Milestone B IF4074 Pembelajaran Mesin Lanjut

Convolutional Neural Network

Disusun Oleh:

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TEKNIK INFORMATIKA

SEKOLAH TEKNIK ELEKTRO DAN INFORMATIKA

INSTITUT TEKNOLOGI BANDUNG

SEMESTER 1

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1. Penjelasan Kode Program

Terdapat beberapa kelas yang strukturnya mencoba mengimitasi kelas-kelas pada library Tensorflow, yang kemudian diimplementasi sendiri, seperti:

- Dari milestone pertama, terdapat beberapa fungsi tambahan yang dibuat:

1. Penyimpanan model dan load model dari file eksternal

```
  def save_model(self):
      params = []
      for layer in self.layers:
          params.append(layer.to_object())
      with open("model.json", "w") as f:
          data = json.dumps(params)
          f.write(data)

  def load_model(self, filepath):
      layers_from_file = []
      with open(filepath, "r") as f:
          data = json.load(f)
      for layer in data:
          print(layer["type"])
          layer_obj = None
          if layer["type"] == "conv2d":
              layer_obj = Convolutional(
                  input_shape=layer[“input_shape”],
                  padding=layer[“padding”],
                  filter_count=layer[“filter_count”],
                  kernel_shape=layer[“kernel_shape”],
                  stride=layer[“stride”],
              )
          elif layer["type"] == "dtctr":
              layer_obj = Detector(activation=layer[“activation”])
          elif layer["type"] == "max_pool":
              layer_obj = Pooling(size=layer[“size”], stride=layer[“stride”], mode="max")
          elif layer["type"] == "avg_pool":
              layer_obj = Pooling(size=layer[“size”], stride=layer[“stride”], mode="avg")
          elif layer["type"] == "flatten":
              layer_obj = Flatten()
          elif layer["type"] == "dense":
              layer_obj = Dense(size=layer[“size”], input_size=layer[“input_size”],
activation=layer[“activation”])

          layers_from_file.append(layer_obj)
```

```
    self.layers = layers_from_file
```

2. Backpropagation

```
def backward(self, din, learning_rate):
    (num_channels, orig_dim) = self.last_input.shape

    dout = np.zeros(self.last_input.shape)

    for c in range(num_channels):
        tmp_y = out_y = 0
        while tmp_y + self.size <= orig_dim:
            tmp_x = out_x = 0
            while tmp_x + self.size <= orig_dim:
                patch = self.last_input[
                    c, tmp_y : tmp_y + self.size, tmp_x : tmp_x + self.size
                ]
                (x, y) = np.unravel_index(np.nanargmax(patch), patch.shape)
                dout[c, tmp_y + x, tmp_x + y] += din[c, out_y, out_x]
                tmp_x += self.stride
                out_x += 1
            tmp_y += self.stride
            out_y += 1
    return dout
```

2. Pembagian Kerja

Nama	**Pekerjaan**
Farras Mohammad Hibban Faddila	Seluruhnya