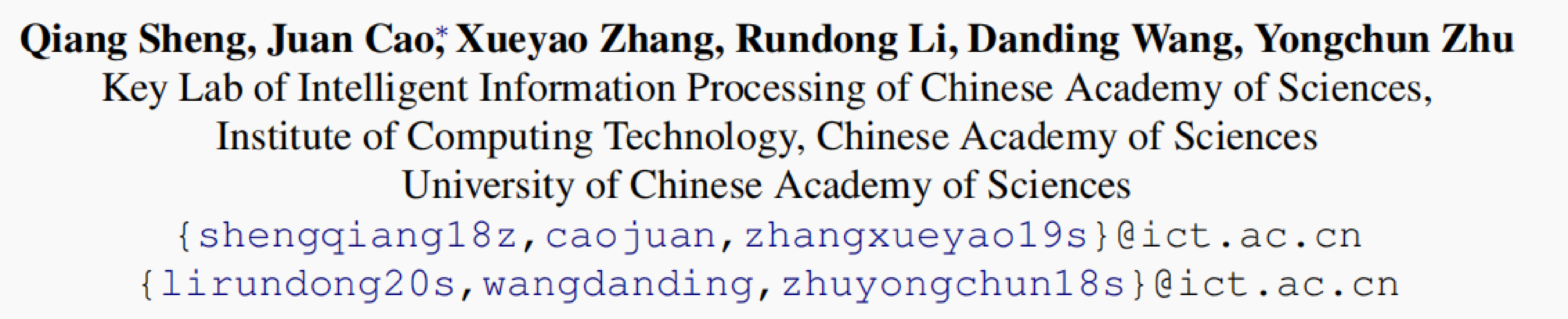
Zoom Out and Observe:
News Environment Perception for Fake News Detection



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code:https://github.com/ICTMCG/News-Environment-Perception

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Reported by Minqin Li

Method

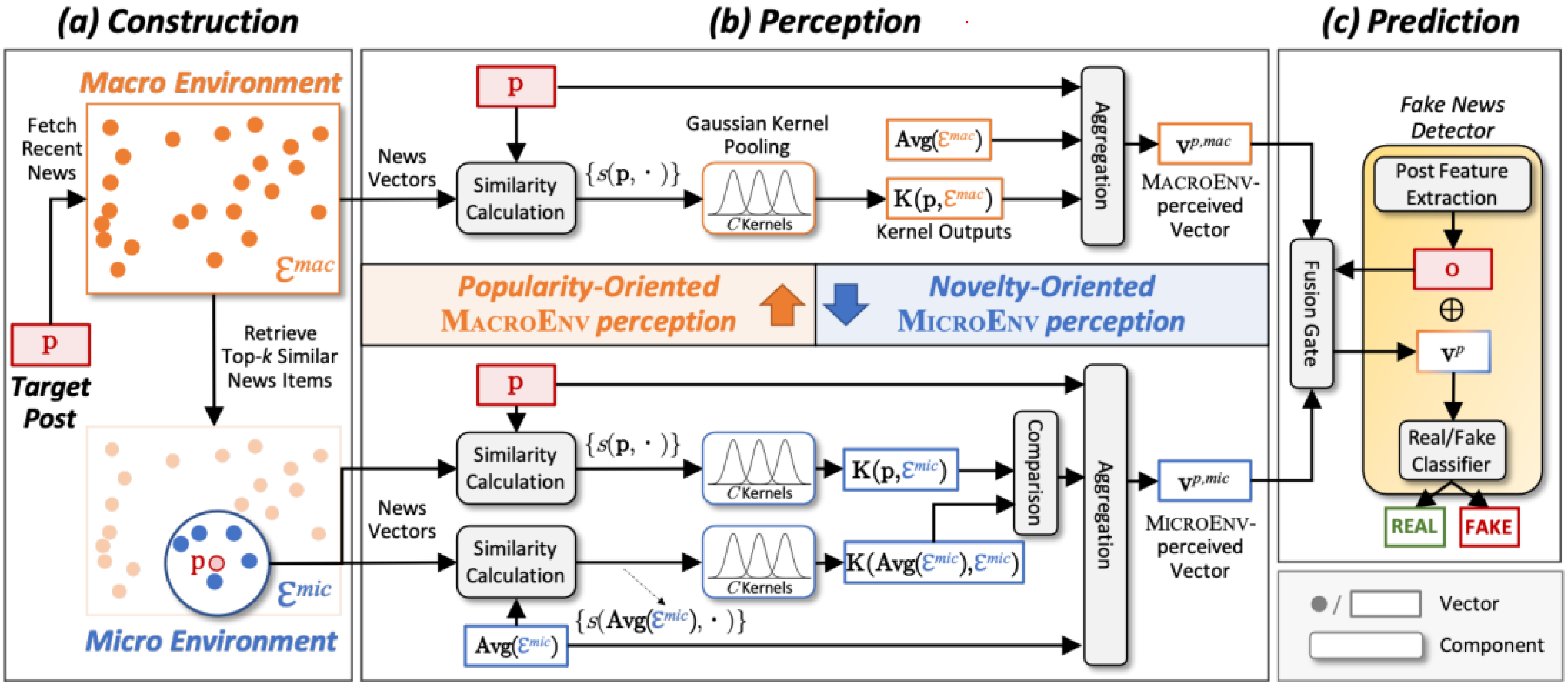


Figure 3: Architecture of the News Environment Perception Framework (NEP).

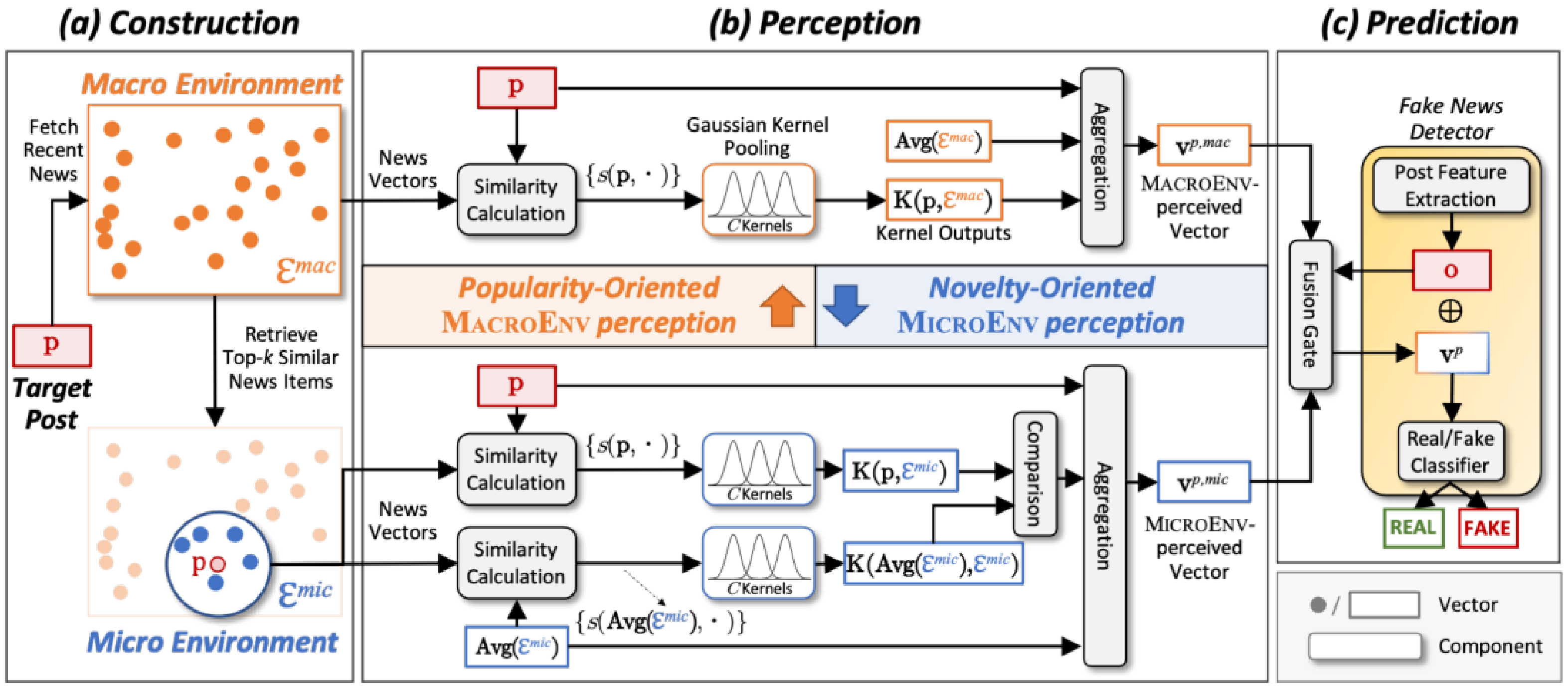
Method

'''Gaussian Kernel Pooling
input:The similarity list.
output:c-dimensional vector.(c is the number of Gaussian kernels)
'''

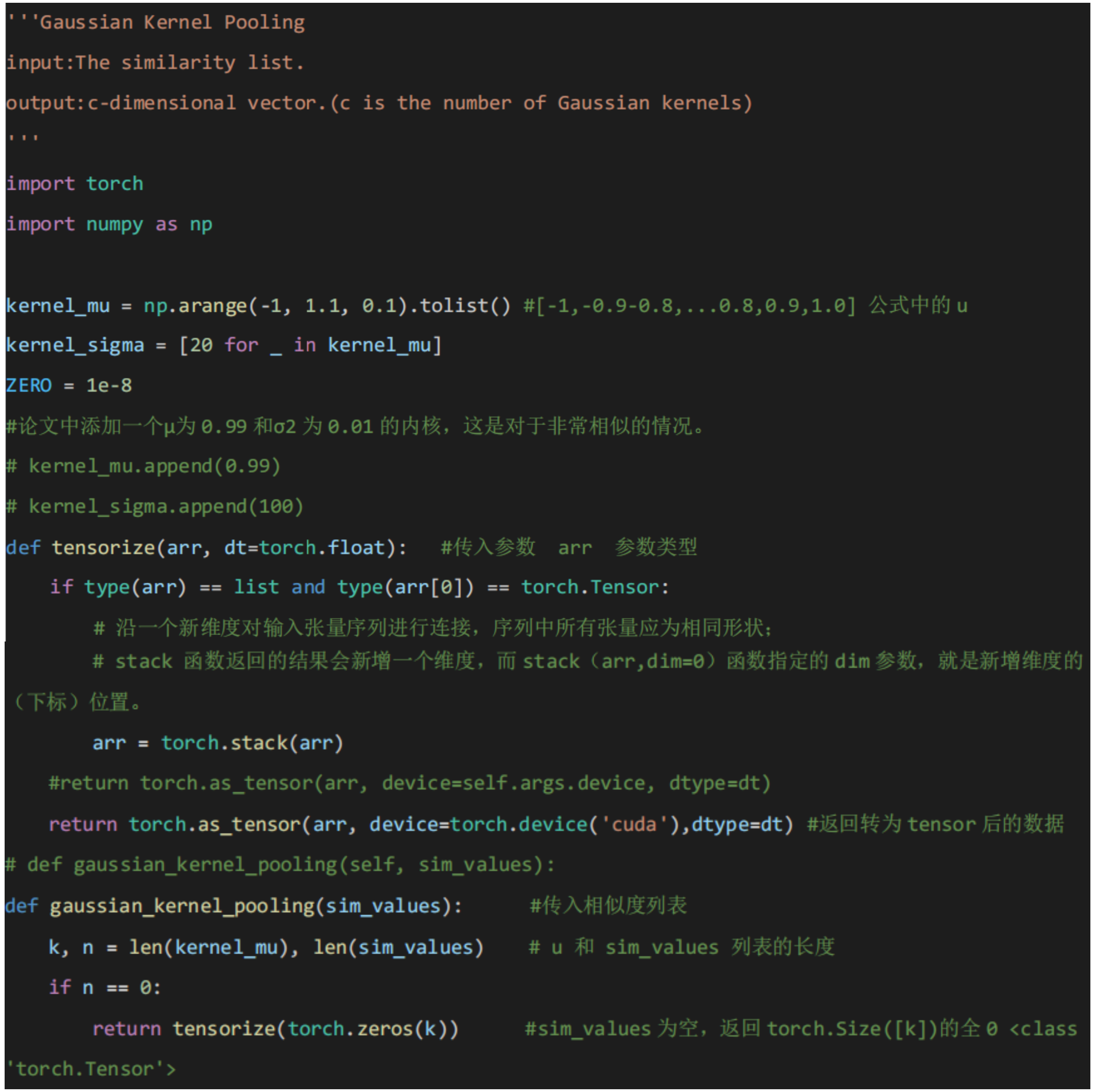
$$\mathbf{K}_k^i = \exp\left(-\frac{(s(\mathbf{p},\mathbf{e}_i)-\mu_k)^2}{2\sigma_k^2}\right)$$

$$\mathbf{K}_k(\mathbf{p},\mathcal{E}^{mac}) = \sum_{i=1}^{|\mathcal{E}^{mac}|}\mathbf{K}_k^i$$

$$\mathbf{K}(\mathbf{p},\mathcal{E}^{mac}) = \text{Norm}\left(\bigoplus_{k=1}^{C}\mathbf{K}_k(\mathbf{p},\mathcal{E}^{mac})\right)$$

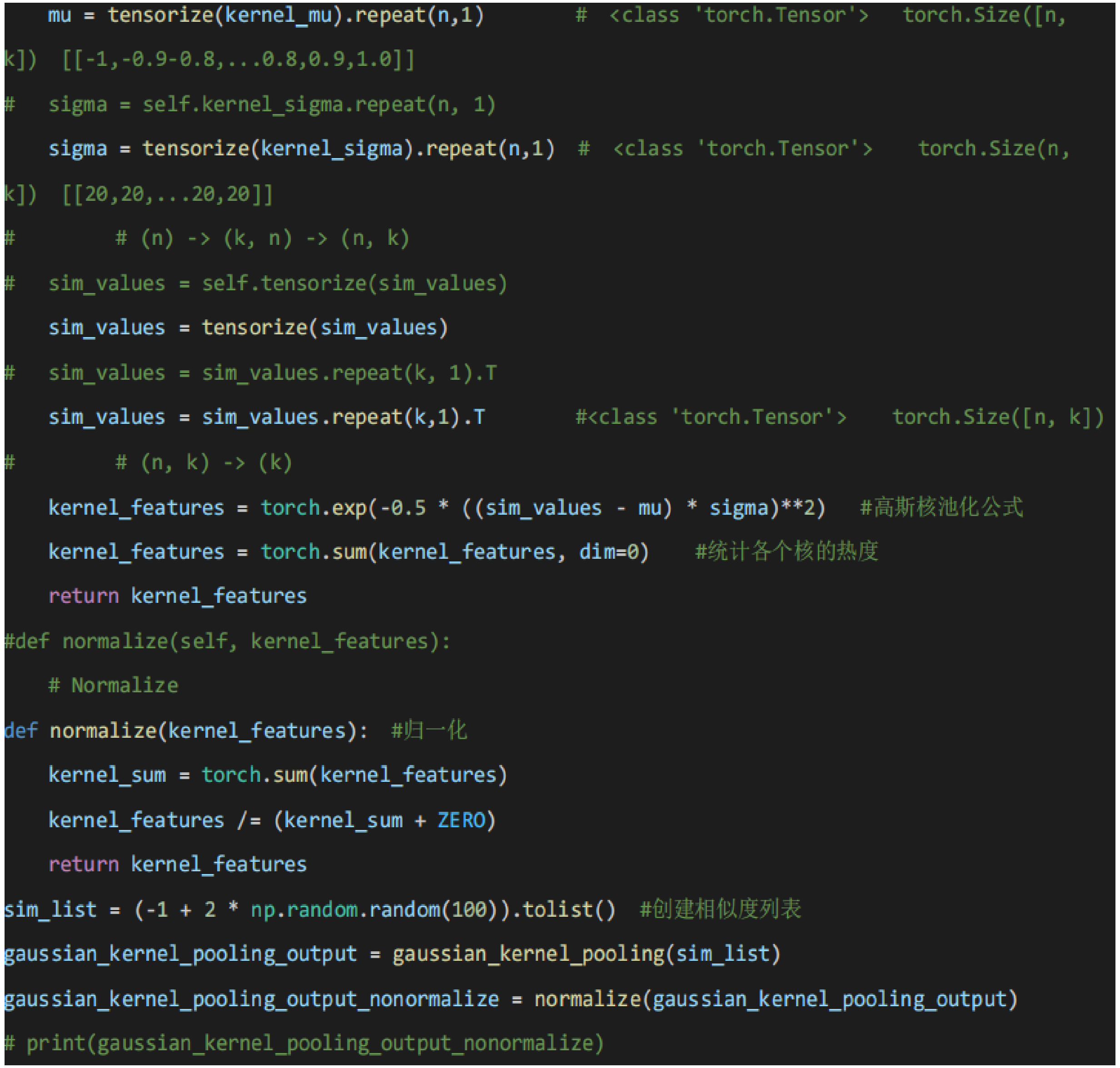


Method



```
'''Gaussian Kernel Pooling
input:The similarity list.
output:c-dimensional vector.(c is the number of Gaussian kernels)
'''
import torch
import numpy as np

kernel_mu = np.arange(-1, 1.1, 0.1).tolist() #[-1,-0.9-0.8,...0.8,0.9,1.0] 公式中的 u
kernel_sigma = [20 for _ in kernel_mu]
ZERO = 1e-8
#论文中添加一个μ为 0.99 和σ2 为 0.01 的内核，这是对于非常相似的情况。
# kernel_mu.append(0.99)
# kernel_sigma.append(100)
def tensorize(arr, dt=torch.float):   #传入参数  arr  参数类型
    if type(arr) == list and type(arr[0]) == torch.Tensor:
        # 沿一个新维度对输入张量序列进行连接，序列中所有张量应为相同形状；
        # stack 函数返回的结果会新增一个维度，而 stack（arr,dim=0）函数指定的 dim 参数，就是新增维度的
（下标）位置。
        arr = torch.stack(arr)
    #return torch.as_tensor(arr, device=self.args.device, dtype=dt)
    return torch.as_tensor(arr, device=torch.device('cuda'),dtype=dt) #返回转为 tensor 后的数据
# def gaussian_kernel_pooling(self, sim_values):
def gaussian_kernel_pooling(sim_values):      #传入相似度列表
    k, n = len(kernel_mu), len(sim_values)    # u 和 sim_values 列表的长度
    if n == 0:
        return tensorize(torch.zeros(k))      #sim_values 为空，返回 torch.Size([k])的全 0 <class
'torch.Tensor'>
```



```
    mu = tensorize(kernel_mu).repeat(n,1)        #  <class 'torch.Tensor'>   torch.Size([n,
k])  [[-1,-0.9-0.8,...0.8,0.9,1.0]]
#   sigma = self.kernel_sigma.repeat(n, 1)
    sigma = tensorize(kernel_sigma).repeat(n,1)  #  <class 'torch.Tensor'>    torch.Size(n,
k])  [[20,20,...20,20]]
#        # (n) -> (k, n) -> (n, k)
#   sim_values = self.tensorize(sim_values)
    sim_values = tensorize(sim_values)
#   sim_values = sim_values.repeat(k, 1).T
    sim_values = sim_values.repeat(k,1).T        #<class 'torch.Tensor'>    torch.Size([n, k])
#        # (n, k) -> (k)
    kernel_features = torch.exp(-0.5 * ((sim_values - mu) * sigma)**2)   #高斯核池化公式
    kernel_features = torch.sum(kernel_features, dim=0)    #统计各个核的热度
    return kernel_features
#def normalize(self, kernel_features):
    # Normalize
def normalize(kernel_features):  #归一化
    kernel_sum = torch.sum(kernel_features)
    kernel_features /= (kernel_sum + ZERO)
    return kernel_features
sim_list = (-1 + 2 * np.random.random(100)).tolist()  #创建相似度列表
gaussian_kernel_pooling_output = gaussian_kernel_pooling(sim_list)
gaussian_kernel_pooling_output_nonormalize = normalize(gaussian_kernel_pooling_output)
# print(gaussian_kernel_pooling_output_nonormalize)
```