## 3 Compare Logistic Regression to CRFs

### 3.1 Analytics

I think CRF will do the work of sequence tagging better than logistic regression method.

1. CRF is a discriminative model, which is easier to use due it does not need features independent assumption. Since CRF is a discriminative model, it directly uses conditional probability instead of joint probability.
2. CRF use global normalization instead of local normalization, which can give a better result for general.
3. CRF is a feature based model and we can do a lot of improvement by modify features.

On the other hand, logistic regression need do more things because it converting the sequence tagging problem into independent classification problem. The independent classification problem needs calculate joint probabilities at first, that will require independent assumption which will increase the difficulties.

At all, CRF is the better choice to handle this problem than Logistic regression.

For example:

```
Waco    B-other
PD I-other
was    O
on O
scene  O
before O
the    O
shooting   O
started    O
because    O
officers   O
knew   O
the    O
gangs  O
were   O
```

```
going  O
to O
meet   O
.  O
Police O
say    O
this   O
prevented  O
more   O
deaths O
```

The result of logistic regression is:

```
Waco    B-other    O
PD I-other    O
was    O  O
on O  O
scene  O  O
before O  O
the    O  O
shooting   O  O
started    O  O
because    O  O
officers   O  O
knew   O  O
the    O  O
gangs  O  O
were   O  O
going  O  O
to O  O
meet   O  O
```

```
. O O
Police O O
say O O
this O O
prevented O O
more O O
deaths O O
```

The result of CRF is:

```
Waco B-other B-sportsteam
PD I-other I-sportsteam
was O O
on O O
scene O O
before O O
the O O
shooting O O
started O O
because O O
officers O O
knew O O
the O O
gangs O O
were O O
going O O
to O O
meet O O
. O O
Police O O
say O O
```

```
this   0  0
prevented  0  0
more   0  0
deaths 0  0
```