In [1]:
```
import logging
from utils import logging as lg
lg.set_logging(logging.ERROR)



from skimage.measure import block_reduce
import numpy as np

import logging
import pickle
import pandas as pd


import matplotlib.pyplot as plt
import seaborn as sns
sns.set(color_codes=True, font_scale=2, style="whitegrid", palette="mute
d")
from notebook_utils import plot


from model import base, provider, heatmap_evaluation
import config

import tensorflow as tf
tf.logging.set_verbosity(tf.logging.ERROR)

%matplotlib inline
```

In [2]:
```
from utils import data_provider
```

In [3]:
```
dataset_loader = data_provider.DatasetLoader(data_dir='../data')
```

In [4]:
```
def plot_heatmaps(_model, dataset, seq):
    if _model == 'shallow':
        model = 's2'
    elif _model == 'deep':
        model = 's3'
    elif _model == 'deepv2':
        model = 'deep_4l'
    elif _model == 'convdeep':
        model = 'convdeep_4l'

    model_path = '.%s' % provider._model_path(model, dataset, seq)
    print(model_path)
    plot.plot_relevance_methods(model_path, dataset_loader, only_positiv
e_rel=True, methods=['sensitivity', 'guided_backprop', 'lrp_alpha2_beta
1', 'lrp_deep_taylor'])
```

Setting 1

In [5]:
```
def plot_relevance_dist_in_middle_region(datasets=['mnist-3-digits'], se
q=12, methods=['sensitivity', 'simple_taylor', 'guided_backprop', 'lrp_a
lpha2_beta1', 'lrp_deep_taylor']):
    results = []
    print(results)
    for dataset in datasets:
        for model in ['s2', 's3', 'deep_4l', 'convdeep_4l']:
#             print(model)
            file = "../stats/rel-dist-%s-seq-%d-%s.pkl" % (dataset, seq,
 model)
            try:
#                 print('getting data from %s' % file)
                results = results + pickle.load(open(file, "rb"))
            except:
                print('%s not found' % file)
#     print(results)
    df = None
    df = pd.DataFrame(results)
    df = df[df.method.isin(methods)]

    def get_marker_linestyle(method):
        if method == 'guided_backprop':
            mk = 's'
            ls = '-'
        elif 'lrp' in method:
            mk = '^'
            ls = '-'
        else:
            mk = '.'
            ls =':'
        return mk, ls
    marker_linestyles = [get_marker_linestyle(m) for m in methods]
    markers = [ m[0] for m in marker_linestyles ]
    linestyles = [ m[1] for m in marker_linestyles ]
    df['architecture_idx'] = df['architecture'].apply(plot.architecture_
idx)

    col_name = 'Percentage of relevance \n in data region'
    df[col_name] = df['rel_dist_in_data_region']

    for c in [col_name]:

        g = sns.factorplot(x="architecture_idx", y=c, col='dataset', hue
="method",
                           data=df, size=5, markers=markers,
                           linestyles=linestyles)

        g.set_xticklabels(['Shallow', 'Deep', 'DeepV2', 'ConvDeep'], rot
ation=15)
        g.set(xlabel='')
    return df

# plt.savefig('rel-dist-3digits.pdf')
```

Experiment concatenated mnists with correct class having 2 digits

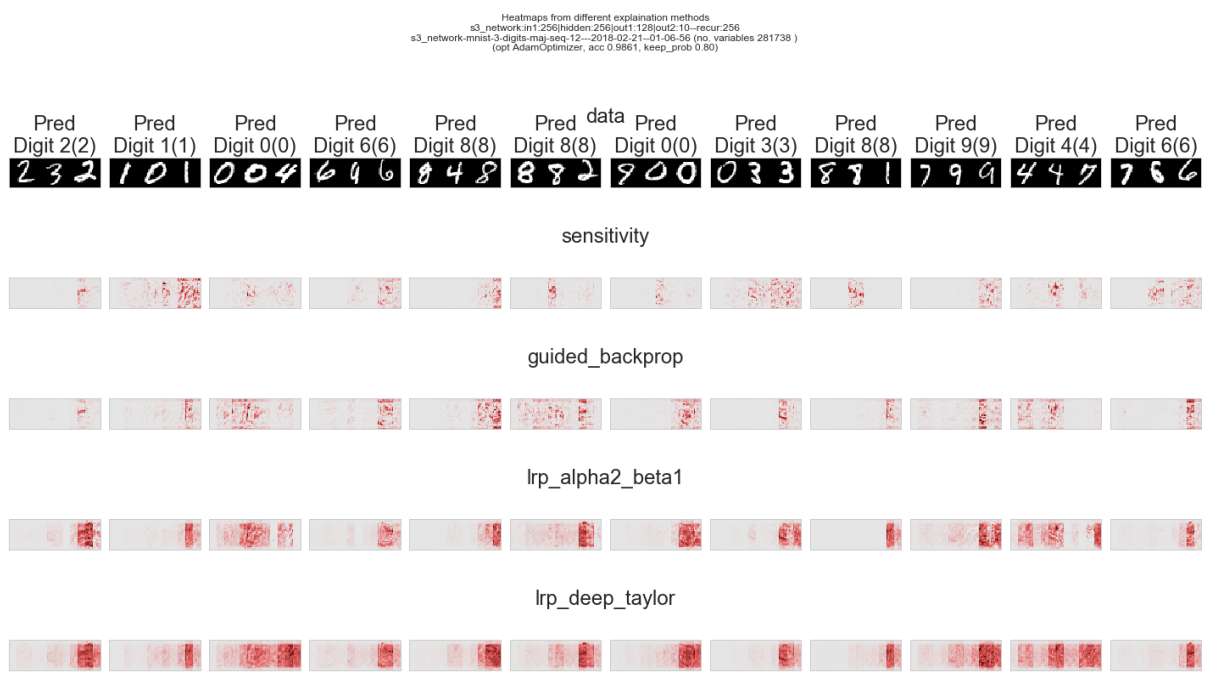
Heatmaps of MNIST

```
In [6]: plot_heatmaps('shallow', 'mnist-3-digits-maj', 12)
```

```
../final-models/s2_network-mnist-3-digits-maj-seq-12
```

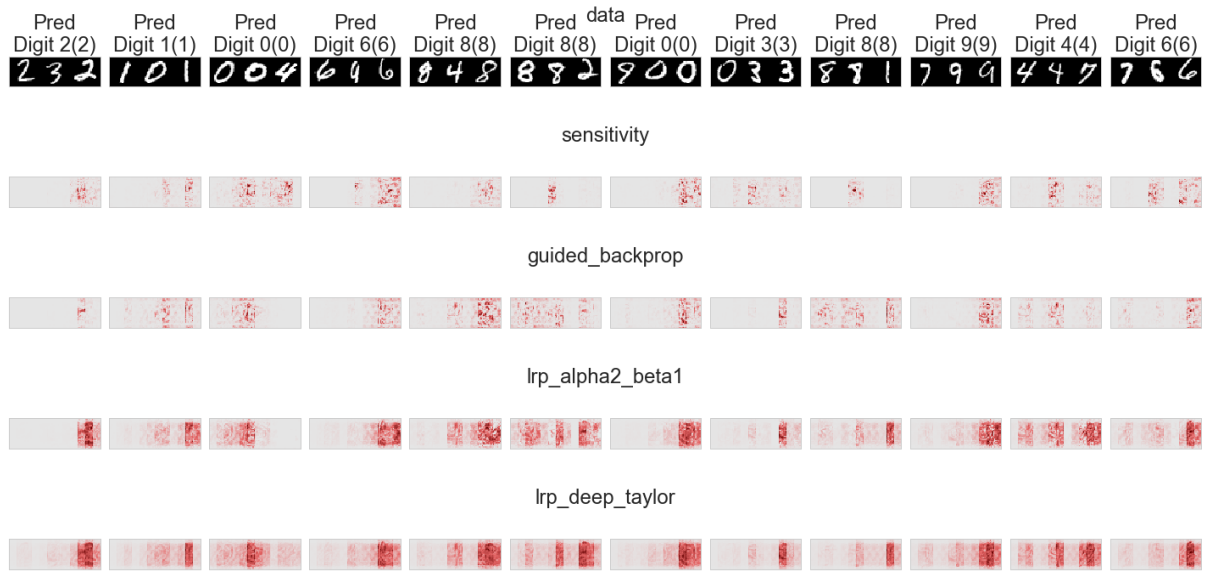
In [7]:
```
plot_heatmaps('deep', 'mnist-3-digits-maj', 12)
```

```
../final-models/s3_network-mnist-3-digits-maj-seq-12
```



In [8]:
```
plot_heatmaps('deepv2', 'mnist-3-digits-maj', 12)
```

```
../final-models/deep_4l_network-mnist-3-digits-maj-seq-12
```



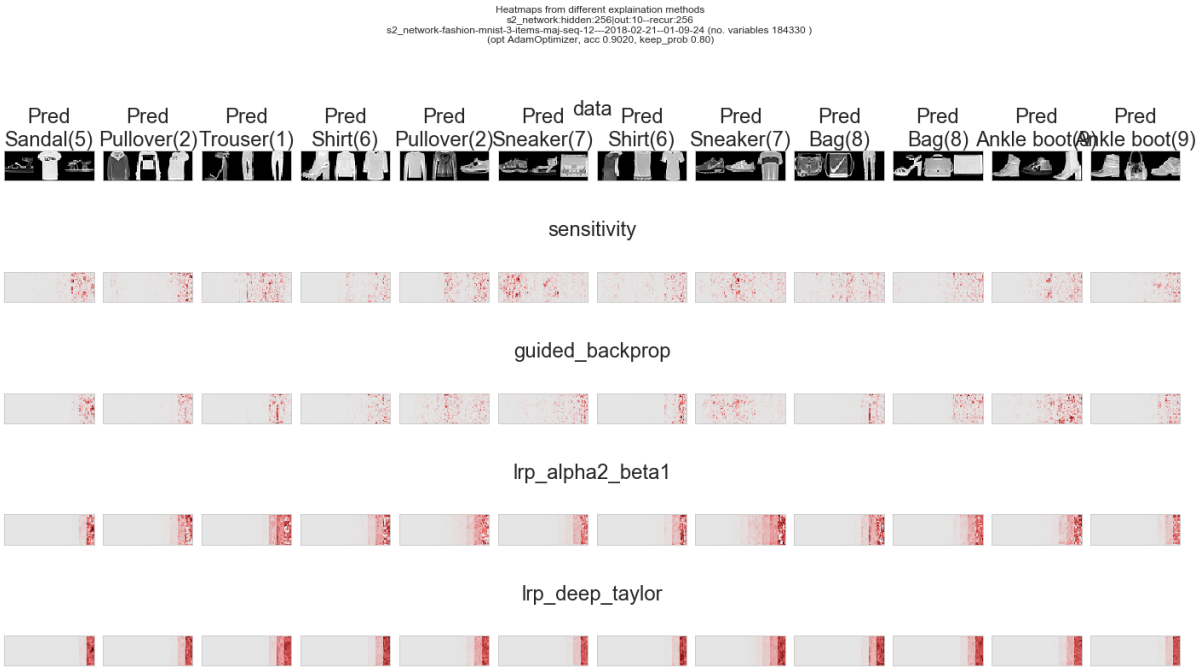
In [9]:
```
plot_heatmaps('convdeep', 'mnist-3-digits-maj', 12)
```

```
../final-models/convdeep_4l_network-mnist-3-digits-maj-seq-12
```

Heatmaps of FashionMNIST

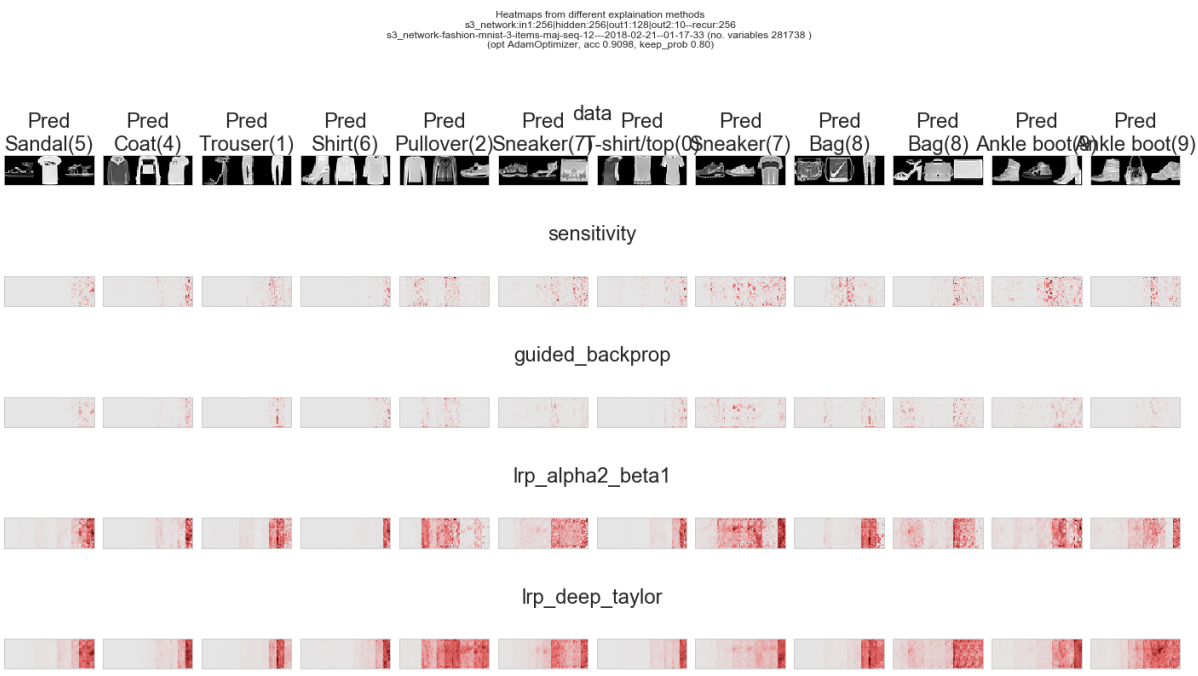
In [10]:
```
plot_heatmaps('shallow', 'fashion-mnist-3-items-maj', 12)
```

```
../final-models/s2_network-fashion-mnist-3-items-maj-seq-12
```



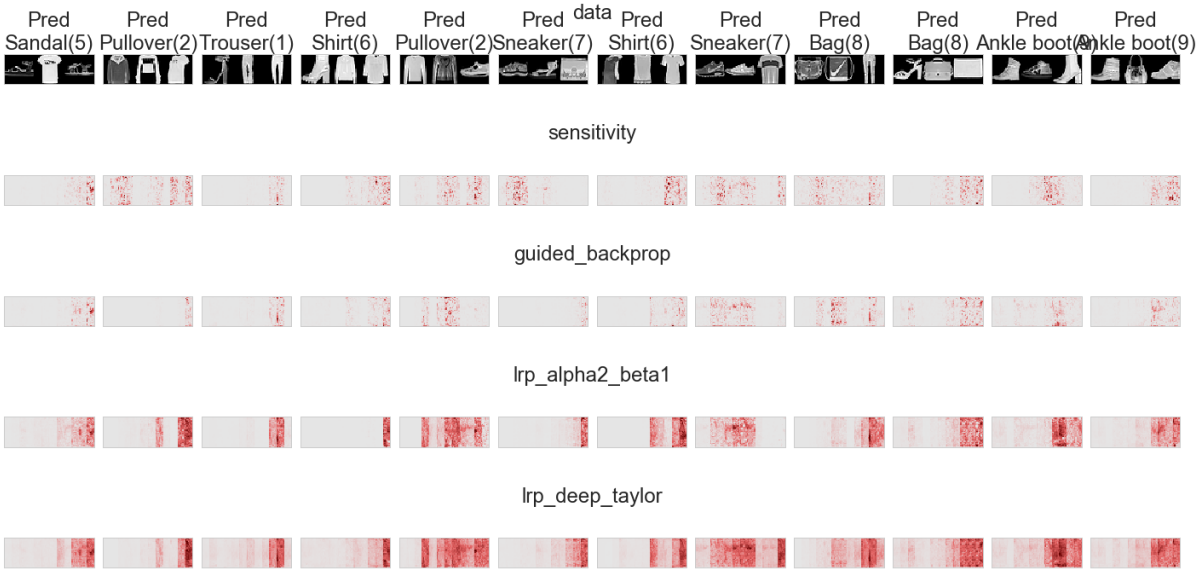
In [11]:
```
plot_heatmaps('deep', 'fashion-mnist-3-items-maj', 12)
```

```
../final-models/s3_network-fashion-mnist-3-items-maj-seq-12
```



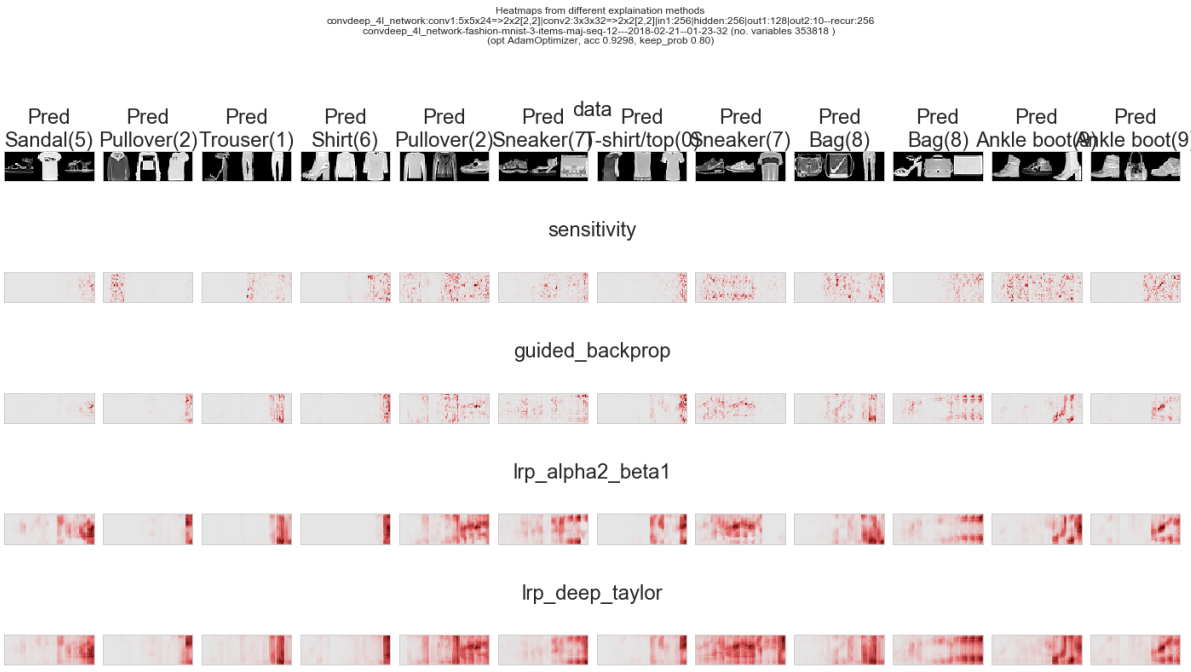
In [12]:
```
plot_heatmaps('deepv2', 'fashion-mnist-3-items-maj', 12)
```

```
../final-models/deep_4l_network-fashion-mnist-3-items-maj-seq-12
```



In [13]:
```
plot_heatmaps('convdeep', 'fashion-mnist-3-items-maj', 12)
```

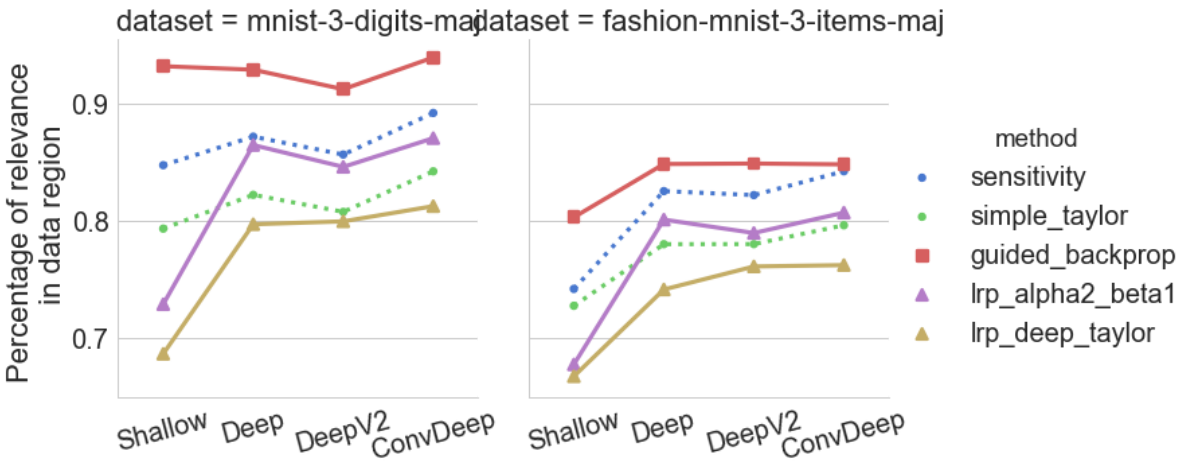
```
../final-models/convdeep_4l_network-fashion-mnist-3-items-maj-seq-12
```



Relevance Distributions

In [14]:
```
plot_relevance_dist_in_middle_region(['mnist-3-digits-maj', 'fashion-mnist-3-items-maj'])
pass
```

```
[]
```



Model Accuracy

In [15]:
```
plot.show_model_accuracy('mnist-3-digits-maj', seqs=[12])
```

```
mnist-3-digits-maj accuracy
```

Out[15]:

	seq	Shallow	Deep	DeepV2	ConvDeep
0	12	0.9806	0.9861	0.9889	0.9911

In [16]:
```
plot.show_model_accuracy('fashion-mnist-3-items-maj', seqs=[12])
```

```
fashion-mnist-3-items-maj accuracy
```

Out[16]:

	seq	Shallow	Deep	DeepV2	ConvDeep
0	12	0.902	0.9098	0.9133	0.9298