"El saber de mis hijos hará mi grandeza"

Sexto Congreso Nacional de Riego, Drenaje y Biosistemas

COMEII- 2021 / Hermosillo, Sonora

ALGORITMO ADAM EN INTELIGENCIA ARTIFICIAL

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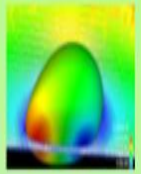
Contenido

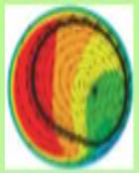
- Antecedentes
- Problemas
- Algoritmo
- Resultados
- Conclusión

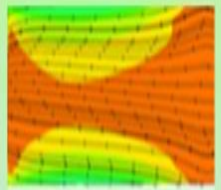
Modelación

Escala:

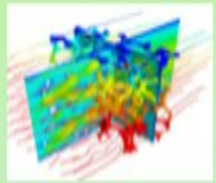


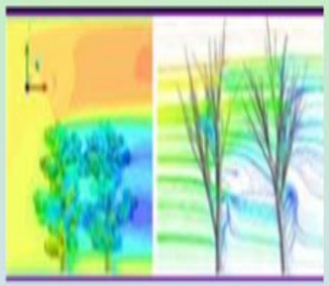
Celular



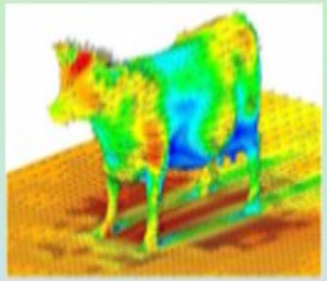


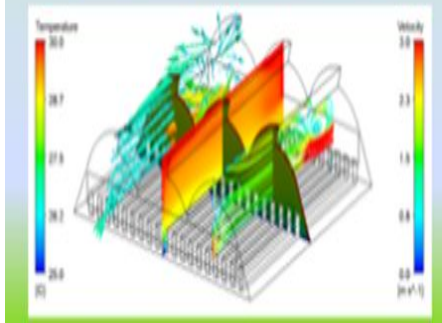
Tejido



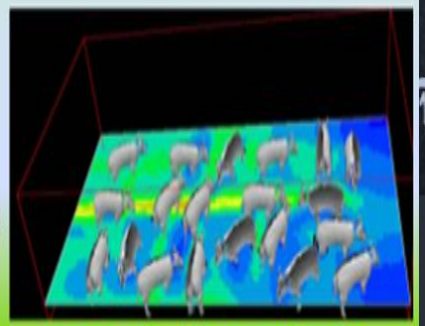


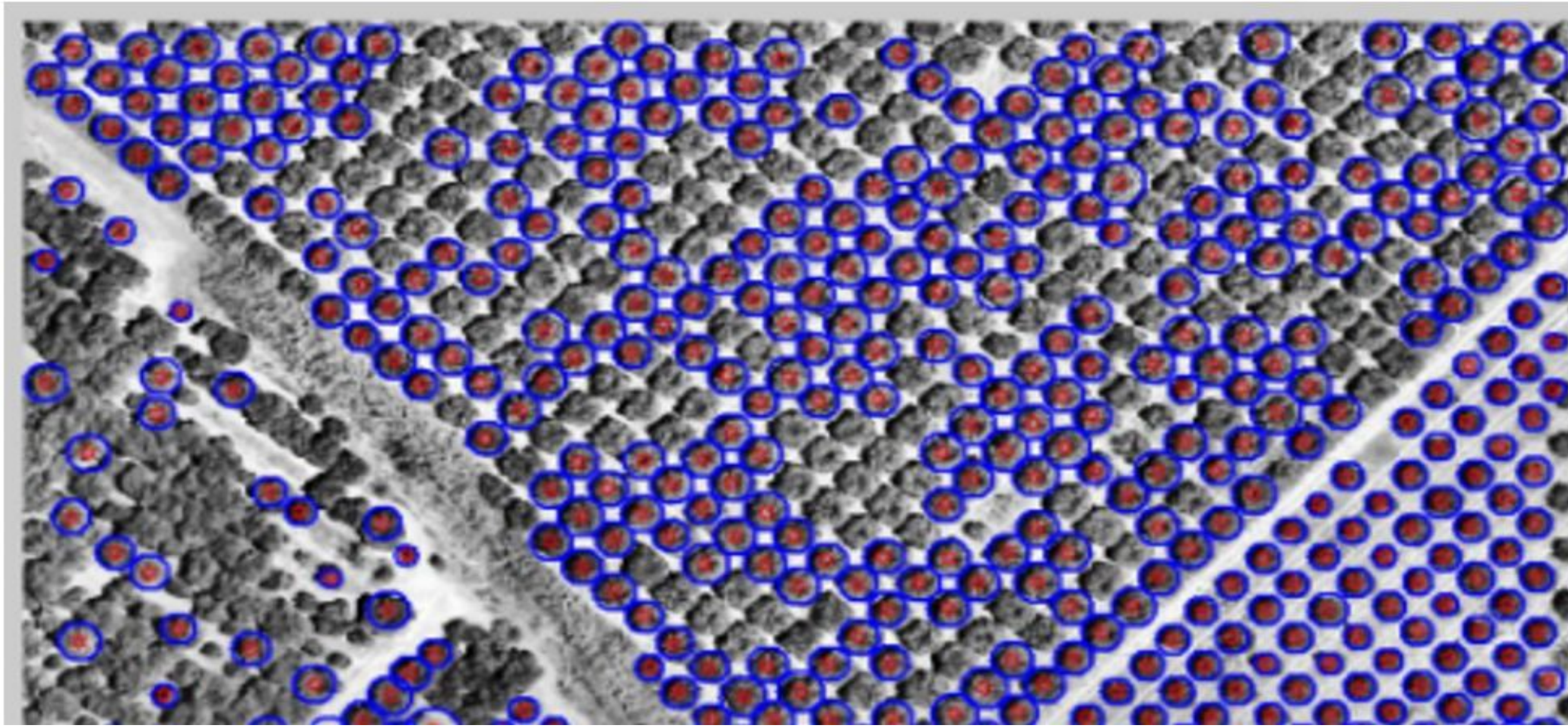
Individuo

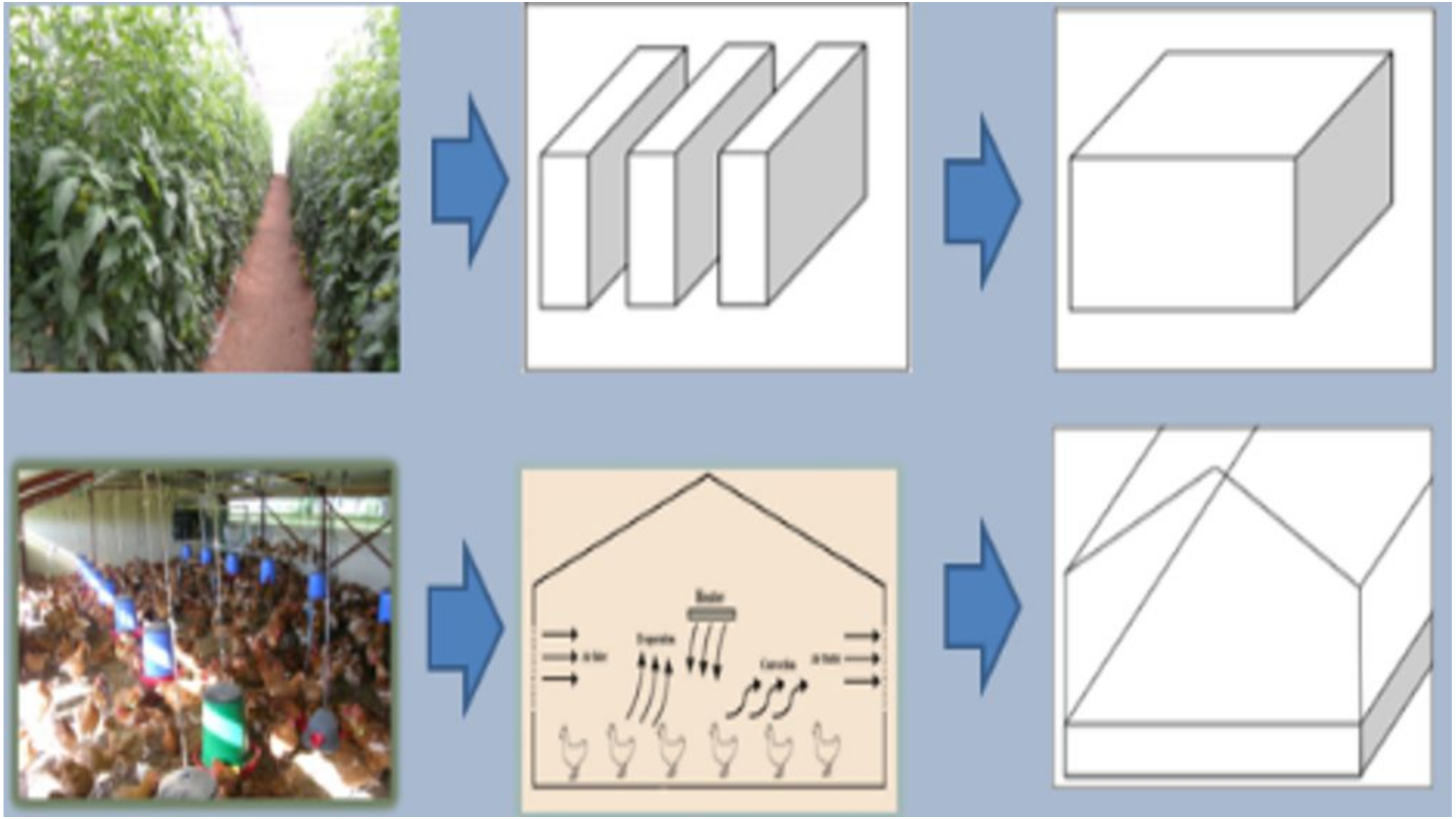




Unidad de Producción

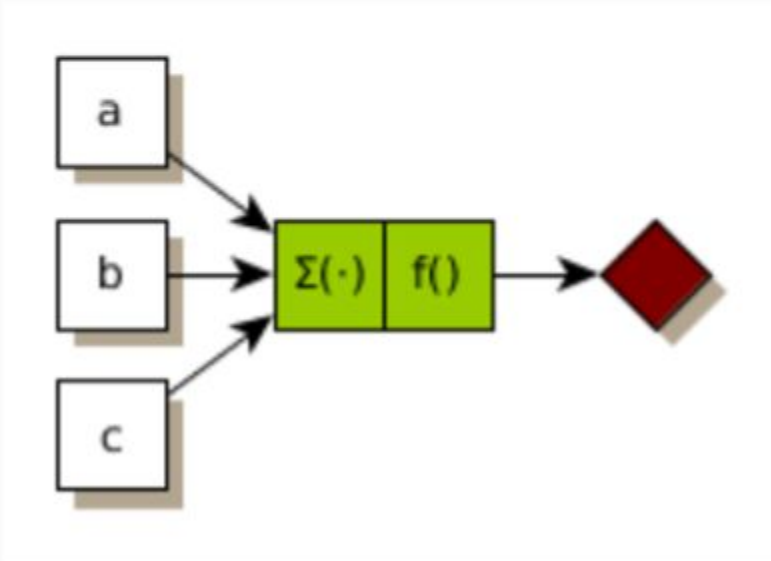


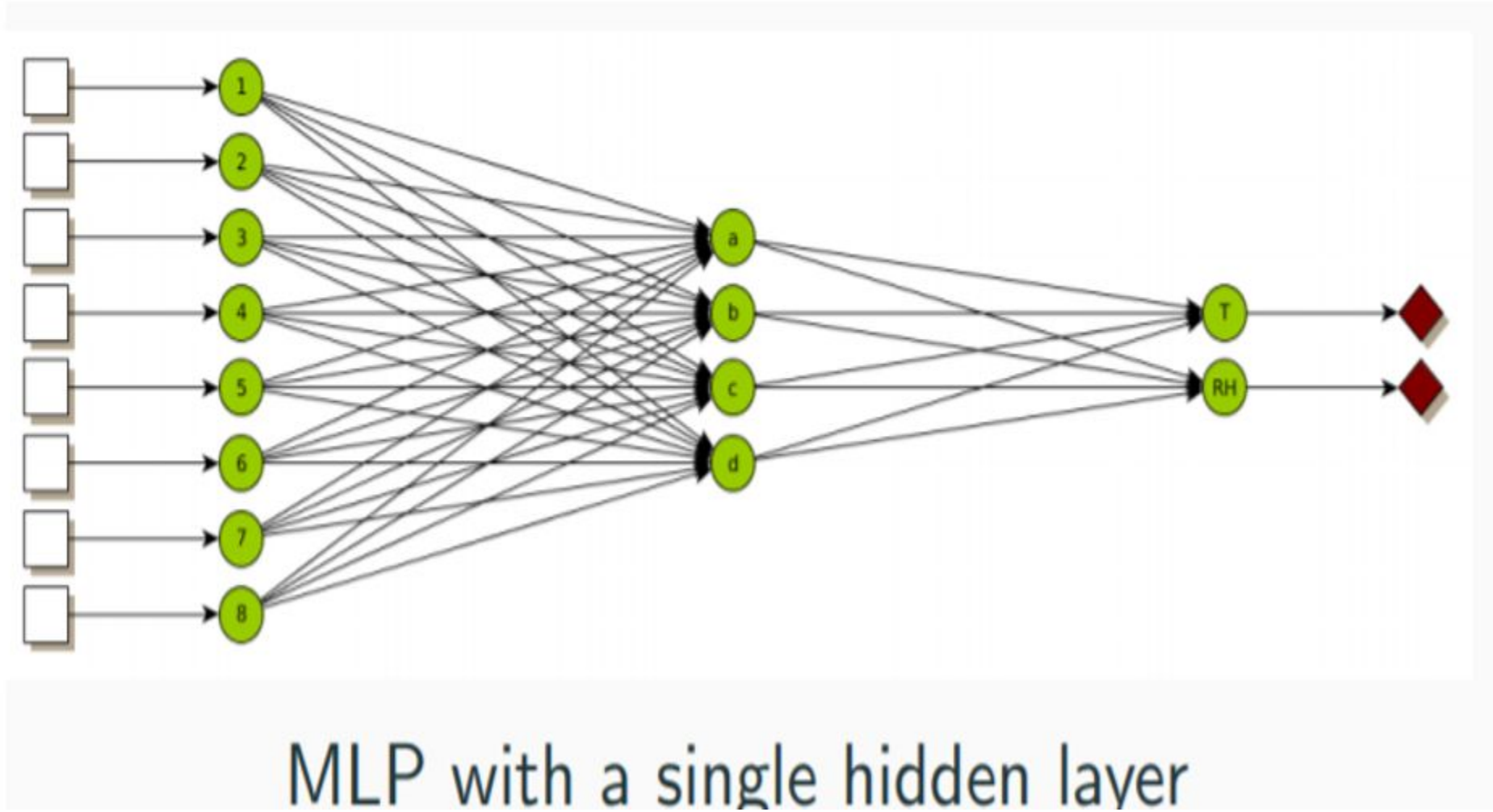




Inteligencia artificial

The simplest neural network has a single node





MLP with a single hidden layer

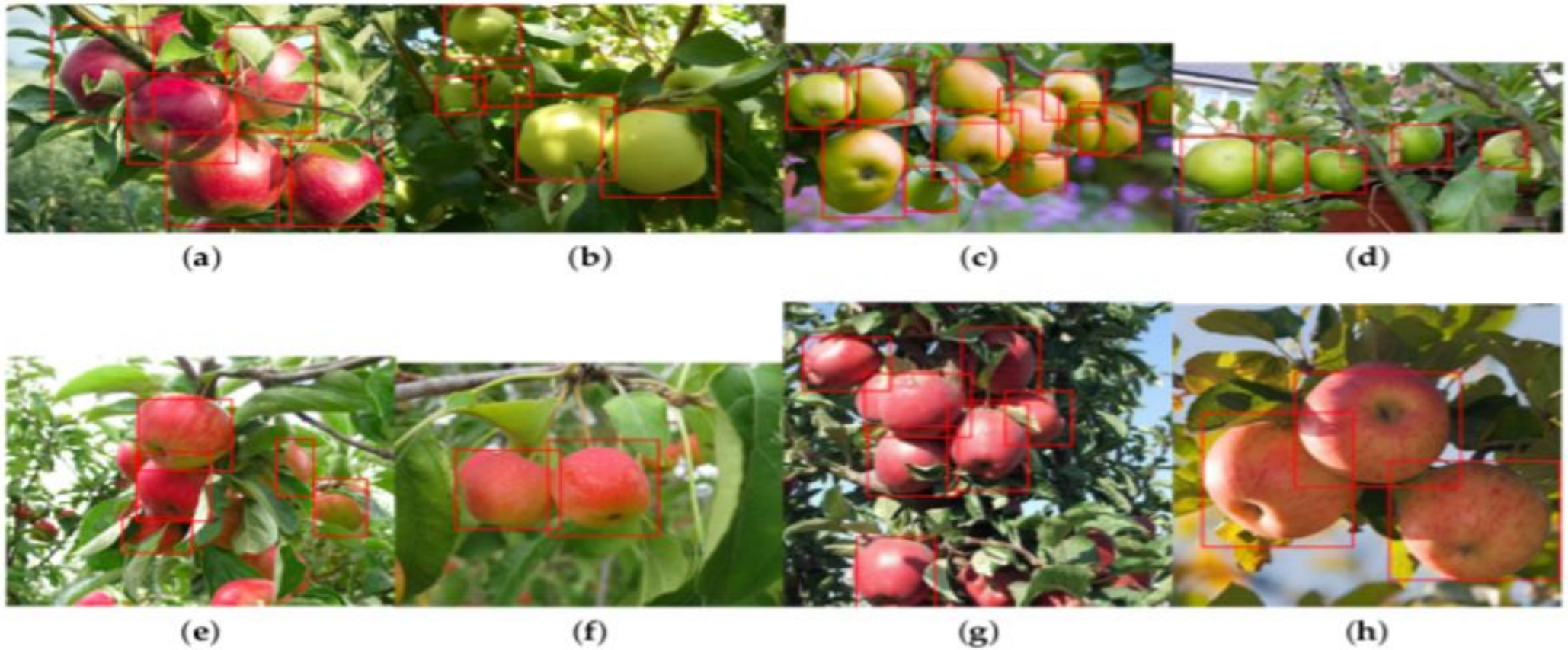
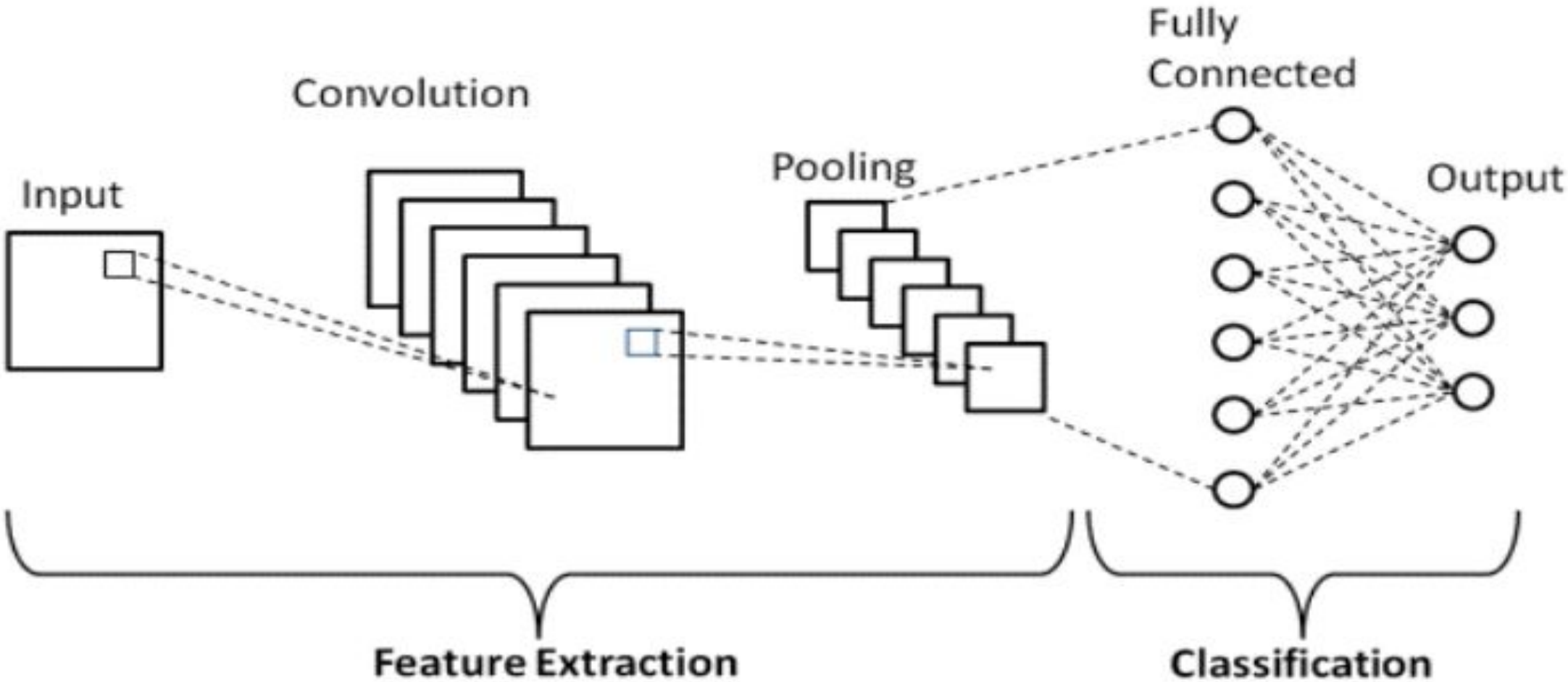
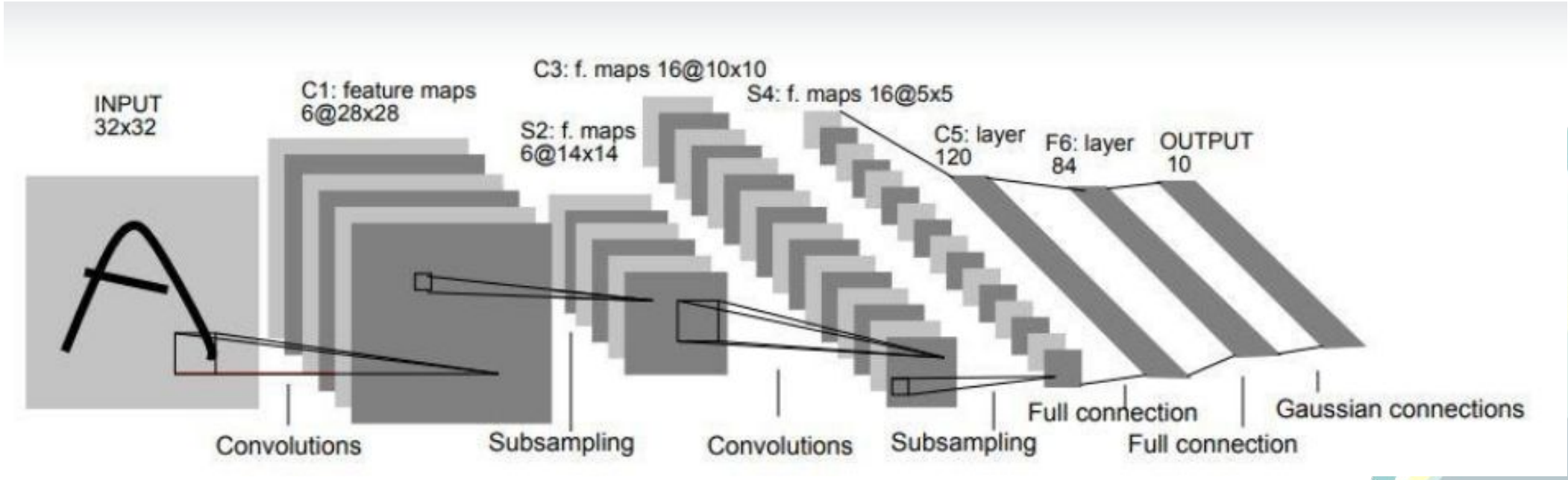


Figure 17. Eight instances of red (**a**,**e**–**h**) and green (**b**–**d**) apples detection (different varieties). Images are obtained from Google Images. Above each detection is the classification confidence output from the DCNN.

Sa et al. (2016). DeepFruits: A Fruit Detection System Using Deep Neural Networks



https://www.upgrad.com/blog/basic-cnn-architecture/




```
#LeNet-5 CNN Architecture
model = keras.Sequential()
model.add(layers.Conv2D(filters=6, kernel_size=(5, 5), activation='relu', input_shape=(32,32,1)))
model.add(layers.AveragePooling2D())
model.add(layers.Conv2D(filters=16, kernel_size=(5, 5), activation='relu'))
model.add(layers.AveragePooling2D())
model.add(layers.Flatten())
model.add(layers.Dense(units=120, activation='relu'))
model.add(layers.Dense(units=84, activation='relu'))
model.add(layers.Dense(units=10, activation = 'softmax'))
```

https://www.upgrad.com/blog/basic-cnn-architectur

$$w_{t+1} = w_t - \alpha_t \frac{\tilde{u}}{\sqrt{\tilde{v}+\varepsilon}}$$

$$u_{t+1} = \mu_1 u_t + (1-\mu_1)\nabla_{wt} f$$

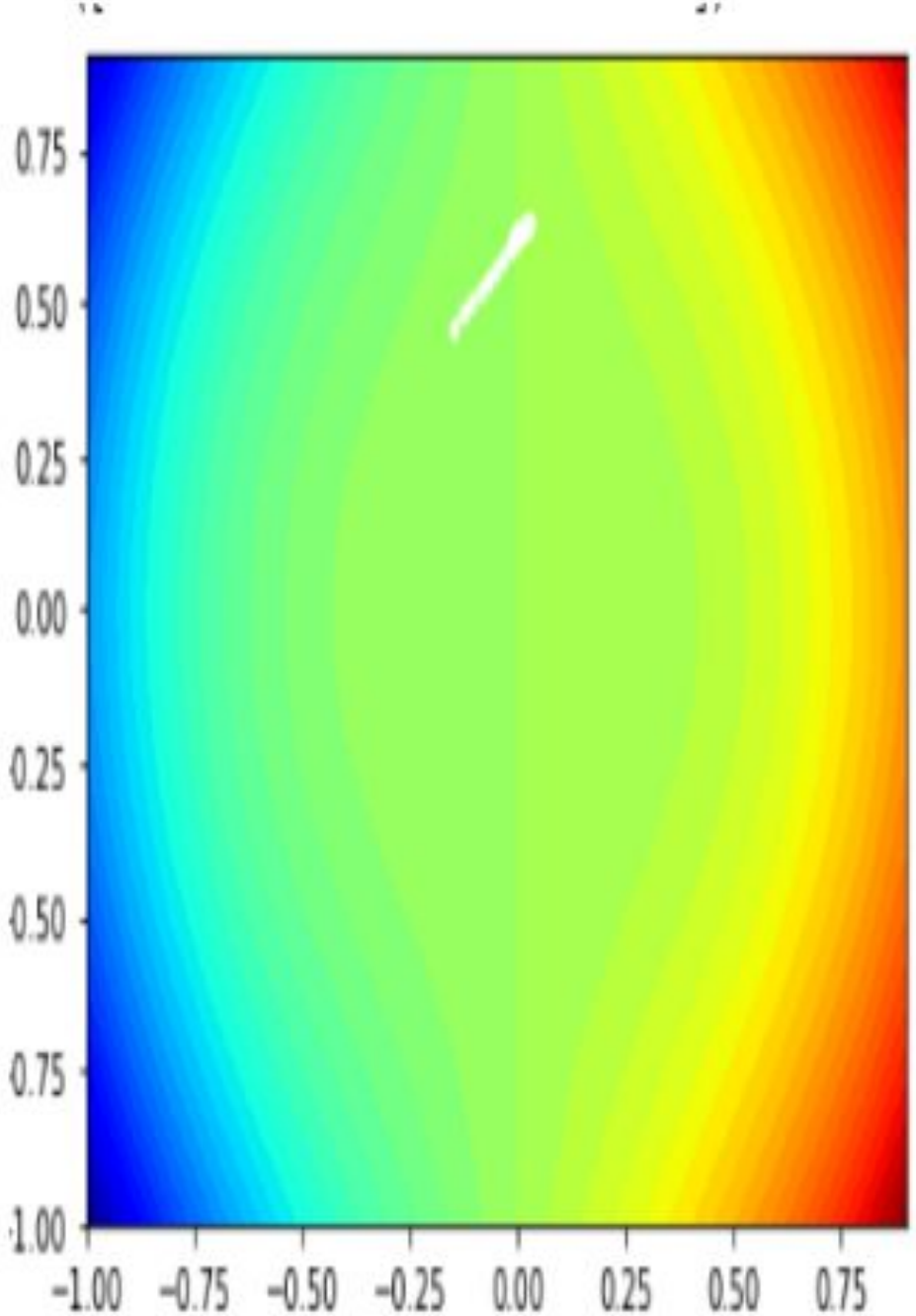
$$v_{t+1} = \mu_2 v_t + (1-\mu_2)\,(\nabla_{wt} f)^2$$

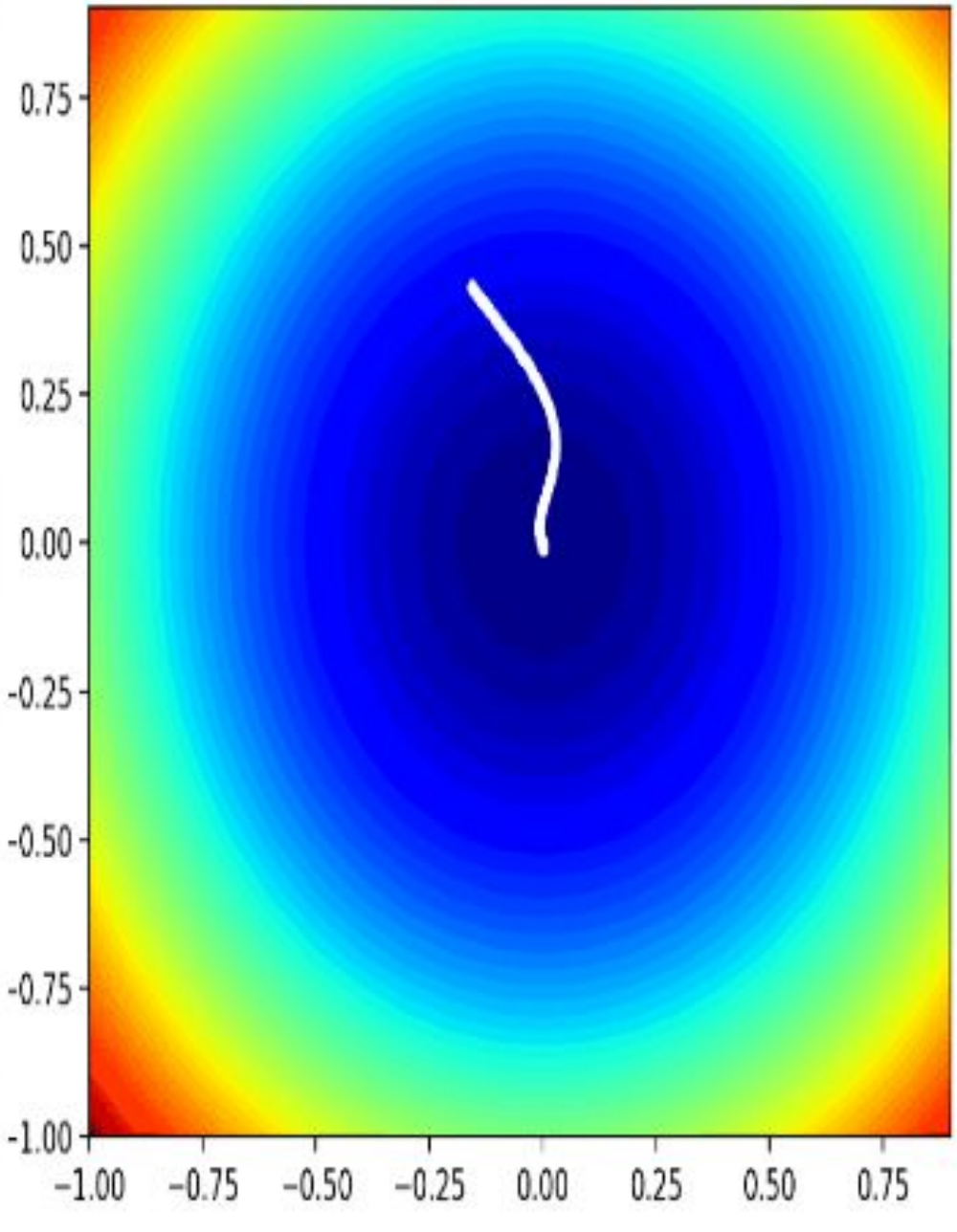
$$w_{t+1} = w_t - \alpha_t \nabla_{wt} f$$

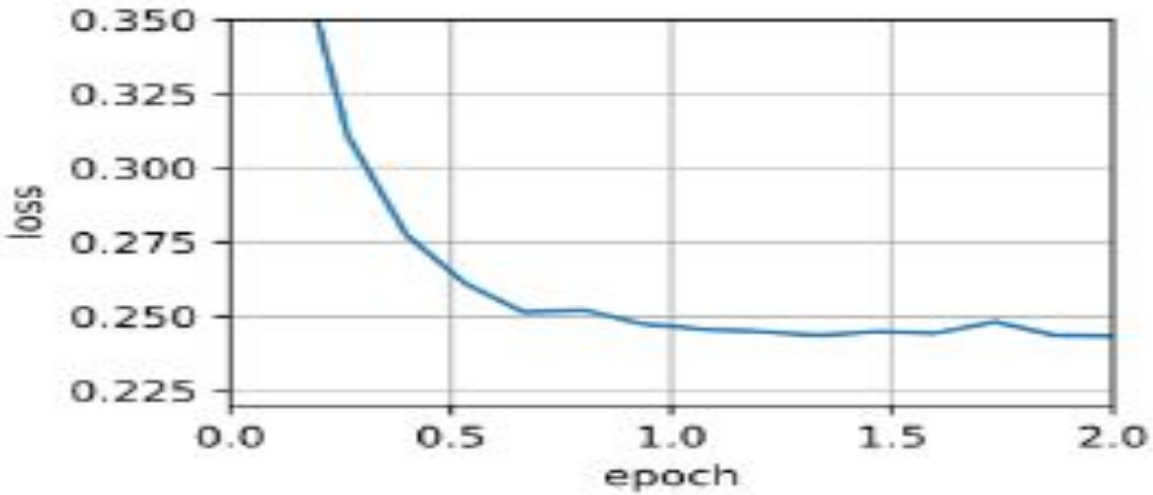
$$| w_{t+1} - w_t | \leq \varepsilon_t$$

$$\tilde{u}_{t+1} = \frac{u_{t+1}}{(1-\mu_1)}$$

$$\tilde{v}_{t+1} = \frac{v_{t+1}}{(1-\mu_2)}$$

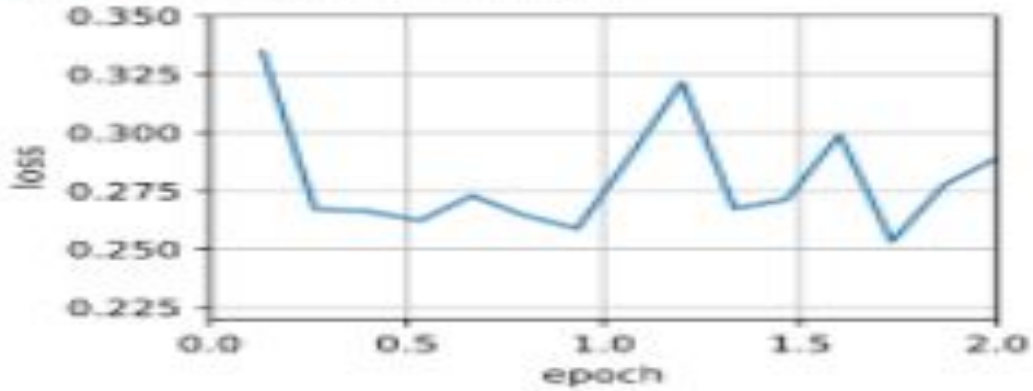

0.75
0.50
0.25
0.00
0.25
0.50
0.75
1.00
−1.00
−0.75
−0.50
−0.25
0.00
0.25
0.50
0.75


0.75
0.50
0.25
0.00
-0.25
-0.50
-0.75
-1.00
−1.00
−0.75
−0.50
−0.25
0.00
0.25
0.50
0.75



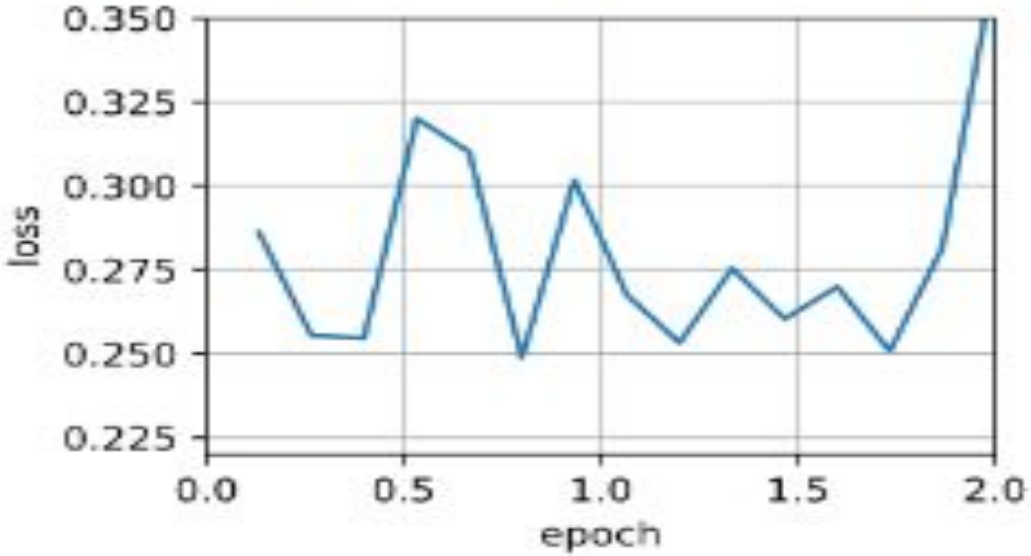

```
d2l.train_concise_ch11('adam', {'learning_rate': 0.1},
```

```
loss: 0.289, 0.050 sec/epoch
```



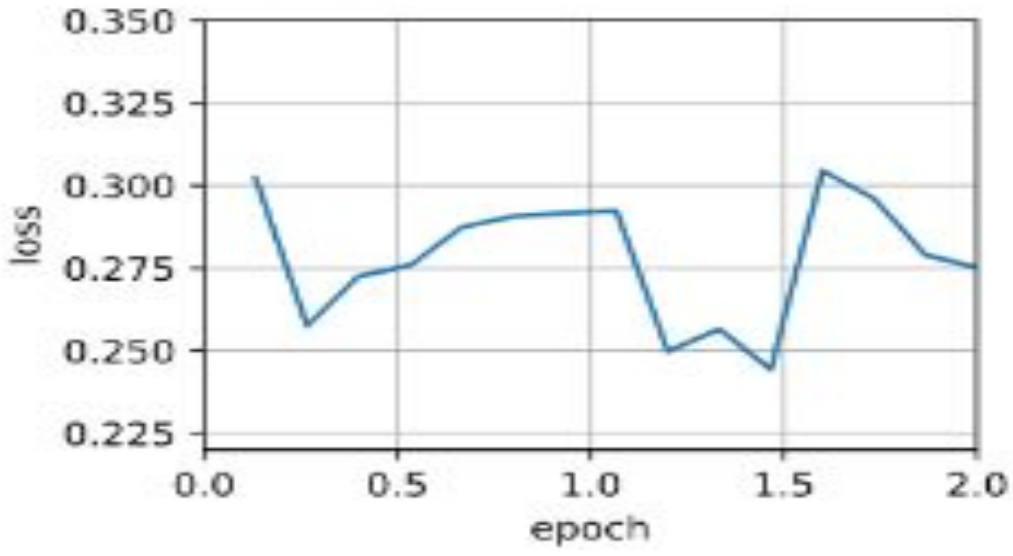

```
d2l.train_ch11(yogi, init_adam_states(feature_dim),
    'lr': 0.1,
    't': 1}, data_iter, feature_dim);
```

```
loss: 0.367, 0.116 sec/epoch
```




```
d2l.train_ch11(yogi, init_adam_states(feature_dim),
    'lr': 0.1,
    't': 1}, data_iter, feature_dim);
```

```
loss: 0.275, 0.143 sec/epoch
```



Conclusiones

El método de adam tiene grandes ventajas por su simpleza

Métodos cercanos al algoritmo adam son

- adamax,
- adaGrad,
- RMSprop
- adaDelta

En algunas circunstancias pueden ser más efectivos algunas modificaciones como yogi

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¡GRACIAS!

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