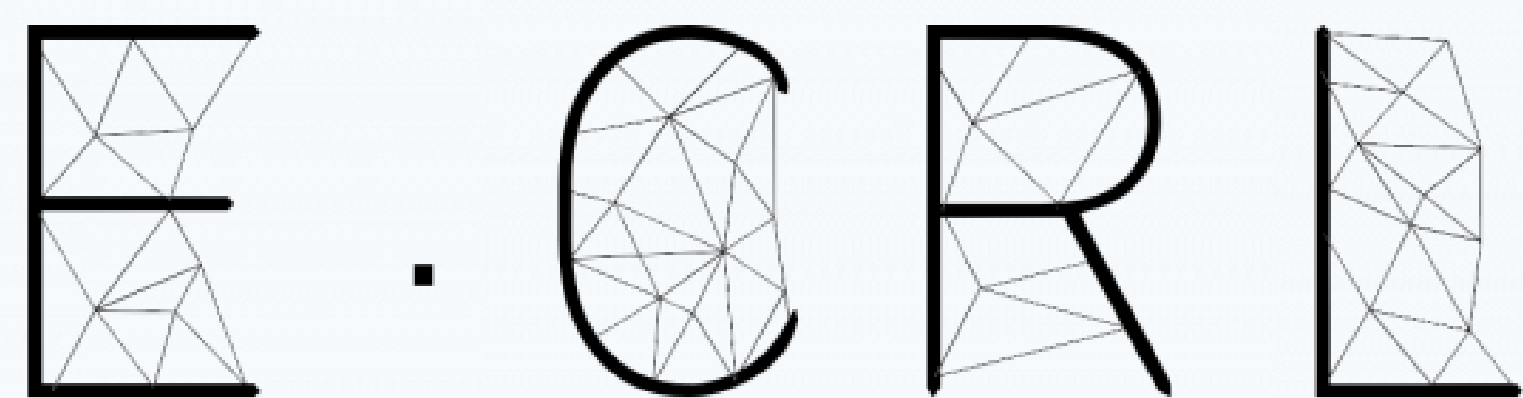


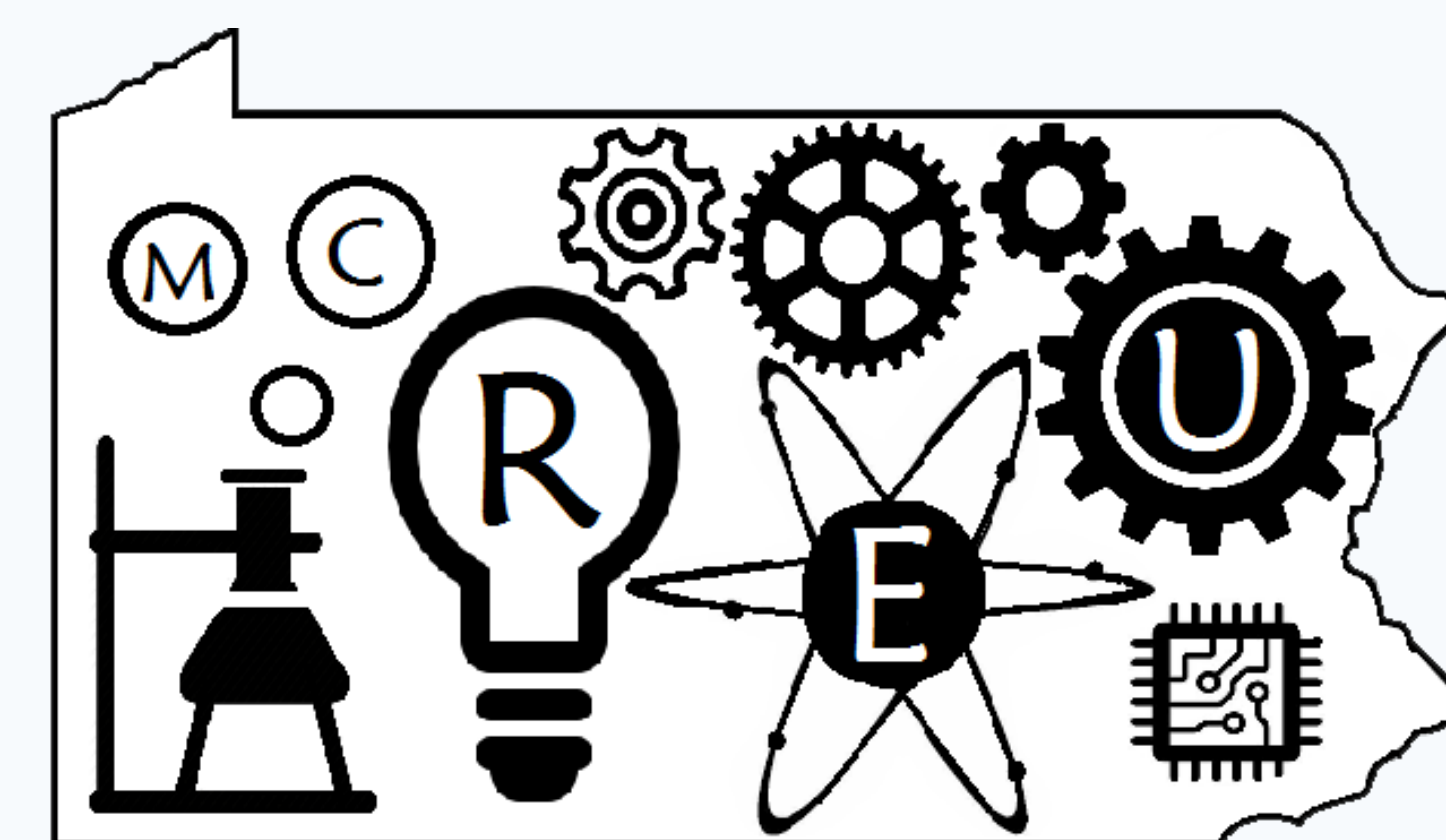
# Exploring New Methods to Visualize Eye Tracking Data



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## Abstract

Data visualization is essential for qualitative analysis and interpretation of research outcomes. Because visualization techniques are unique among disciplines, it is important to develop techniques that are appropriate for specific areas of research. Eye tracking research methods are commonly used in computer science and psychology as a way to quantify human thought patterns. While there are many methods to represent eye tracking data, few engineering education researchers have proposed methods specific to the field. Preliminary data was collected during a student design task to explore data visualization methods as they relate to engineering education. Our proposed method integrates an area of interest (AOI) timeline with cognitive workload data to visually represent how a student completes a design task. This method will be applied to further research in engineering education that will hopefully be used to improve how design is taught to students.

## Method

Step 1: Collect Data

Step 2: Define areas of interest

Step 3: Export position and cognitive workload data

Step 4: Code MATLAB to sort, clean, synchronize, and combine data sets

Step 5: Plot time on horizontal axis, plot cognitive workload on vertical axis and use color to represent the area of interest

## Results

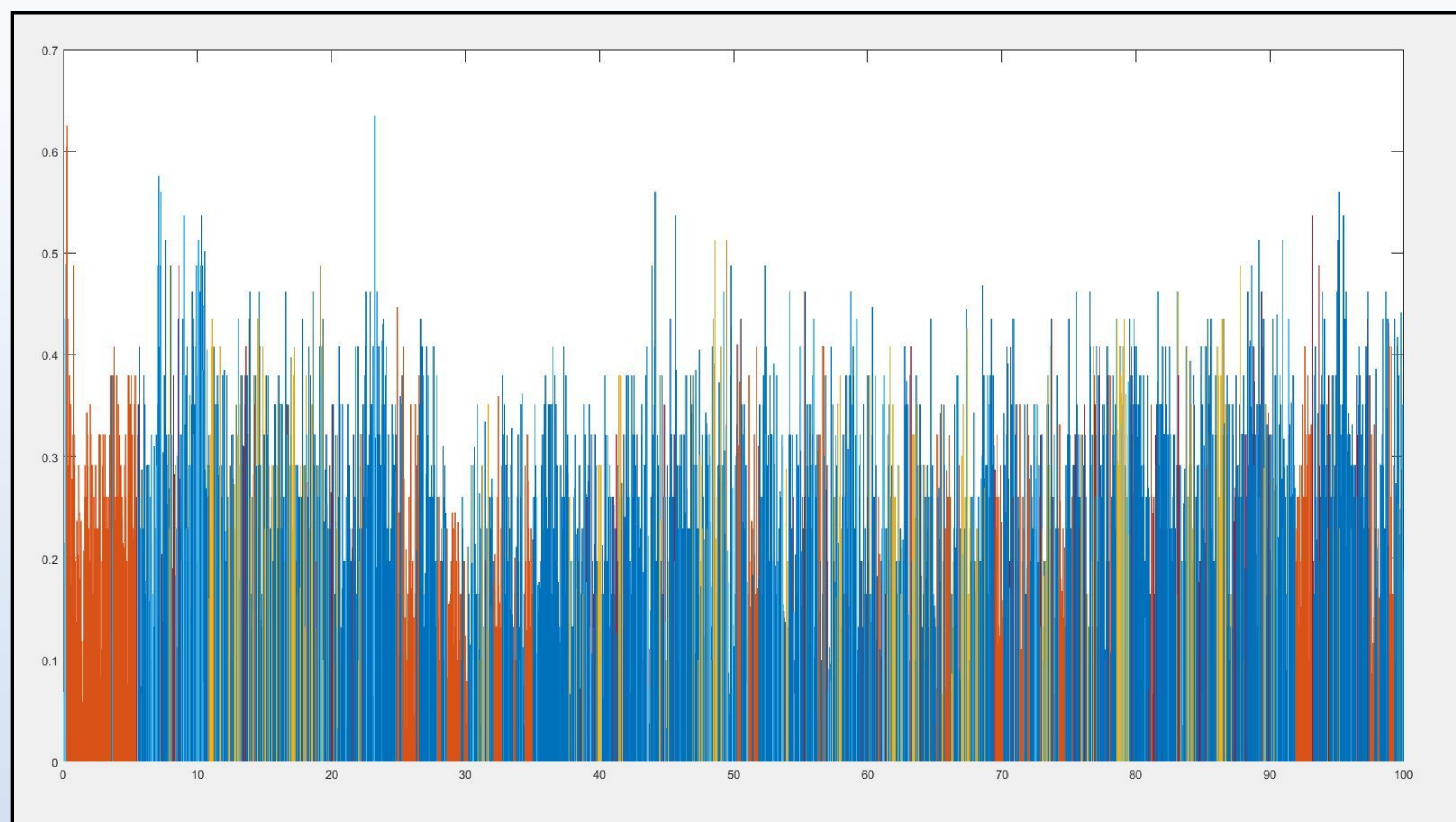


Figure 1: Area of interest timeline and cognitive workload during a design task

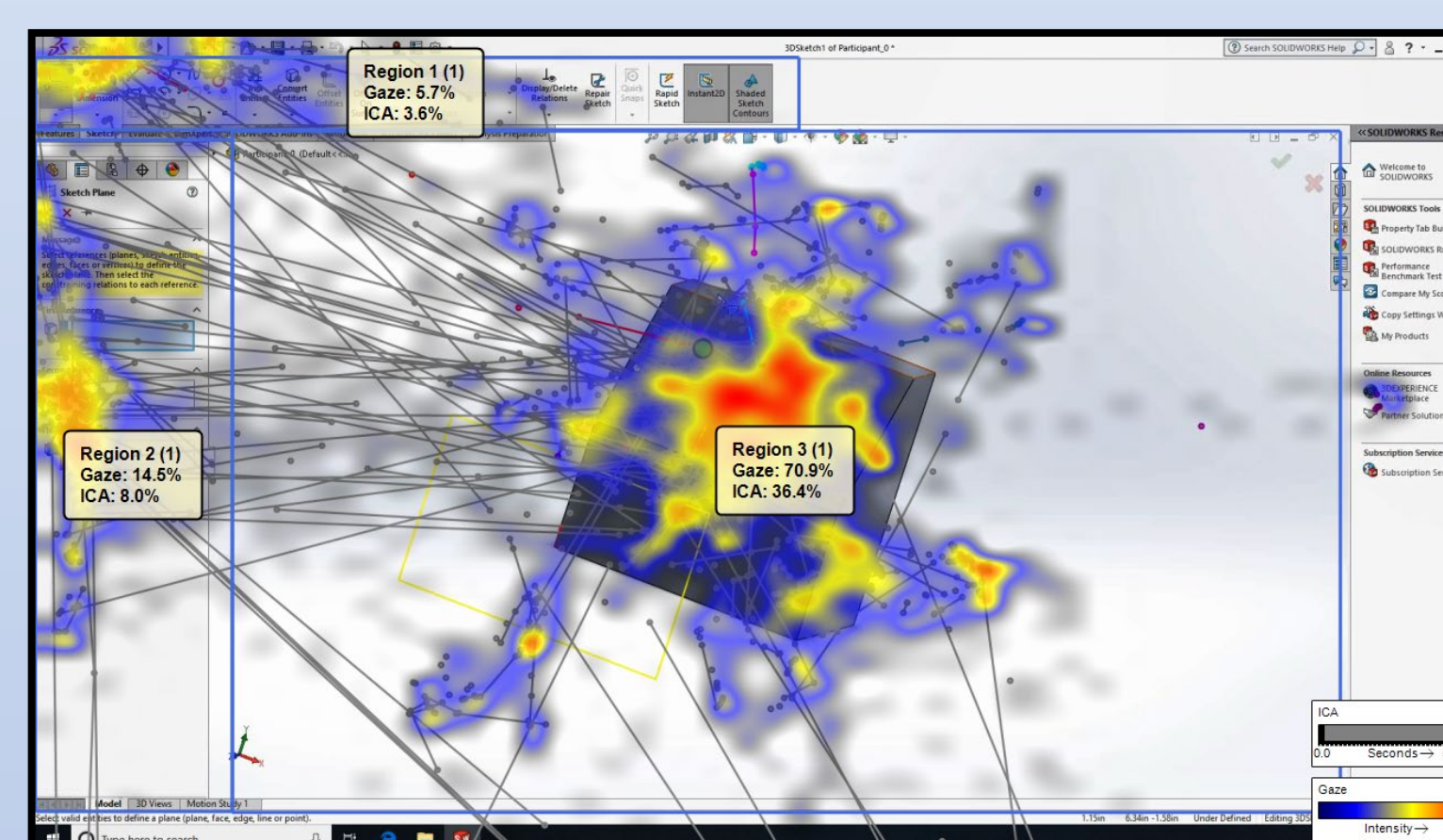


Figure 2: In context areas of interest and heat map

- Design challenge instructions
- SolidWorks work area
- SolidWorks top menu bar
- SolidWorks side menu bar
- Outside of defined regions

Figure 3: Area of interest color code

## Next Steps

1. Collect data on more participants
2. Visualize each data set
3. Refine visualization technique after all data is collected and trends emerge
4. Explore visualizations to draw conclusions across participants
5. Apply method to other areas of research

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