

Big Data Visualization: User to Data Scientist - Purdue Undergraduate Research Conference 2018

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Background - HoloLens

Microsoft HoloLens research is shaping the way people view and interact with data and statistical analyses. By removing the restriction of a 2D environment, the possibilities of new user-data relationships are endless. The HoloLens enables users to see their surroundings with 3D holograms projected into the space. Using special mapping, these objects can be manipulated in size and location to a user's will.



<https://www.microsoft.com/en-us/hololens>

Background - Lupus

Systemic lupus erythematosus – Lupus is an inflammatory disease that affects an individual head to toe. Lupus is caused by an attack on one's own immune system, and can realistically affect the whole body, although certain areas are much more likely. One of the trademark symptoms of Lupus is the butterfly rash across the cheeks.



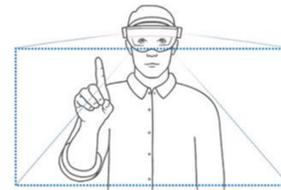
<https://www.mayoclinic.org>

Methodology

Using Unity game engine and Microsoft Visual Studio, I am developing an application for the HoloLens that immerses users in analyses of large heterogeneous data sets. Data analyses rarely are originally designed in a 3D space, so the application must account for different formats, i.e. changing static graphs to interactive plots. In addition to reformatting, the HoloLens also allots users three key points of interaction; gaze, gesture, and voice. This eliminates the technological learning curve almost entirely.



Gaze



Gesture

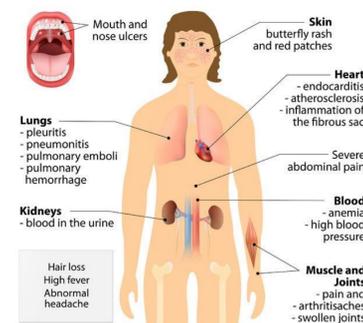


Voice

<https://developer.microsoft.com/en-us/windows/mixed-reality>



Systemic lupus erythematosus



<https://www.practicalpainmanagement.com>

Acknowledgements: Dr. Mark Ward, Statistics, Purdue University, Department of Computer Graphics Technology, Polytechnic Institute
This material is based upon work supported by the National Science Foundation under Grant No. 1246818.

Project Status

The application is currently in the development process, meaning that changes are made and ideas are added as time goes on. So far, 2D analyses of data can be embedded into the application and be displayed around the user. The user is able to gaze at objects and receive feedback that their gaze is on a specific object.

Future Results and Impact

By the end of Summer 2018, the application is expected to be developed in entirety, so that it acts as a framework for 3D data analysis for the disease Lupus. A user will be provided a generic anatomical human model. They will be able to then refine selections about symptoms, and display different key data points, for example: race, gender, nationality, and age. The information displayed by the application depends on where the user is looking at the human model, and which form of interaction they choose.

To summarize, the project focuses to bridge the learning gap between trained data scientists and first time users. With the HoloLens, users can directly interact with data, which personalizes the experience. By doing such, the user is able to more quickly realize the potential of data visualization and can provide unique perspectives to analyzing large data sets.

