

## Homework 4: The Mean Brain

Michelle Chyn

March 4, 2015

1. Sample Space:  $A = \{0, 1\}^{n \times n}$  the adjacency matrix
2. Model Space:  $P = \{P_\theta : \theta \in \Theta\}$  all the possible distributions
3. Action Space:  $[0, 1]^{n \times n}$  the mean brain
4. Decision Rule:
  - (a) If sample size is 1,  $\min_{uv} \sum (a_{uv} - p_{uv})^2$
  - (b) If sample size  $> 1$ ,  $\min_{uv} \sum (\hat{p}_{uv} - p_{uv})^2$  where  $\hat{p}_{uv} = \frac{1}{m} \sum_{i=1}^m a_{uv}^{(i)} + \frac{\epsilon}{m^2}$ .  
 $\hat{p}$  is the test mean of all  $A^{(i)}$ . The term  $\frac{\epsilon}{m^2}$  is used for eliminating a resulting mean of all 0's or 1's.
5. Loss Function:  $\sum_{uv} (\hat{p}_{uv} - p_{uv})^2$
6. Risk Function:  $E[loss]$