**Literature Review**

Kyle Chinn – “Do We Have a Mouse Problem?”

1. **Citations**

* Rohith Sri Sai, Mukkamala & Rella, Sindhusha & Veeravalli, Sainagesh. (2019). OBJECT DETECTION AND IDENTIFICATION A Project Report.
* Won-Du Chang, Chang-Hwan Im, "Enhanced Template Matching Using Dynamic Positional Warping for Identification of Specific Patterns in Electroencephalogram", Journal of Applied Mathematics, vol. 2014, Article ID 528071, 7 pages, 2014. <https://doi.org/10.1155/2014/528071>
* Hassaballah, M. & Ali, Abdelmgeid & Alshazly, Hammam. (2016). Image Features Detection, Description and Matching. 10.1007/978-3-319-28854-3\_2.
* Swaroop, Paridhi & Sharma, Neelam. (2016). An Overview of Various Template Matching Methodologies in Image Processing. International Journal of Computer Applications. 153. 8-14. 10.5120/ijca2016912165.
* Hashemi, Nazanin & Aghdam, Roya & Ghiasi, Atieh & Fatemi, Parastoo. (2016). Template Matching Advances and Applications in Image Analysis.

1. **Summary**

**OBJECT DETECTION AND IDENTIFICATION A Project Report**: This paper is a project report of all of the current, top object detection methods used in the industry today. It discusses the strengths and weaknesses of all of them, as well as best use cases. I will be trying a few of the discussed cases out in my project, namely, YOLO (You Only Look Once), sum squared difference (SSD), Fast R-CNN.

**Enhanced Template Matching:** The topic of this paper is to explore whether dynamic positional warping (DPW), originally developed for two-dimensional pattern recognition, could be applied to one-dimensional pattern recognition. They use electroencephalogram (EEG) template matching for their study. For their results, they compared the ROC curves to compare the performance of various template matching approaches. Based on their findings, the DPW performed the best.

Since I’m not very knowledgeable in the medical field, some of the understanding was lacking. I plan to do some research on a DPW-like python approach to see if it could work for my project.

**Image Features Detection, Description and Matching:** This paper, like the first one, is a survey of some of the most prevalent feature detection, description, and matching techniques. They focus on two broad groups of detection, single-scale detection and multiscale detection. They also discuss methods for image feature descriptors and feature mapping. This paper was very helpful to read though, and I will be testing multiple aspects of it for my project.

**An Overview of Various Template Matching Methodologies:** This paper discussed the different template based matching approaches and where they are most effectively applied. The three general categories discussed are feature-based, area-based, template-based, and motion tracking/occlusion handling. Naïve, image correlation, sum of absolute difference, and sum squared difference are described techniques and when they are best used. The authors conclude the paper by discussing the limitations and advantages of template matching. I hope to use template matching as a solution for my project, so this was quite helpful.

**Template Matching Advances and Applications in Image Analysis:** This paper is similar to the one above in both its approach and content. Some of the new topics discussed are sequential similarity detection distortion measures, mean intensity/scale/rotation invariance, and deformable template models. The second half of the paper is a description of how template matching is used today for things like face/eye recognition and license plate recognition. I am very interested in exploring deformable template matching for my project, since it’s more flexible than rigid template matching.