Sample MNIST Report

FastEstimator 1.1.0

September 28, 2020

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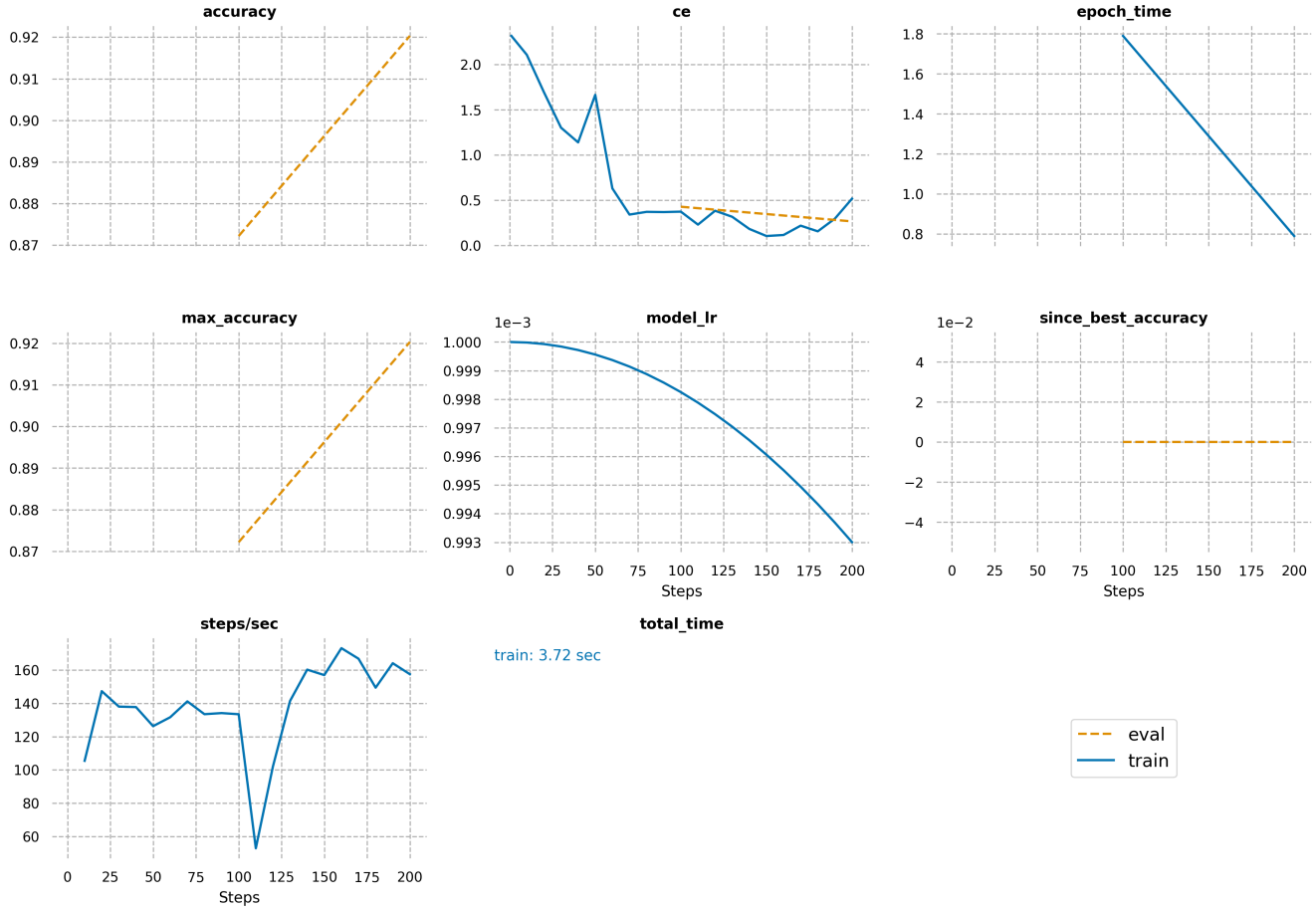
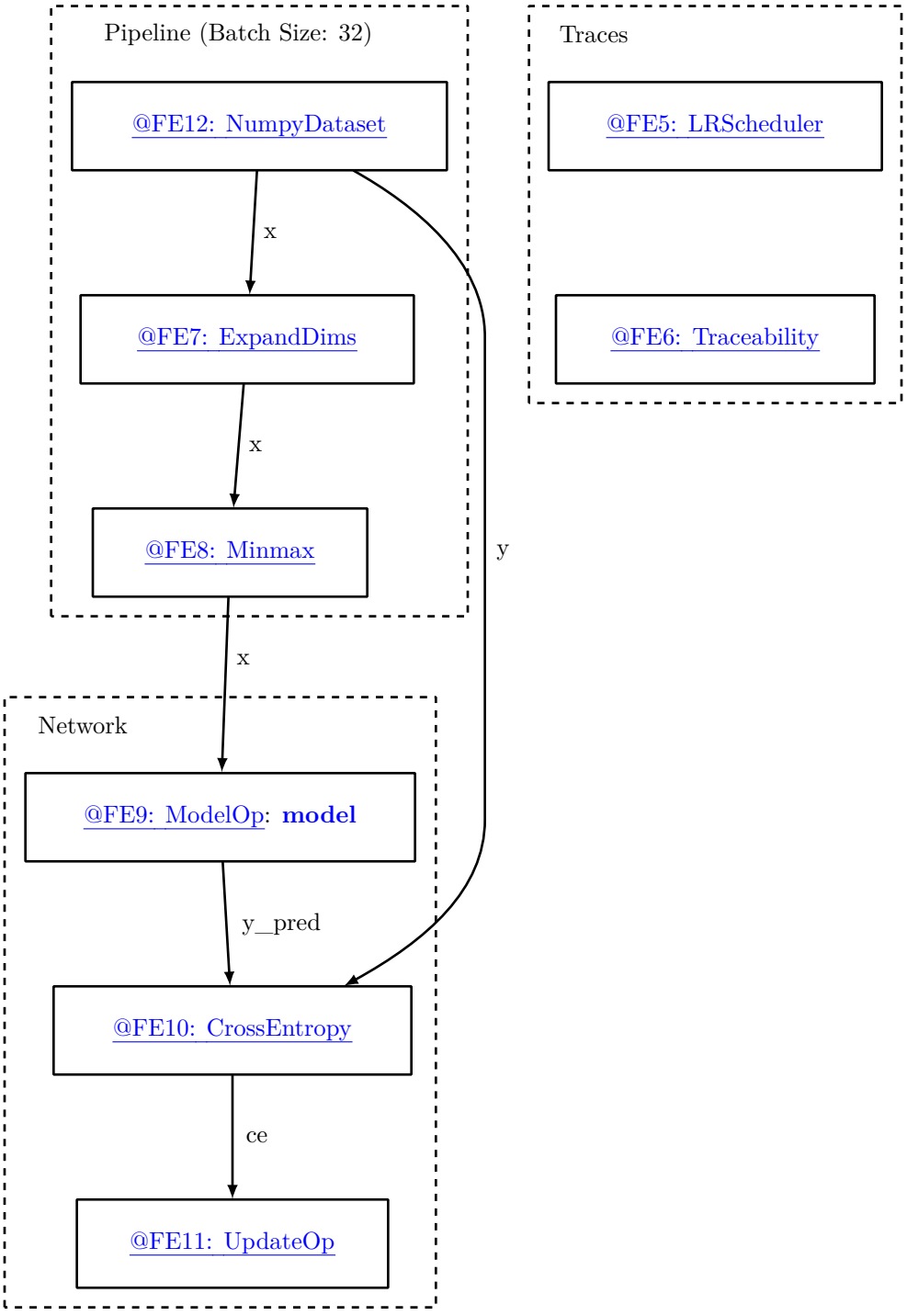
1 Training Graphs



2 FastEstimator Architecture

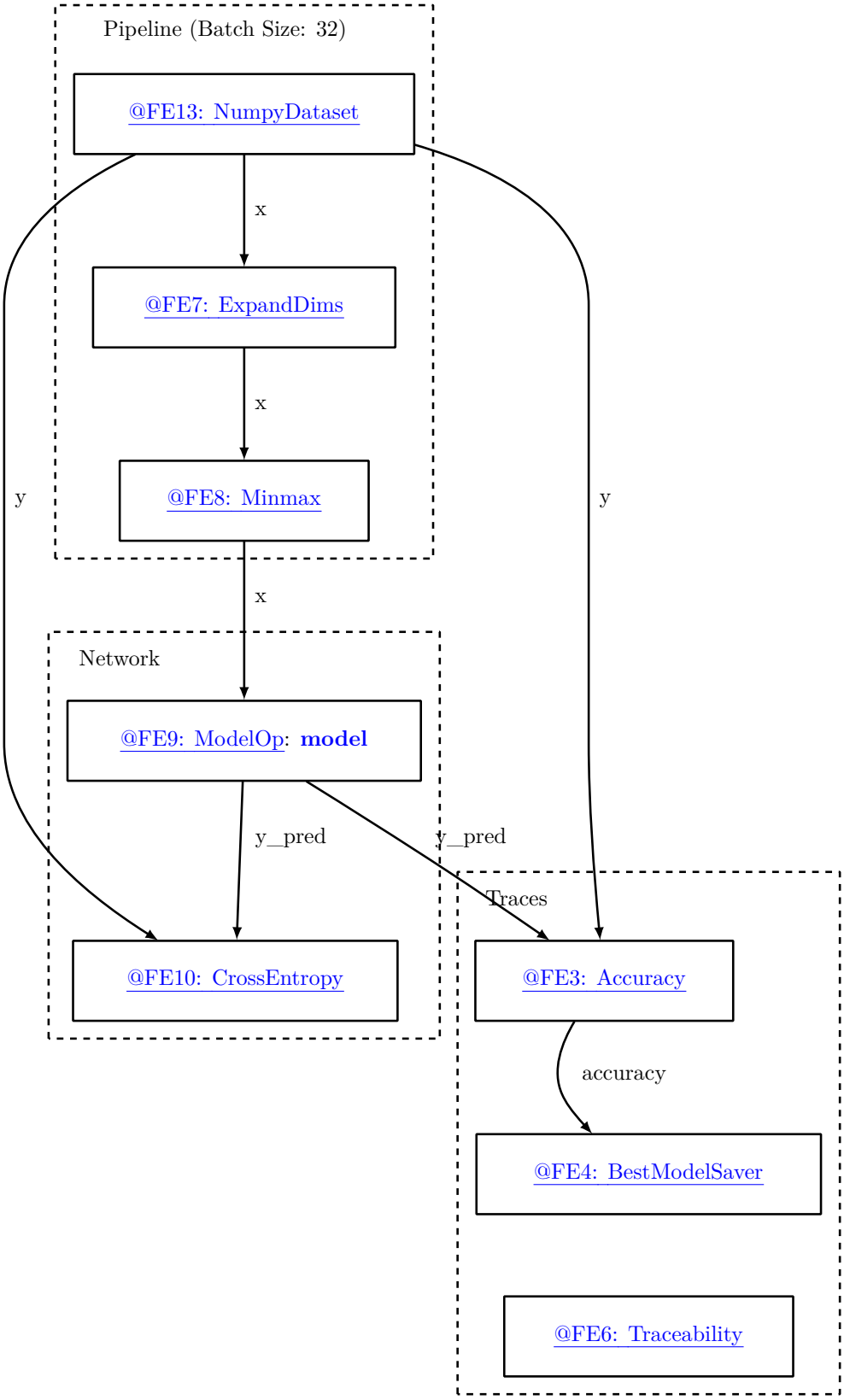
2.1 Train

2.1.1 Epoch 1



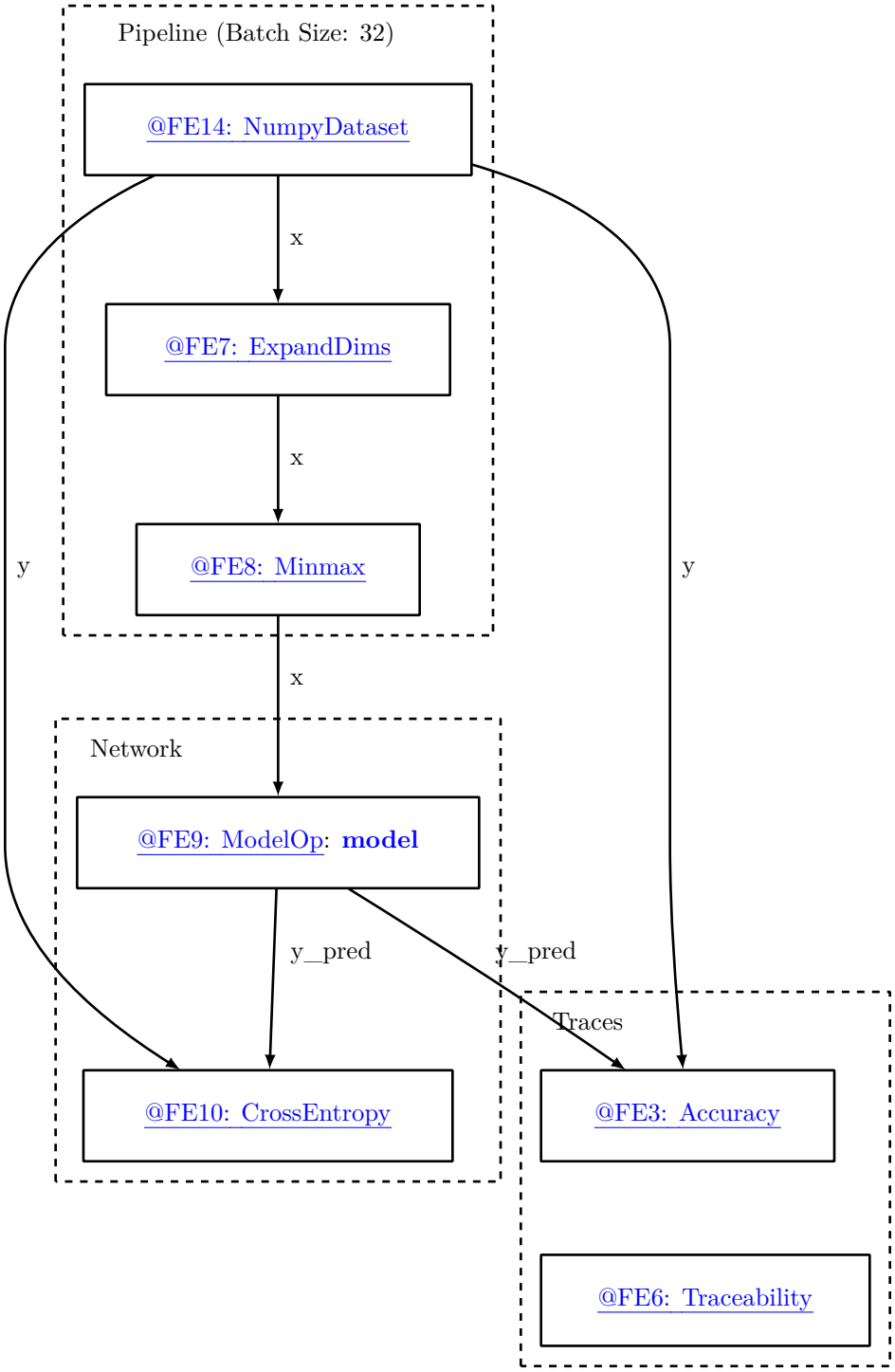
2.2 Eval

2.2.1 Epoch 1



2.3 Test

2.3.1 Epoch 1



3 Parameters

3.1 Base Classes

Estimator	@FE0
Type:	fastestimator.estimator.Estimator
pipeline	@FE2: Pipeline
network	@FE1: TFNetwork
epochs	2
max_train_steps_per_epoch	100
max_eval_steps_per_epoch	100
traces	[@FE3: Accuracy, @FE4: BestModelSaver, @FE5: LRScheduler, @FE6: Traceability]
log_steps	10
monitor_names	None

TFNetwork	@FE1
Type:	fastestimator.network.TFNetwork
ops	[@FE9: ModelOp, @FE10: CrossEntropy, @FE11: UpdateOp]

Pipeline	@FE2
Type:	fastestimator.pipeline.Pipeline
train_data	@FE12: NumpyDataset
eval_data	@FE13: NumpyDataset
test_data	@FE14: NumpyDataset
batch_size	32
ops	[@FE7: ExpandDims, @FE8: Minmax]
num_process	None
drop_last	False
pad_value	None
collate_fn	None

3.2 Traces

Accuracy	@FE3
Type:	fastestimator.trace.metric.accuracy.Accuracy
true_key	'y'
pred_key	'y_pred'
mode	('eval', 'test')
output_name	'accuracy'

BestModelSaver	@FE4
Type:	fastestimator.trace.io.best_model_saver.BestModelSaver
model	@FE15: model
save_dir	'/var/folders/lx/drkxftt117gblvgsp1p39rlc0000gn/T/tmp0d25jsq3'
metric	'accuracy'
save_best_mode	'max'
load_best_final	False

LRScheduler	@FE5
Type:	fastestimator.trace.adapt.lr_scheduler.LRScheduler
model	@FE15: model
lr_fn	lambda step: cosine_decay(time=step, cycle_length=3750, init_lr=0.001, min_lr=1e-06, start=1, cycle_multiplier=1)

Traceability	@FE6
Type:	fastestimator.trace.io.traceability.Traceability
save_path	'/var/folders/lx/drkxftt117gblvgsp1p39rlc0000gn/T/tmp0d25jsq3/report'
extra_objects	None

3.3 Ops

ExpandDims	@FE7
Type:	fastestimator.op.numpyop.univariate.expand_dims.ExpandDims
inputs	'x'
outputs	'x'
mode	None
axis	-1

Minmax	@FE8
Type:	fastestimator.op.numpyop.univariate.minmax.Minmax
inputs	'x'
outputs	'x'
mode	None
epsilon	1e-07

ModelOp	@FE9
Type:	fastestimator.op.tensorop.model.model.ModelOp
model	@FE15: model
inputs	'x'
outputs	'y_pred'
mode	None
trainable	True

CrossEntropy		@FE10
Type:	fastestimator.op.tensorop.loss.cross_entropy.CrossEntropy	
inputs	('y_pred', 'y')	
outputs	'ce'	
mode	'!infer'	
from_logits	False	
average_loss	True	
form	None	

UpdateOp		@FE11
Type:	fastestimator.op.tensorop.model.update.UpdateOp	
model	@FE15: model	
loss_name	'ce'	
mode	'train'	
defer	False	

3.4 Datasets

NumpyDataset (Train)		@FE12
Type:	fastestimator.dataset.numpy_dataset.NumpyDataset	
Num Instances:	60000	
Keys:	x	{"shape": [28, 28], "dtype": "uint8"}
	y	{"num_unique_values": 10, "shape": [], "dtype": "uint8"}
data	{ 'x': @FE17: tensor, 'y': @FE18: tensor}	

NumpyDataset (Eval)		@FE13
Type:	fastestimator.dataset.numpy_dataset.NumpyDataset	
Split:	self(-100)	
Num Instances:	9900	
Keys:	x	{"shape": [28, 28], "dtype": "uint8"}
	y	{"num_unique_values": 10, "shape": [], "dtype": "uint8"}
data	{ 'x': @FE19: tensor, 'y': @FE20: tensor}	

NumpyDataset (Test)		@FE14
Type:	fastestimator.dataset.numpy_dataset.NumpyDataset	
Split:	@FE13(100)	
Num Instances:	100	
Keys:	x	{"shape": [28, 28], "dtype": "uint8"}
	y	{"num_unique_values": 10, "shape": [], "dtype": "uint8"}
	id	{"num_unique_values": 100, "shape": [], "dtype": "int"}
data	{ 'x': @FE19: tensor, 'y': @FE20: tensor}	

3.5 Models

model	@FE15
Type:	tensorflow.python.keras.engine.sequential.Sequential
Definition:	@FE16: LeNet
Optimizer:	'adam'

3.6 Functions

LeNet	@FE16
Type:	function
	fastestimator.architecture.tensorflow.lenet.LeNet

3.7 Tensors

tensor	@FE17
Type:	numpy.ndarray
Shape:	(60000, 28, 28)

tensor	@FE18
Type:	numpy.ndarray
Shape:	(60000,)

tensor	@FE19
Type:	numpy.ndarray
Shape:	(10000, 28, 28)

tensor	@FE20
Type:	numpy.ndarray
Shape:	(10000,)

4 Models

4.1 model

```
Model: "sequential"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d (Conv2D)              (None, 26, 26, 32)        320
_________________________________________________________________
max_pooling2d (MaxPooling2D) (None, 13, 13, 32)        0
_________________________________________________________________
conv2d_1 (Conv2D)            (None, 11, 11, 64)        18496
_________________________________________________________________
max_pooling2d_1 (MaxPooling2D) (None, 5, 5, 64)        0
```

```
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 3, 3, 64)          36928
_________________________________________________________________
flatten (Flatten)            (None, 576)               0
_________________________________________________________________
dense (Dense)                (None, 64)                36928
_________________________________________________________________
dense_1 (Dense)              (None, 10)                650
=================================================================
Total params: 93,322
Trainable params: 93,322
Non-trainable params: 0
_________________________________________________________________
```

@FE15: model

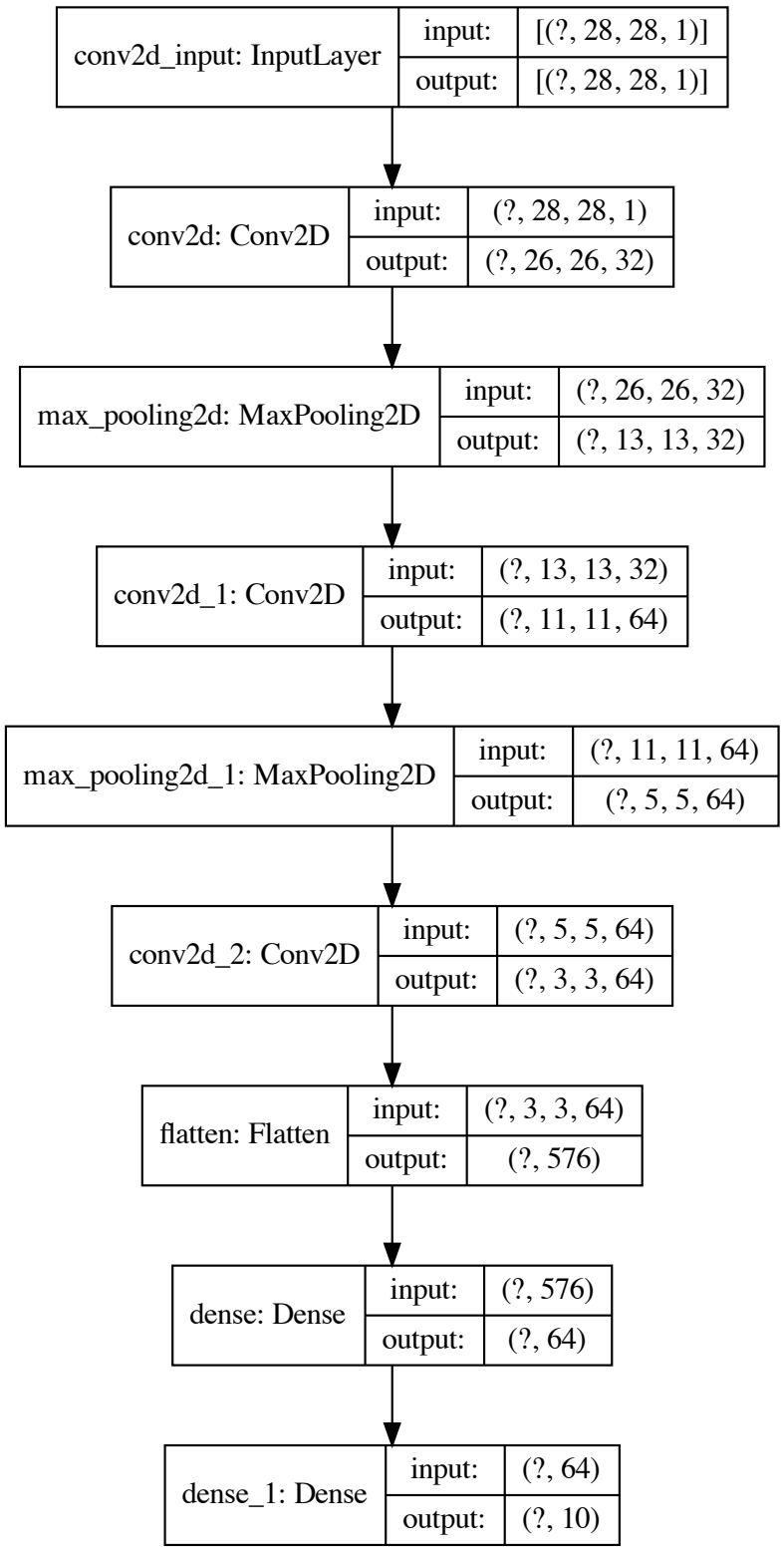


Figure 1: @FE15: model

5 System Config

- FastEstimator 1.1.0
- Python 3.6.10
- OS: darwin
- Number of GPUs: 0

Module	Version
albumentations	0.4.5
appnope	0.1.0
argparse	1.1
astor	0.8.1
backcall	0.2.0
boto3	1.14.0
botocore	1.17.0
certifi	2020.04.05.2
cgi	2.6
chardet	3.0.4
click	7.1.2
cloudpickle	1.1.1
csv	1.0
ctypes	1.1.0
cv2	4.2.0
cycler	0.10.0
dateutil	2.8.1
decimal	1.70
decorator	4.4.2
distutils	3.6.10
dot2tex	2.11.3
fastestimator	1.1.0
filelock	3.0.12
gdown	3.12.0
h5py	2.10.0
idna	2.9
imgaug	0.2.6
importlib_metadata	1.6.1
ipaddress	1.0
ipykernel	5.3.2
ipython_genutils	0.2.0
IPython	7.16.1
jedi	0.17.1
jmespath	0.10.0
joblib	0.15.1
json	2.0.9
jsonpickle	1.4.1

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Module	Version
jupyter_client	6.1.6
jupyter_core	4.6.3
keras_applications	1.0.8
keras_preprocessing	1.1.2
kiwisolver	1.2.0
logging	0.5.1.2
matplotlib	3.2.1
natsort	7.0.1
notebook	6.0.3
numpy	1.18.5
opt_einsum	v3.2.1
optparse	1.5.3
ordered_set	4.0.1
pandas	1.0.4
parso	0.7.0
pexpect	4.8.0
pickleshare	0.7.5
platform	1.0.8
prompt_toolkit	3.0.5
ptyprocess	0.6.0
pydot	1.4.1
pyfiglet	0.8.post1
pygments	2.6.1
pylatex	1.3.2
pyparsing	2.4.7
pytz	2020.1
pywt	1.1.1
PIL	7.1.2
re	2.2.1
requests	2.23.0
scipy	1.4.1
seaborn	0.10.1
six	1.15.0
skimage	0.17.2
sklearn	0.23.1
socketserver	0.4
socks	1.7.1
tensorboard	2.1.1
tensorflow	2.1.0
tensorflow_core	2.1.0
tensorflow_probability	0.8.0
termcolor	(1, 1, 0)
torch	1.4.0
tqdm	4.46.1
traitlets	4.3.3

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Module	Version
urllib3	1.25.9
wcwidth	0.2.5
werkzeug	1.0.1
wget	3.2
wrapt	1.12.1
yaml	5.3.1
zlib	1.0
zmq	19.0.1