High Adventure Science: Earth Systems and Sustainability is an [NSF DRK-12 project](https://www.nsf.gov/awardsearch/showAward?AWD_ID=1220756) to develop online modules for middle school and high school students in Earth and Space Science classes, testing the hypothesis that students who use computational models, analyze real-world data, and engage in building scientific reasoning and argumentation skills are better able to understand Earth science core ideas and how humans impact Earth's systems. I engaged in this project particularly for designing and developing data mining approaches for students’ written scientific argumentation to automatically provide information and feedback to teachers and students. It includes automated scoring, automatically discover the underlying topics, the role of graph in scientific argumentation through image processing, automatically detect students’ mechanistic account of the phenomena and depict students’ mental models. Check out the [High Adventure Science](https://has.concord.org/) live system.

Diagram

Description automatically generatedA picture containing chart

Description automatically generated

Using image processing approach to quantify visual artifacts students used to support scientific claims

Chart, bubble chart

Description automatically generated

**Relevant publications**

Xing, W., Lee, H. S., & Shibani, A. (2020). Identifying patterns in students’ scientific argumentation: content analysis through text mining using Latent Dirichlet Allocation. *Educational Technology Research and Development*, *68*(5), 2185-2214.

Pei, B., Xing, W., & Lee, H. S. (2019). Using automatic image processing to analyze visual artifacts created by students in scientific argumentation. *British Journal of Educational Technology*, *50*(6), 3391-3404.

Check out the paper published in [2015 IEEE Interantional Conference on Data Mining (ICDM)](file:///C:\Users\wanlixing\Dropbox%20(UFL)\A%20NEXT%20IDEA\1%20UF%20Research%20Group\xing_website\Sample\www\pub\IEEE_ICDM_draft.pdf).