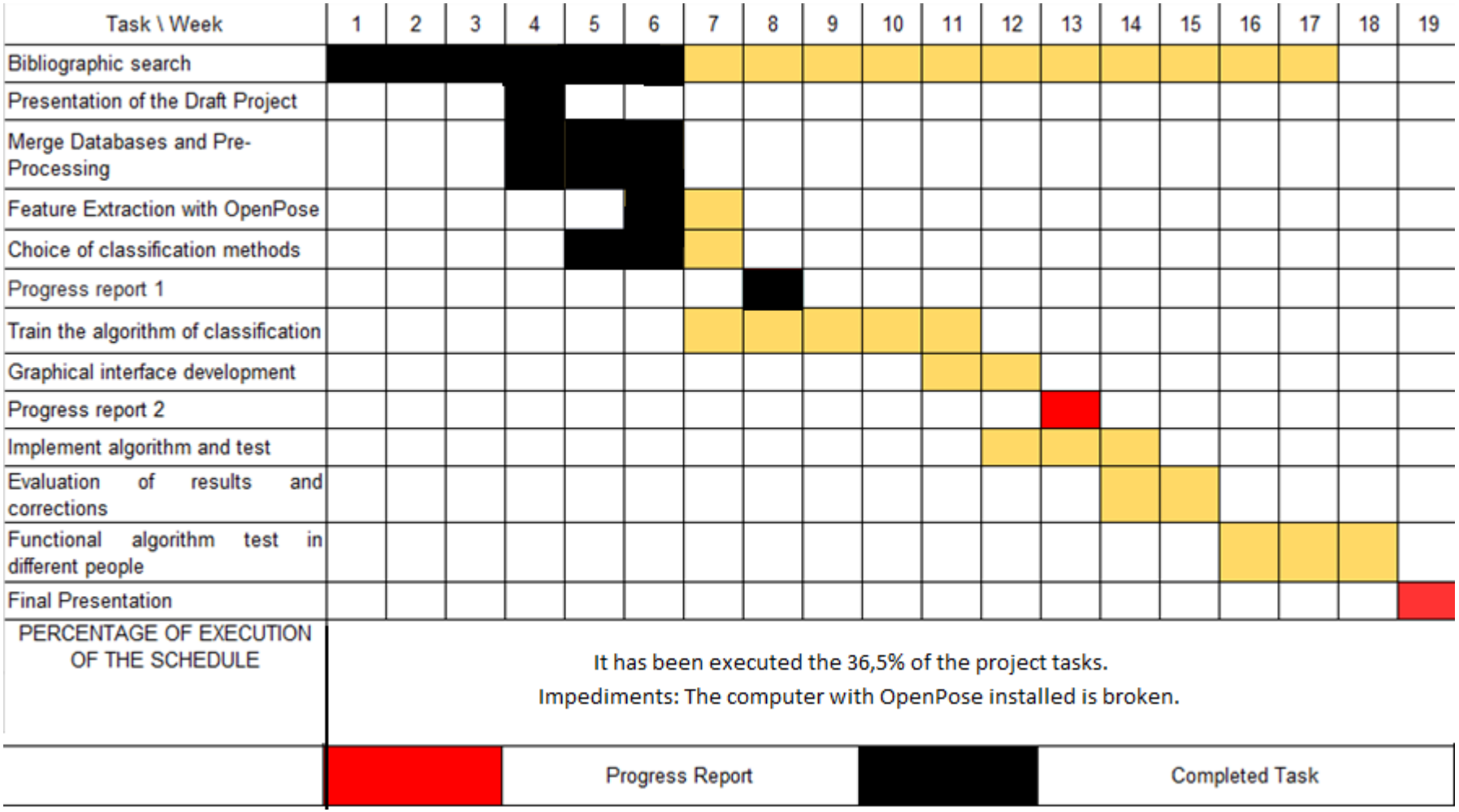


https://www.codeproject.com/Articles/1232042/Introduction-to-Convolutional-Neural-Networks
https://www.vidaextra.com/hardware/kinect-esta-oficialmente-muerto
https://www.baojpsicologos.es/controlar-emociones-discusiones/

Methodology

1. Literature review
2. Databases Structure
3. Training
4. Implementation and Testing

Schedule


Task \ Week
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
Bibliographic search
Presentation of the Draft Project
Merge Databases and Pre-Processing
Feature Extraction with OpenPose
Choice of classification methods
Progress report 1
Train the algorithm of classification
Graphical interface development
Progress report 2
Implement algorithm and test
Evaluation of results and corrections
Functional algorithm test in different people
Final Presentation
PERCENTAGE OF EXECUTION OF THE SCHEDULE
It has been executed the 36,5% of the project tasks.
Impediments: The computer with OpenPose installed is broken.
Progress Report
Completed Task

References

Scherer, K. R. (2005). What are emotions? And how can they be measured? Social Science Information, 44(4), 695–729. https://doi.org/10.1177/0539018405058216

DWOSKIN, E and RUSLI, E. Así funciona la tecnología que mide las emociones ocultas en el rostro (2016). The Wall Street Journal [En línea]. Disponible en: http://www.expansion.com/economia-digital/innovacion/2016/01/27/56a15c61e2704e01358b460f.html

BOSKER, B. "Affectiva's Emotion Recognition Tech: When Machines Know What You're Feeling" (2012). The Huffington Post. Retrieved February 3, 2013.

Chuliá, L. C. (2015). Reconocimiento de emociones mediante técnicas de aprendizaje profundo Grado en Ingeniería Informática.

RHONDA, S. Sindrome de Asperger (2016). KidsHealth [En línea]. Disponible en: http://m.kidshealth.org/es/parents/asperger-esp.html

Mordoka C. (2016). What are emotions? Structure and funtion of emotions Studia Humana, 5(3), 29-45. http://doi.org/10.1515/sh-2016-0013