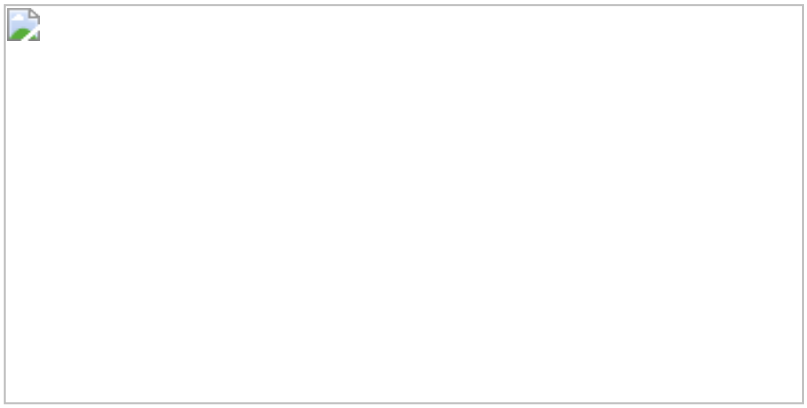
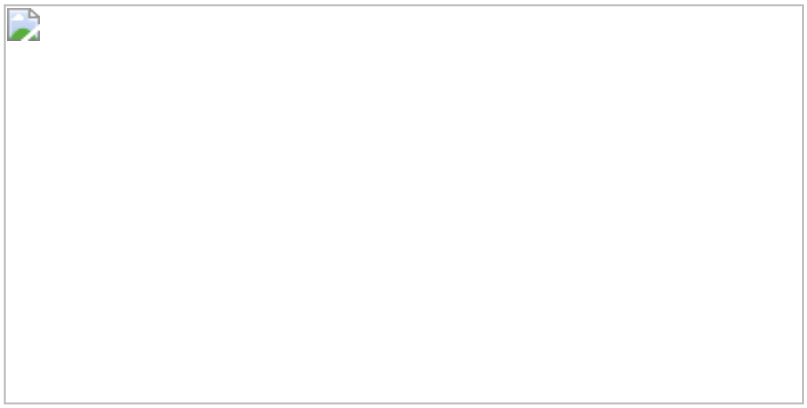
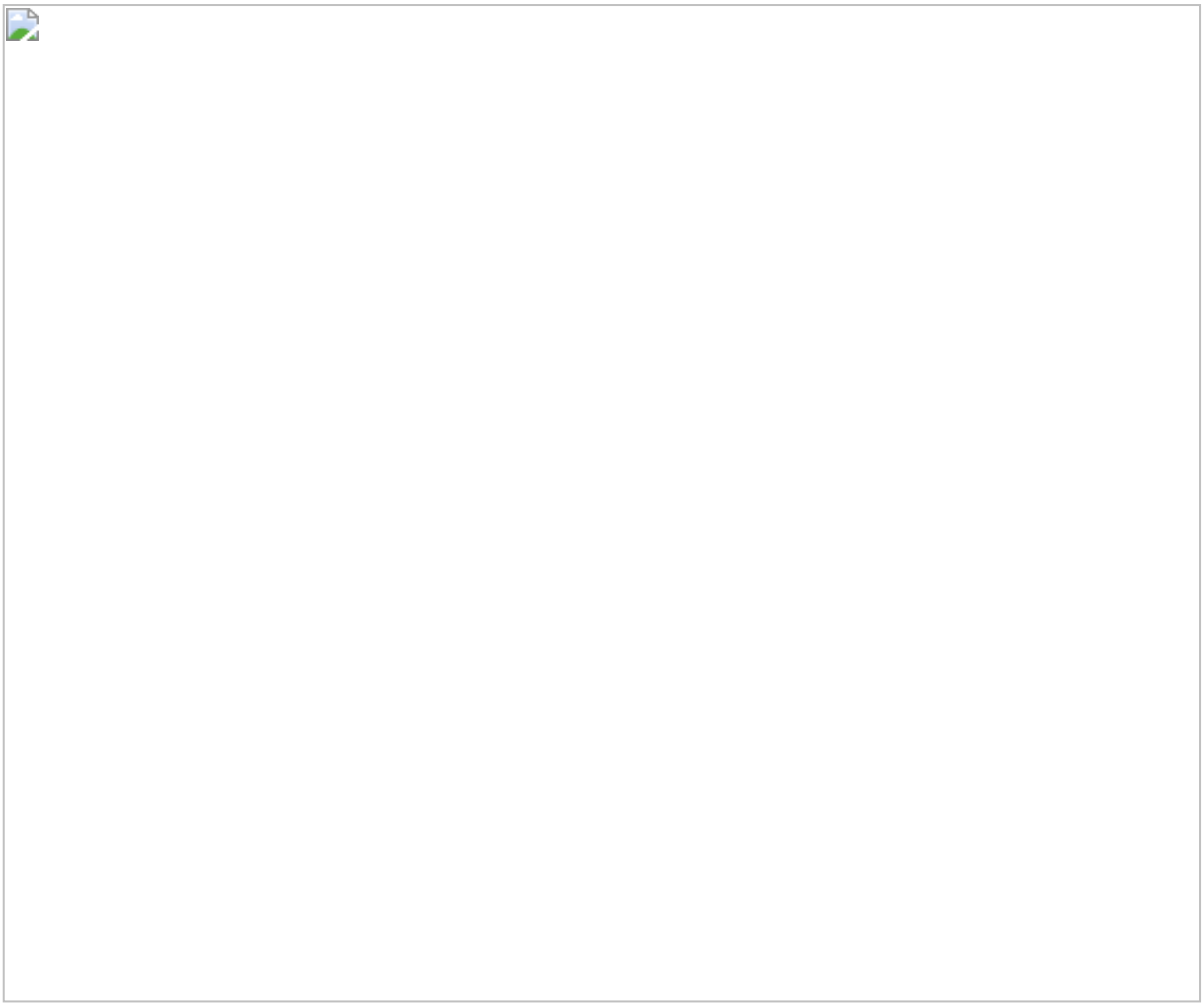
Energy-based MIXer (EMIX)





The repository consists of the code base for EMIX. EMIX is a multi-agent value factorization algorithm built on top of QMIX. The framework minimizes surprise by utilizing the energy across agents in the case of multi-agent partially-observable settings. By making use of a novel surprise value function in conjunction with an energy operator, EMIX minimizes the joint surprise across all agents in the multi-agent population.



Installation

The implementation makes use of PyMARL (writtent in PyTorch) and is built on top of the QMIX implementation.

1. Docker Support

[Skip this step if using a local machine]

Build the Dockerfile using

```
cd docker
bash build.sh
```

2. StarCraft II and SMAC

The following command will download SC2 in the `3rdparty` folder and copy the custom SMAC maps required for experiments-

```
bash install_sc2.sh
```

3. Library Dependencies

Library dependencies are listed in the `requirements.txt` file and can be installed using the following command-

```
pip install -r requirements.txt
```

Executing Experiments

1. Local Machine

Once the installation is complete, EMIX experiments can be executed using the following command:

```
python3 prog/main.py --config=emix --env-config=sc2 with
env_args.map_name=2s3z
```

The config files consist of default hyperparameter values. To change these for EMIX refer to `emix.yaml` config file located in `prog/config` folder.

2. Docker Container

To run experiments using the Docker container use the following-

```
bash run.sh $GPU python3 prog/main.py --config=emix --env-config=sc2 with
env_args.map_name=2s3z
```

All results will be stored in the Results folder. For additional details on loading and saving models please refer to the PyMARL page.

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