

INTRODUCCIÓN

Lo que se busca es mejorar la calidad de vida del usuario mediante el diagnóstico y la terapia no invasiva. El estado de ánimo impacta en el deterioro de la salud y la calidad de vida; de igual modo se plantea su integración para detección de las emociones en los auto inteligentes, como una variable a considerar en los sistemas de seguridad de este.

OBJETIVOS

Diseñar y desarrollar un sistema de inteligencia artificial capaz de determinar el porcentaje de las 5 emociones básicas que un usuario presenta ante una cámara frontal.



OBJETIVOS ESPECÍFICOS

- Generar una data set de entrenamiento y de pruebas con los datos que nos proporcione el software de iMotion®
- Diseñar la arquitectura de red neuronal capaz de determinar las emociones de un sujeto.
- Determinar el porcentaje que presente el usuario de cada una de las 5 emociones básicas.



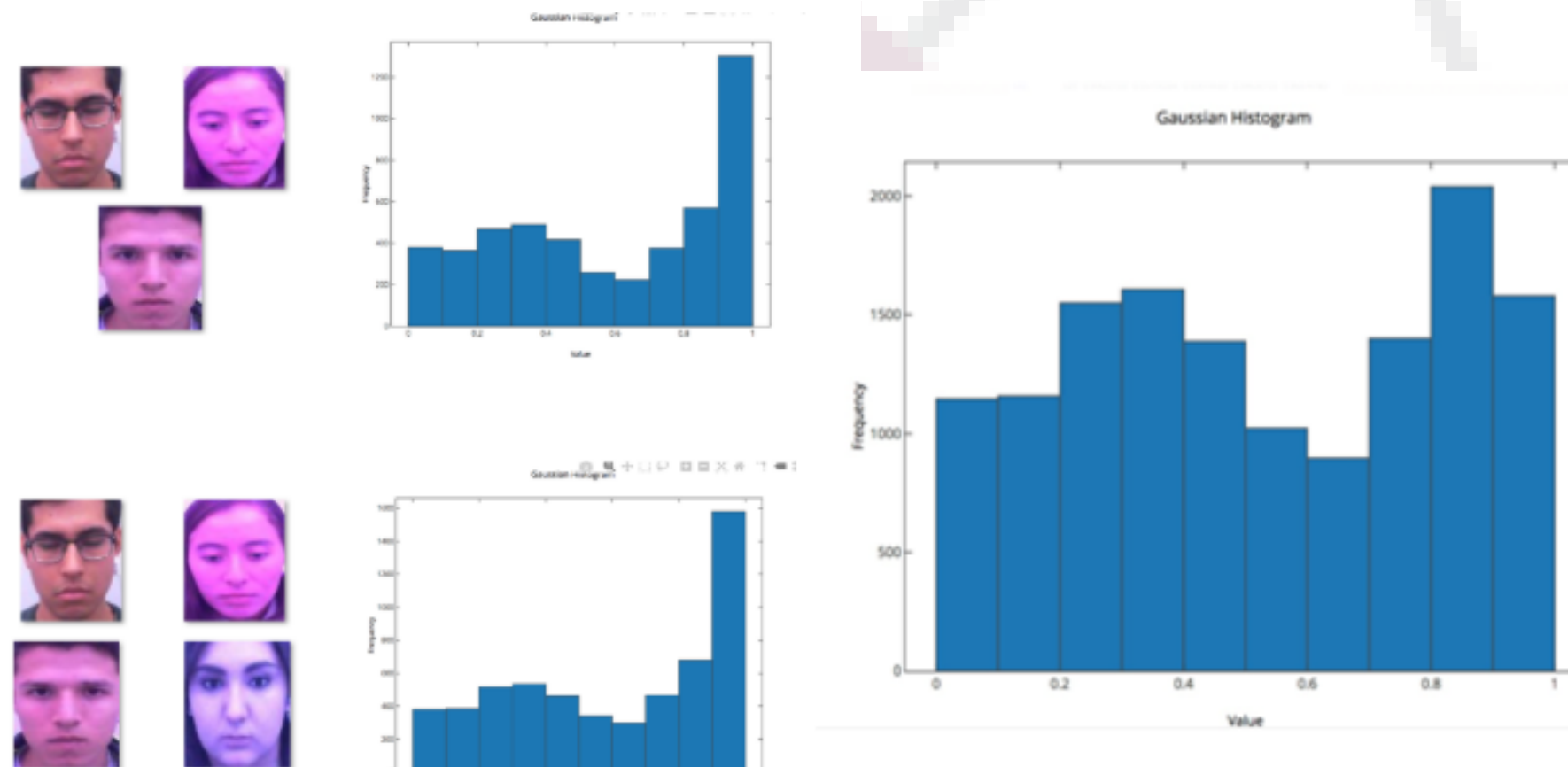
D E S A R R O L L O

Procesamiento

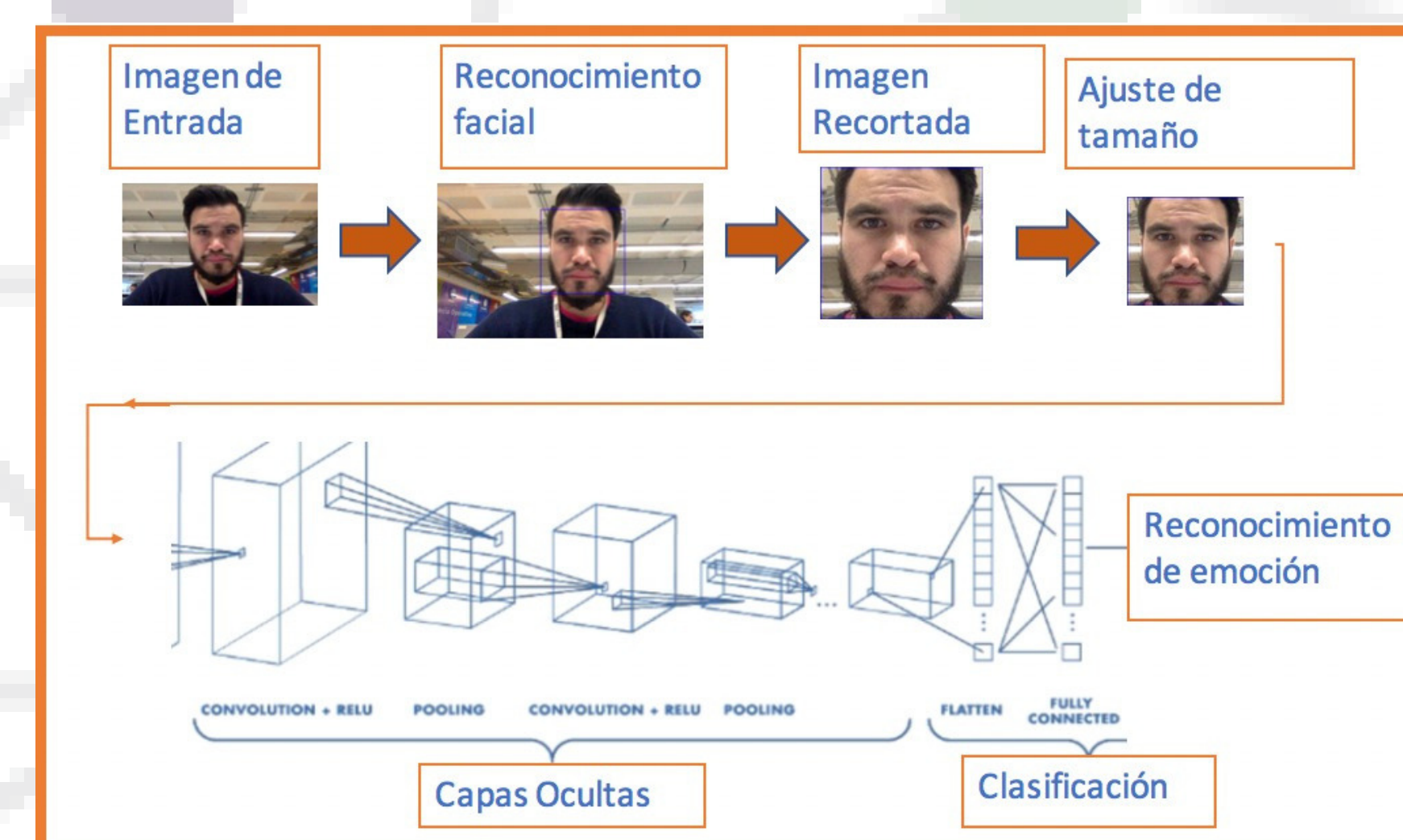
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2	0	0.488564626	0.295437592	0.423455099	0.139998407
3	0.681610967	0.556967952	0.205836074	0.336678078	0.769789003
4	0.714951978	0.409412270	0.174668854	0.434161394	0.655655984
5	0.545568662	0.622123808	0.13816719	0.417081243	0.451831712
6	0.404609456	0.754325564	0.195173908	0.37305933	0.416000373
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10	0.712030513	0.922827771	0.399078619	0.727957884	0.843760676
11	0.795663614	0.95132042	0.368364761	0.755602772	0.840009395
12	0.824748984	0.94080109	0.450186717	0.866927735	0.845084186
13	0.886705866	0.897376188	0.55622783	0.814268074	0.813920551
14	0.908998205	0.964974168	0.574825724	0.877518171	0.879564344
15	0.816164216	0.930959305	0.549018528	0.866024028	0.847034753



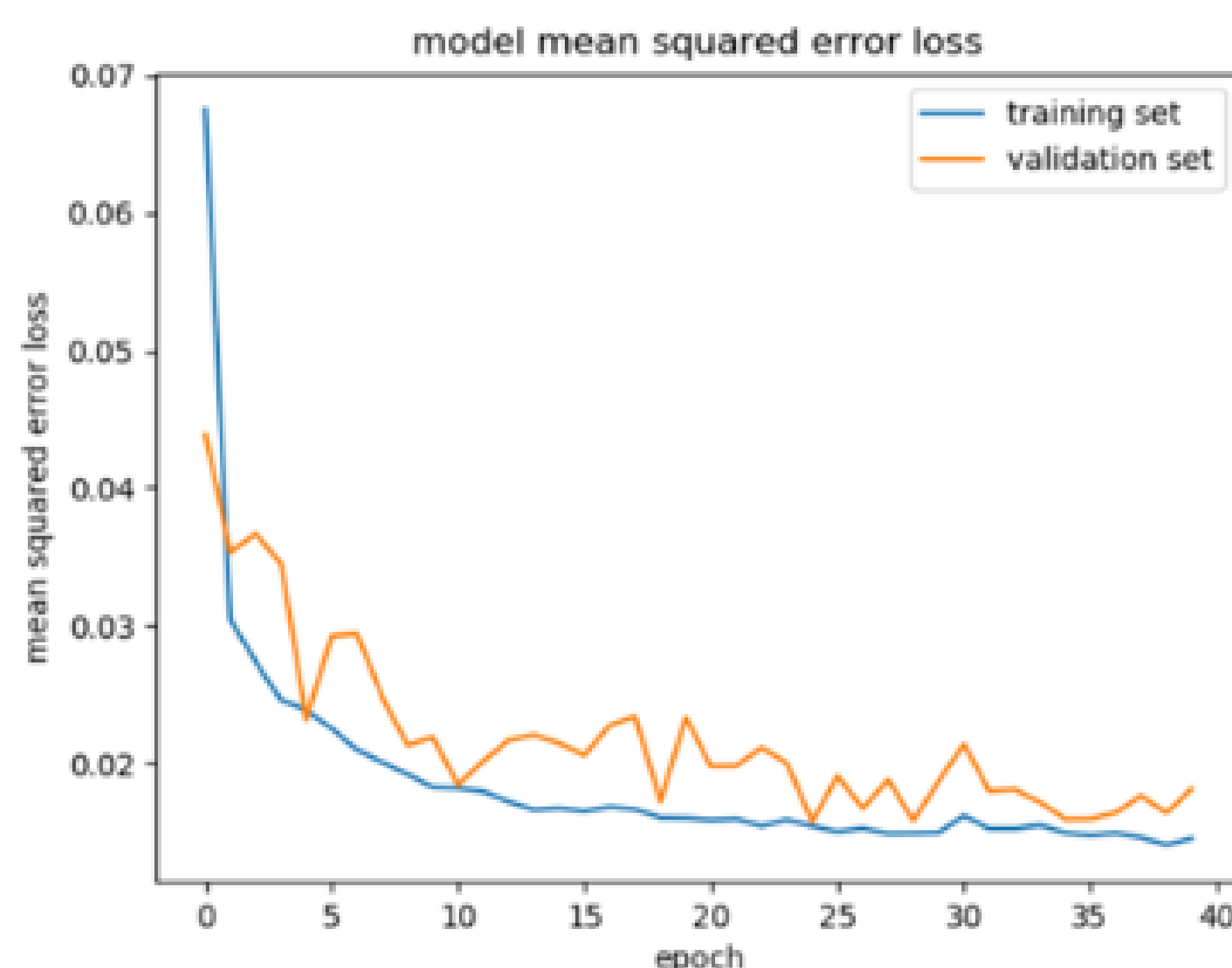
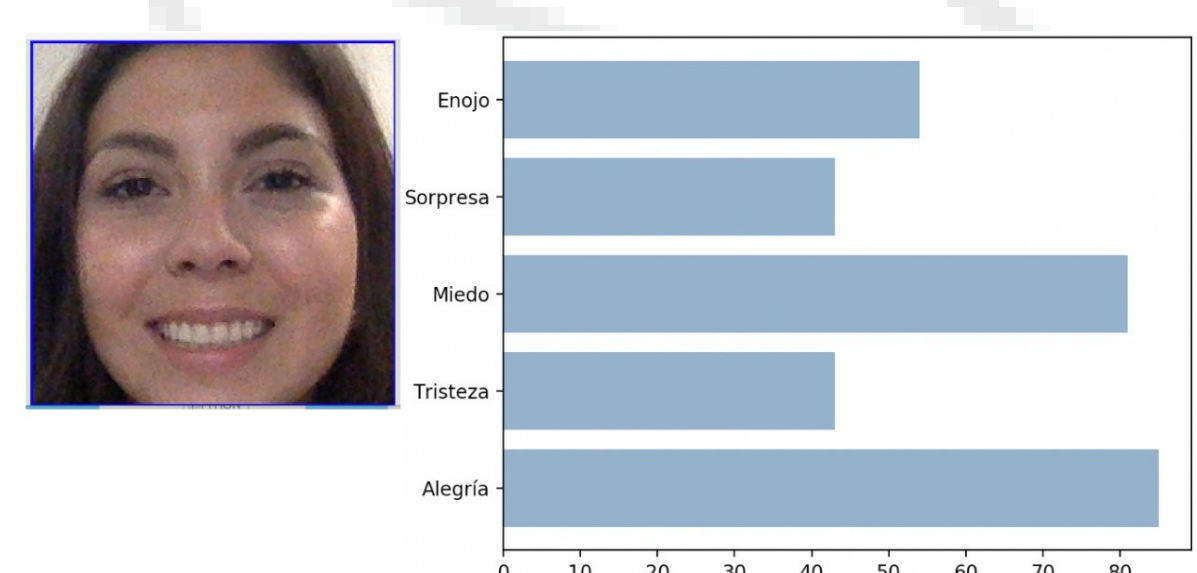
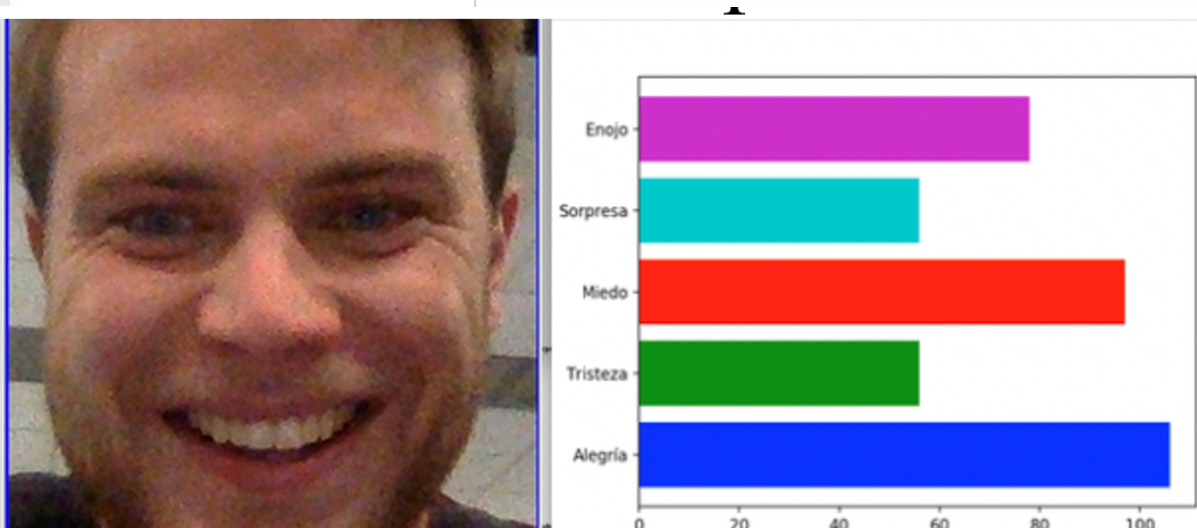
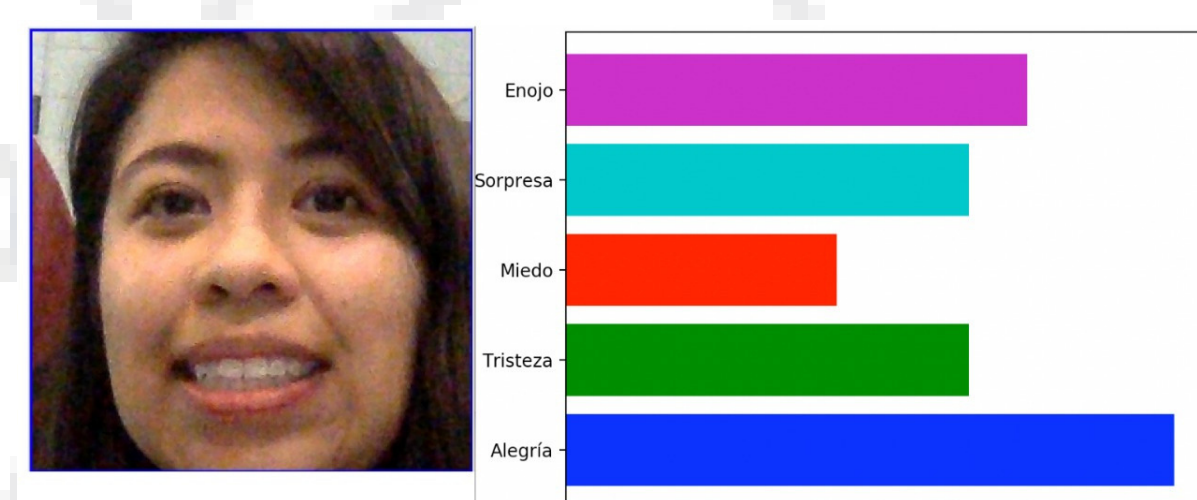
Balanceo de Datos



Entrenamiento



RESULTADOS



Sentimiento	Accuracy	Tiempo de entrenamiento [min]	Error en prueba aleatoria
Joy	.9124	25	4.71%
Anger	.9047	30	10.8%
Sadness	.9050	34	6.74%
Surprise	.9140	37	2.01%
Fear	.9024	32	8.76%

CONCLUSIONES

Deep Learning en conjunto con los diseños mecatrónicos pueden ser la solución a muchos problemas contemporáneos y clave para la creación de nuevos sistemas híbridos inteligentes, capaces de interactuar con el humano en cualquier tipo de ambiente.

TRABAJO A FUTURO

- Aumentar los datos de entrenamiento
- Seguir robusteciendo la CNN
- Aplicaciones de domótica emocional e instrumentación de vehículos



INTRODUCTION

What we are looking for is to improve the user's life quality by the diagnosis and a non-invasive therapy.

The mood has an impact in the health's deterioration and life quality, in the same way its integration is proposed to detect emotions in smart cars, as a variable to be considered in the security systems of this.

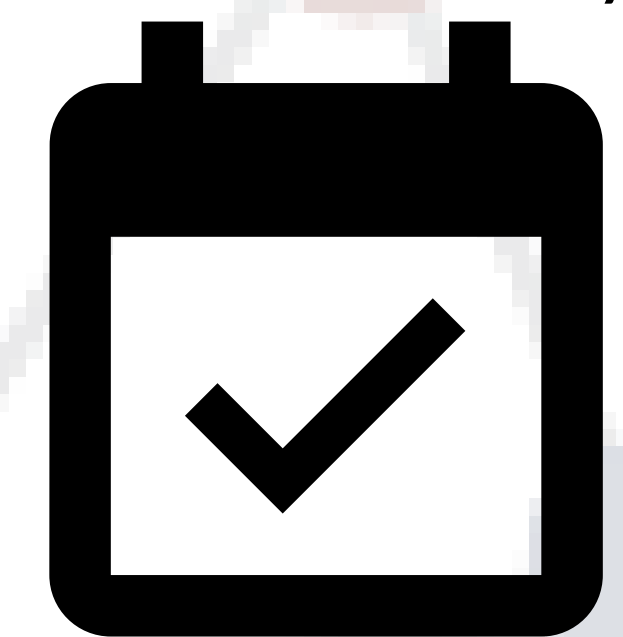
OBJECTIVES

Design and develop an artificial intelligence system which will be able to determine the percentage of the 5 main emotions that the user has in front of a camera.



SPECIFIC OBJECTIVES

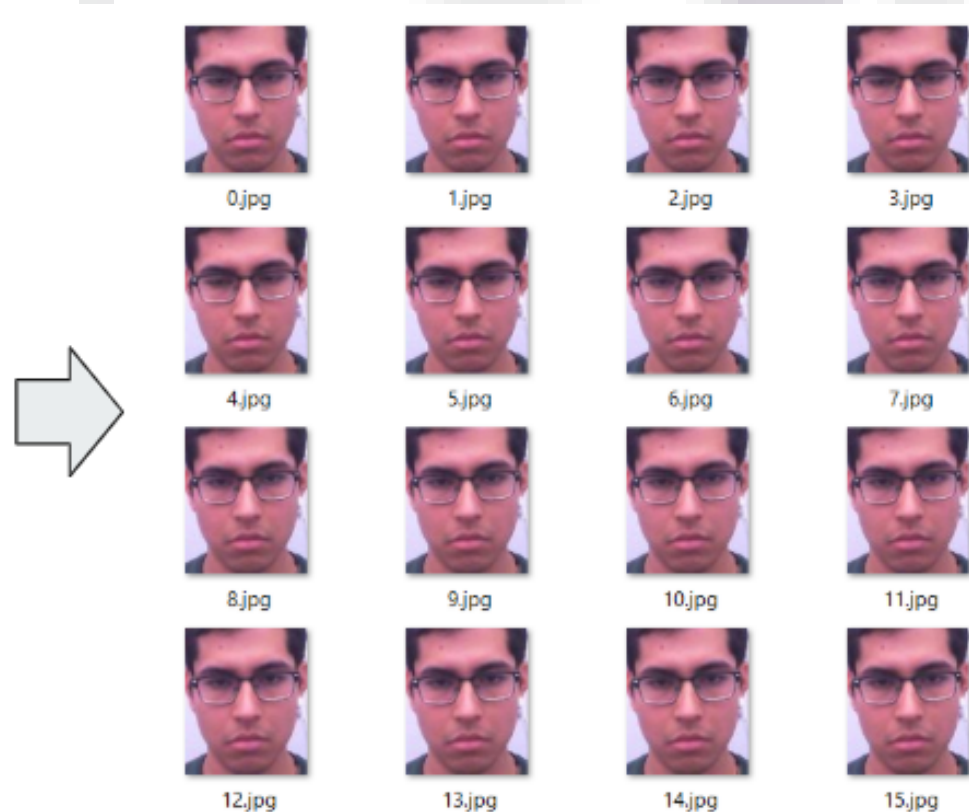
- Generate a training data-set with the data obtain in the iMotion® software.
- Design the architecture of a neural network capable of determine the emotions in a subject.
- Determine the percentage for each of the 5 main emotions that the user may present.



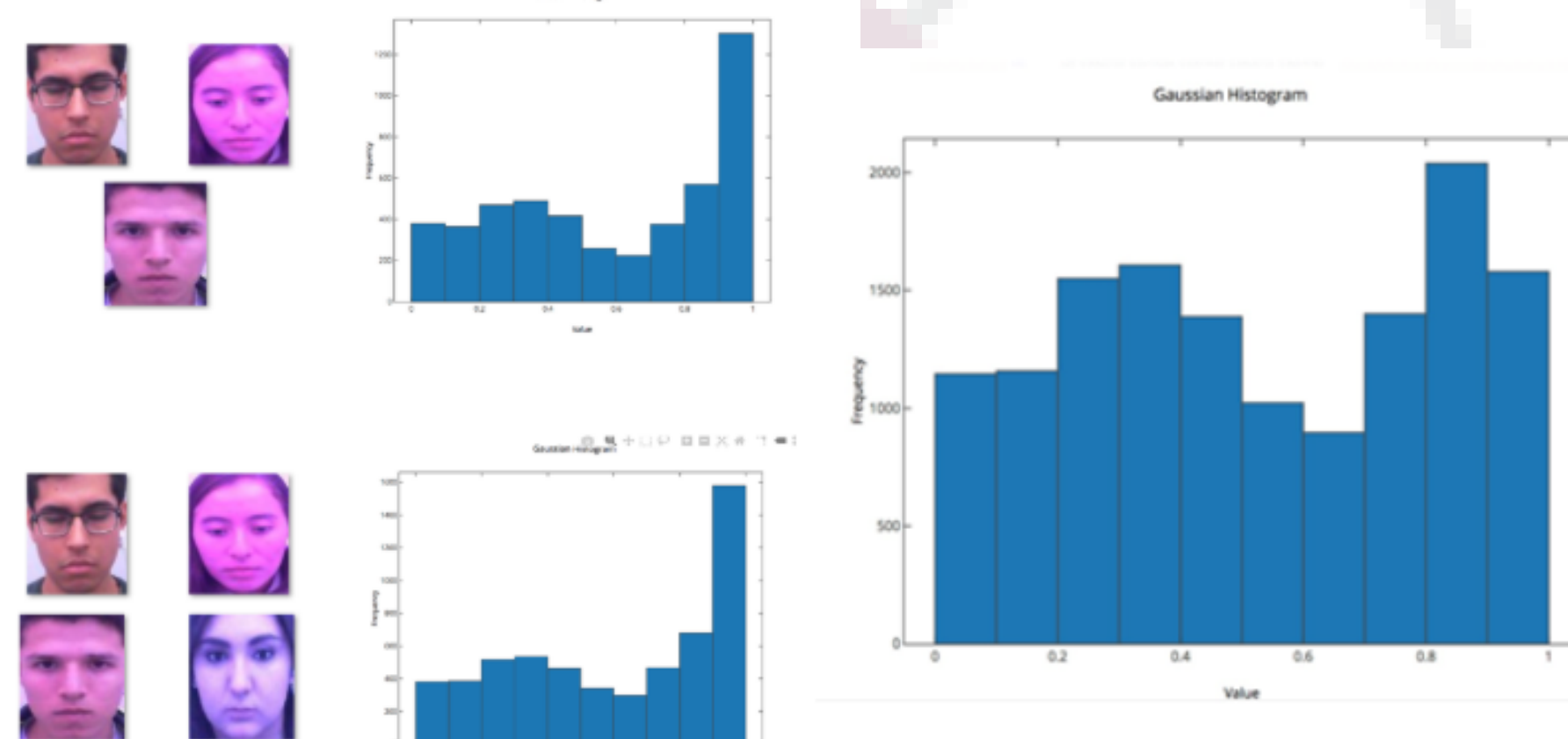
DEVELOPMENT

Preprocessing

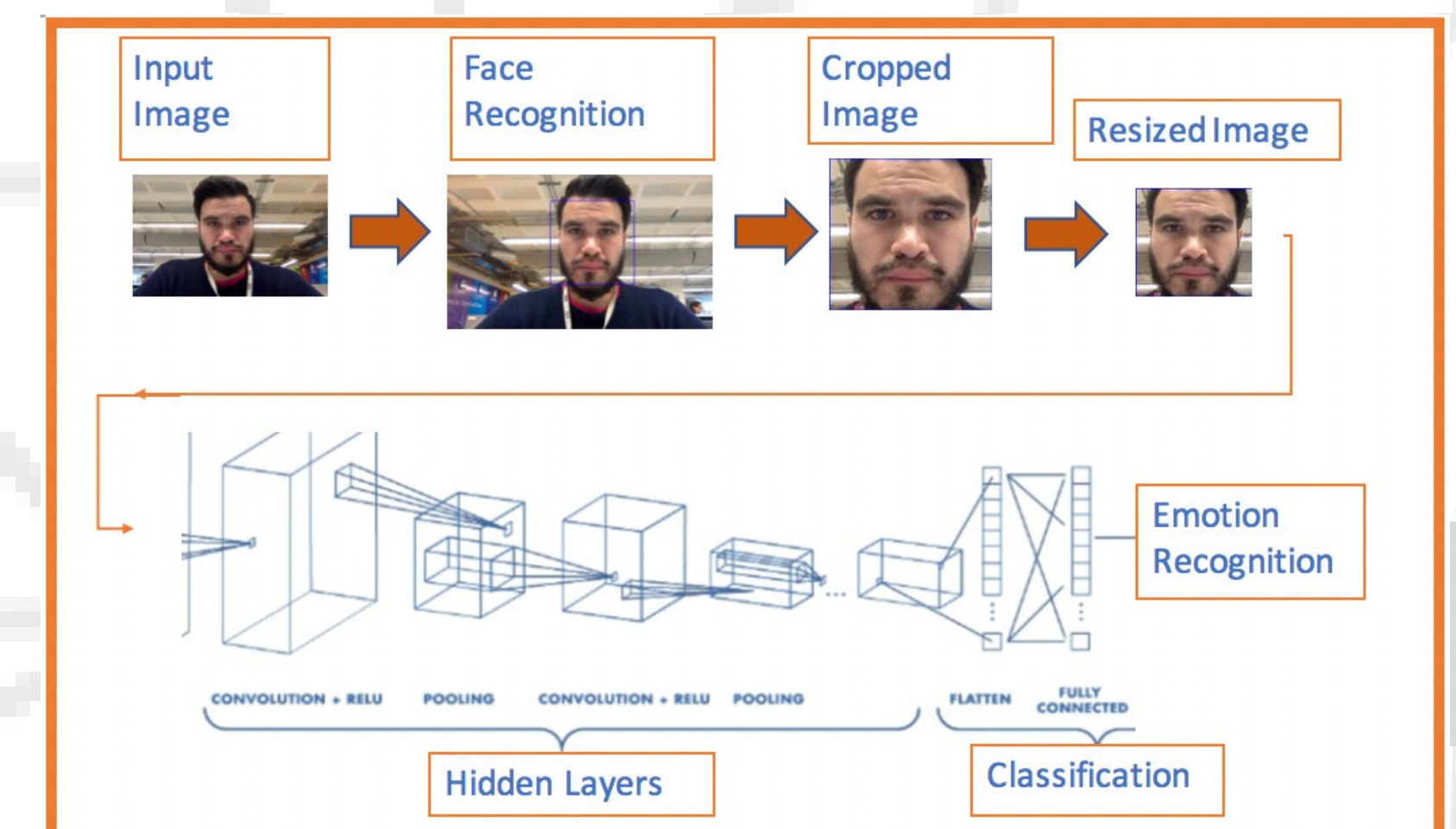
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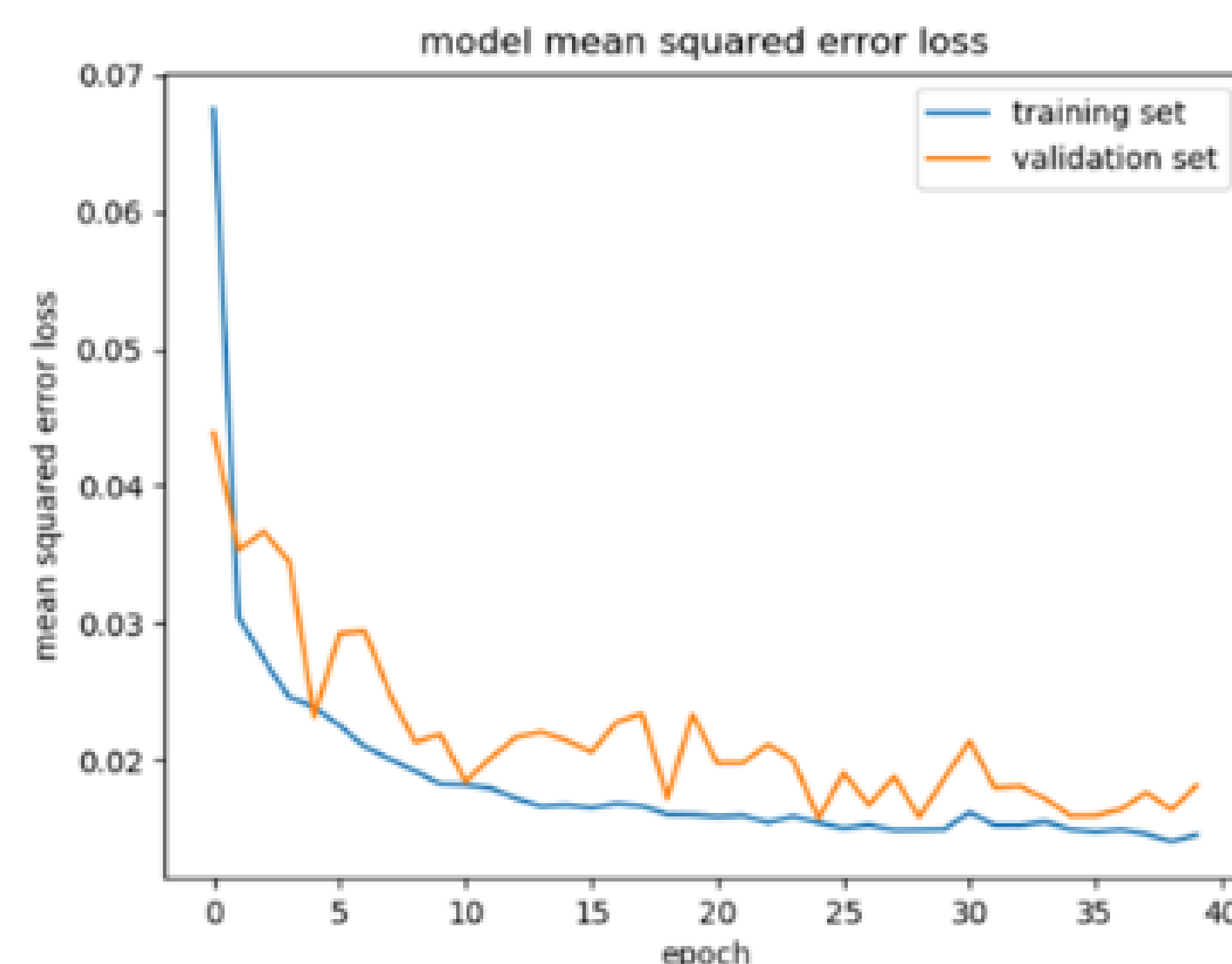
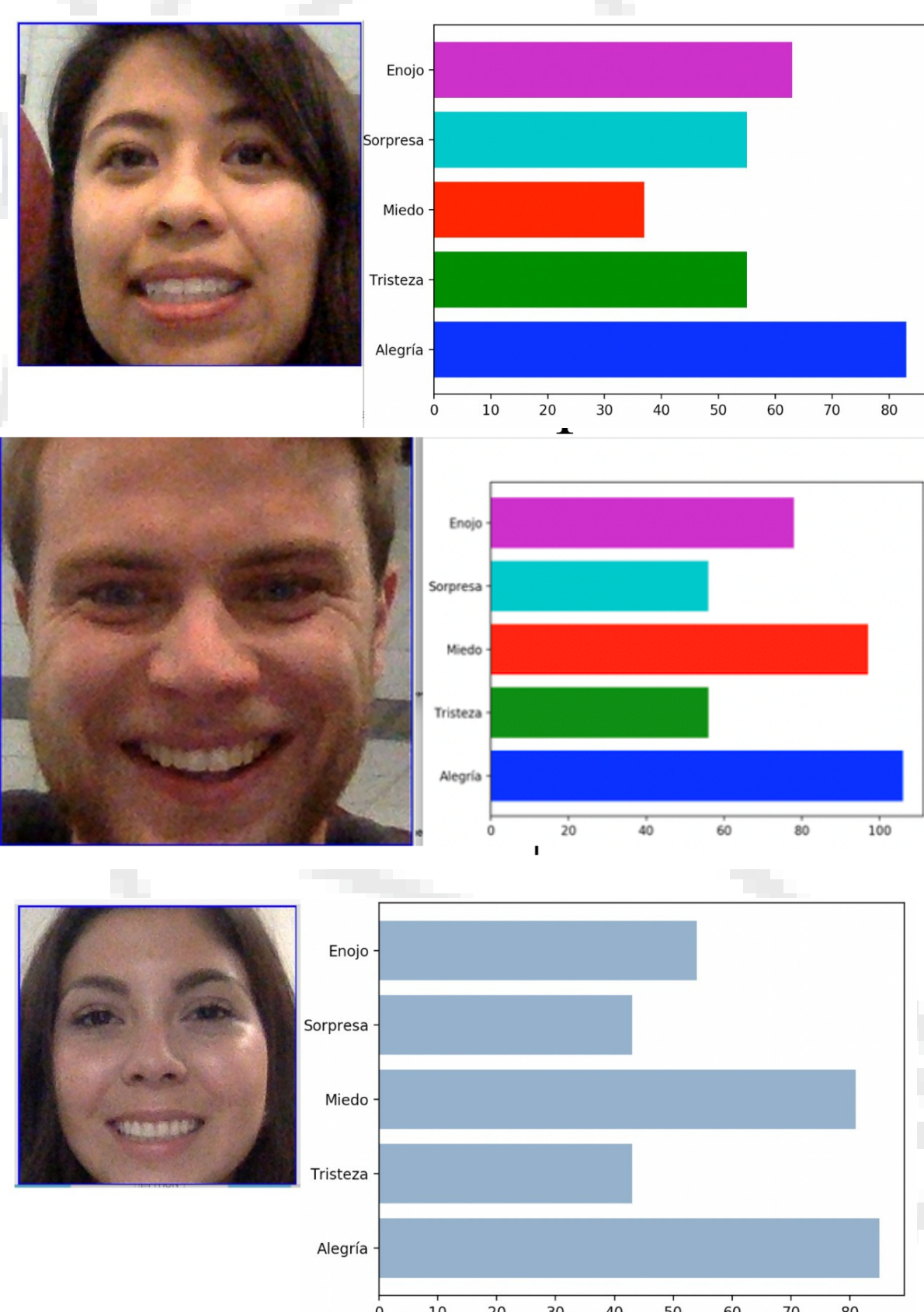
Data Balance



Training



RESULTS



CONCLUSIONS

Deep learning with mechatronic design can be the solution for contemporary problems and may be the key for the develop of hibrid-smart system capable to interact with human being in several enviroments.

FUTURE WORK

- Increase our training data-set
- keep developing our CNN
- Apliances in emotional domotics and automotive instrumentation



Emotion	Accuracy	Training Time [min]	Error in random test
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