**SUMMARY/MOTIVATION**

- The Goal of this research is to develop an approach to quantify injury caused by mild traumatic brain injury (mTBI). From this quantification the correct treatment course can be determined.
- Determining the correct course of treatment will lead to attenuated long-term effects from the disease.
- 1.4 million TBIs occur every year in the United States Alone [Morris, 2010]. Estimated cost of mTBI in the United States is estimated to be $17 billion per year [CDC, 2002].
- To overcome the difficulties in detecting lesions caused by mTBI Contextual information is fused with visual information through Bayesian Nets.

**TECHNICAL APPROACH**

The spread function captures the progression of the disease.
- $b, c$ - Learned Parameters
- $d$ - distance function rotated by the tangent and weighted

**DATA SET**

- Individual Animals: 57
- Volumes: 147 (63 Sham, 34 Single Hit, 28 Contralateral 3day, 22 Contralateral 7day)
- Lesions are small, on average 1.2% of the brain volume.

**CONCLUSIONS/FUTURE DEVELOPMENT**

- This approach for automatic quantization of mTBI lesions will be essential for determining treatment courses.
- Multiple contextual inputs allow for the knowledge of the injury to be utilized in the detection of lesions.
- Full testing of the system needs to be carried out with varying ranges of contextual inputs.

Support for this work was provided by NSF IGERT: Video Bioinformatics Grant DGE 0903667.

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**TECHNICAL CHALLENGES**

- mTBI shows little change in MR imaging. 
  Probability of Lesion Based on T2 value in General
  
- In MR imaging there are many modalities that measure physical aspects of the material being imaged.
- Every modality increases the cost dramatically, so limiting the imaging to a single modality is very desirable.

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