

1. 项目说明

本项目旨在使用深度学习方法识别来自无人机捕获的人体行为。使用卷积神经网络（CNN）对关键点数据进行训练和推理，进而实现对动作的分类。

2. 环境配置

2.1 硬件环境

- **GPU**: 1 x RTX 3080 Ti (12GB)
- **CPU**: 12 vCPU Intel(R) Xeon(R) Silver 4214R CPU @ 2.40GHz
- **内存**: 90GB
- **硬盘**:
 - 系统盘: 30 GB
 - 数据盘: 50 GB

2.2 软件环境

- **操作系统**: Ubuntu 22.04
- **Python**: 3.10
- **CUDA**: 11.8
- **Miniconda**: conda3

3. 数据位置

3.1 数据集

数据集包含以下文件：

- `data/train_joint.npy` : 训练数据，形状为 (16432, 3, 300, 17, 2)
- `data/train_label.npy` : 训练标签，形状为 (16432,)
- `data/test_joint_A.npy` : 测试数据A，形状为 (2000, 3, 300, 17, 2)
- `data/test_label_A.npy` : 测试标签A，形状为 (2000,)
- `data/test_joint_B.npy` : 测试数据B，无标签，形状为 (4599, 3, 300, 17, 2)

3.2 数据预处理

数据预处理包括将 `train_joint.npy` 和 `test_joint_A.npy` 进行维度调整和归一化处理，具体方法已在代码中实现。

4. 训练参数设置

以下是训练过程中使用的参数设置：

- **批次大小 (Batch Size)** : 32
- **训练周期 (Epochs)** : 300
- **损失函数**: 交叉熵损失 (CrossEntropyLoss)
- **优化器**: Adam优化器

5. 日志

5.1.训练日志

UAV/train_B/train_log.txt at main · OrangeXiaobai/UAV (github.com)

```
Epoch: 1, Loss: 4.587566366919284, Accuracy: 0.02123904576436222
Epoch: 2, Loss: 3.6612612296635074, Accuracy: 0.10327409931840312
Epoch: 3, Loss: 3.211676061849186, Accuracy: 0.1814143135345667
Epoch: 4, Loss: 2.9058748158963272, Accuracy: 0.24890457643622202
Epoch: 5, Loss: 2.6294930637578555, Accuracy: 0.3158471275559883
Epoch: 6, Loss: 2.3946536714464774, Accuracy: 0.3670886075949367
Epoch: 7, Loss: 2.1941638929834624, Accuracy: 0.4188777994157741
Epoch: 8, Loss: 2.0513136767227826, Accuracy: 0.4519839337877313
Epoch: 9, Loss: 1.906222007849801, Accuracy: 0.4832035053554041
Epoch: 10, Loss: 1.7926797162929862, Accuracy: 0.5144230769230769
...
Epoch: 290, Loss: 0.01387949558722421, Accuracy: 0.99634858812074
Epoch: 291, Loss: 0.0371945446740366, Accuracy: 0.991784323271665
Epoch: 292, Loss: 0.06120738900213507, Accuracy: 0.9873417721518988
Epoch: 293, Loss: 0.08032457985875043, Accuracy: 0.9871592015579357
Epoch: 294, Loss: 0.06430465963711807, Accuracy: 0.9889849074975657
Epoch: 295, Loss: 0.05809323278731925, Accuracy: 0.9894717624148004
Epoch: 296, Loss: 0.04481212222659781, Accuracy: 0.9919668938656281
Epoch: 297, Loss: 0.04425212727248747, Accuracy: 0.9919060370009737
Epoch: 298, Loss: 0.016671056214095748, Accuracy: 0.9960443037974683
Epoch: 299, Loss: 0.011355990486148727, Accuracy: 0.9984785783836416
Epoch: 300, Loss: 0.05569844526892229, Accuracy: 0.9861854917234664
```

5.2.推理日志

UAV/train_B/inference_log.txt at main · OrangeXiaobai/UAV (github.com)

[illegible]

```

0.000000e+00 0.000000e+00 0.000000e+00 0.000000e+00 0.000000e+00
0.000000e+00 9.3999101e-42 0.000000e+00 0.000000e+00 0.000000e+00
0.000000e+00 0.000000e+00 0.000000e+00 0.000000e+00 0.000000e+00
0.000000e+00 0.000000e+00 0.000000e+00 0.000000e+00 0.000000e+00
0.000000e+00 0.000000e+00 0.000000e+00 0.000000e+00 0.000000e+00
0.000000e+00 0.000000e+00 0.000000e+00 0.000000e+00 0.000000e+00
0.000000e+00 0.000000e+00 0.000000e+00 0.000000e+00 0.000000e+00
0.000000e+00 0.000000e+00 0.000000e+00 0.000000e+00 0.000000e+00]
...
Sample 4598, Predictions: [0.0000000e+00 0.0000000e+00 0.0000000e+00 0.0000000e+00
0.0000000e+00 4.86118354e-27 0.0000000e+00 0.0000000e+00
1.45132482e-41 5.19379028e-33 1.50434995e-40 0.0000000e+00
0.0000000e+00 6.88037546e-43 8.73008943e-43 0.0000000e+00
0.0000000e+00 1.40129846e-45 0.0000000e+00 0.0000000e+00
5.14905551e-38 0.0000000e+00 0.0000000e+00 0.0000000e+00
1.01048039e-38 1.27073288e-23 5.37101993e-33 7.82742015e-30
5.17638545e-25 0.0000000e+00 0.0000000e+00 0.0000000e+00
0.0000000e+00 2.04245670e-31 0.0000000e+00 0.0000000e+00
8.68443757e-25 0.0000000e+00 1.40129846e-45 0.0000000e+00
0.0000000e+00 0.0000000e+00 0.0000000e+00 1.04523811e-35
0.0000000e+00 4.76441478e-44 3.38825140e-39 0.0000000e+00
0.0000000e+00 0.0000000e+00 0.0000000e+00 0.0000000e+00
0.0000000e+00 0.0000000e+00 0.0000000e+00 0.0000000e+00
0.0000000e+00 3.96287206e-42 0.0000000e+00 0.0000000e+00
0.0000000e+00 0.0000000e+00 3.33966703e-32 1.37981488e-38
0.0000000e+00 6.47992640e-40 0.0000000e+00 1.89996713e-34
0.0000000e+00 0.0000000e+00 0.0000000e+00 0.0000000e+00
9.91793677e-33 0.0000000e+00 3.16821959e-12 1.79172474e-25
4.10065341e-12 5.94150510e-25 3.55509571e-18 2.82325677e-13
3.08033102e-03 2.93659445e-14 6.88109916e-11 9.80218756e-04
2.77403710e-20 8.81497433e-25 4.12656045e-20 1.09458276e-10
5.60022833e-19 1.65195320e-06 2.88463175e-01 3.71494454e-14
3.94241389e-21 6.71558892e-29 4.63921999e-23 7.78423381e-10
1.39251971e-14 1.03418027e-13 1.43523404e-09 1.00271397e-35
3.13890856e-43 0.0000000e+00 0.0000000e+00 2.87776538e-39
0.0000000e+00 0.0000000e+00 0.0000000e+00 0.0000000e+00
0.0000000e+00 0.0000000e+00 0.0000000e+00 3.18669429e-33
0.0000000e+00 0.0000000e+00 0.0000000e+00 0.0000000e+00
0.0000000e+00 0.0000000e+00 1.83731294e-29 0.0000000e+00
0.0000000e+00 0.0000000e+00 0.0000000e+00 3.41800806e-30
1.33683873e-42 1.38252106e-41 1.20089106e-38 1.37178712e-40
1.43467095e-38 1.13893121e-13 4.61540378e-17 7.02778037e-24
2.66157641e-19 1.93914709e-13 2.40437113e-32 3.34377512e-30
7.40863465e-26 0.0000000e+00 2.53773224e-23 0.0000000e+00
0.0000000e+00 1.15603158e-38 8.80464913e-27 0.0000000e+00
0.0000000e+00 0.0000000e+00 3.97390234e-25 0.0000000e+00
7.07474649e-01 0.0000000e+00 0.0000000e+00 0.0000000e+00
5.31092118e-43 0.0000000e+00 0.0000000e+00]

```

6.Github

OrangeXiaobai/UAV ([github.com](https://github.com/OrangeXiaobai/UAV))

