

6 Conclusions

This video game car racing project has successfully integrated four STEM elements (Science, Technology, Engineering and Mathematics) in one STEM Project. Team has applied the Data Mining Clustering Analysis on grouping the similar stages into Cluster Fields. Each field has higher correlation with particular car technology associated field characteristics. Players can choose the right car and upgrade the right technology within each field to shorten the playing time significantly. By following the systematic data-driven and engineering problem solving approach, team has improved both Performance Index and Model Accuracy significantly. The most excited of this STEM project is that our kids can play video games while learning statistics and engineering problem solving (STEM approach).

Acknowledgements

Special thanks to Chia Lin and Chao-Yuan Chen for supporting our research. Thanks to the technical support staff at JMP for providing us the Data Mining techniques used herein.

References

- [1] <https://play.google.com/store/apps/details?id=com.fingersoft.hillclimb&hl=en>
- [2] [https://en.wikipedia.org/wiki/Hill_Climb_Racing_\(video_game\)](https://en.wikipedia.org/wiki/Hill_Climb_Racing_(video_game))
- [3] Merrilea J. Mayo, Video Games: A Route to Large-Scale STEM Education? *Science* 02 Jan 2009: Vol. 323, Issue 5910, pp. 79-82, DOI: 10.1126/science.1166900
- [4] Michael R. Anderberg. Cluster analysis for applications. Academic Press, New York, 1973. ISBN 0120576503.
- [5] Rokach, Lior, and Oded Maimon. "Clustering methods." Data mining and knowledge discovery handbook. Springer US, 2005. 321-352
- [6] R. Sibson. "Slink: an optimally efficient algorithm for the single-link cluster method". *The Computer Journal*, British Computer Society. 16 (1): 30-34, 1973.
- [7] D. Defays. "An efficient algorithm for a complete-link method". *The Computer Journal*, British Computer Society. 20 (4): 364-366.
- [8] Szekely, G.J. and Rizzo, M.L. "Hierarchical Clustering vis Joint Between-Within Distances: Extending Ward's Minimum Variance Method". *Journal of Classification* 22, 151-183, 2005.
- [9] Ward, Joe H. "Hierarchical Grouping to Optimize an Objective Function". *Journal of the American Statistical Association*. 58(301): 236-244.
- [10] Ma, et al. "Segmentation of multivariate mixed data via lossy data coding and compression." *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 29(9) (2007): 1546-1562.
- [11] <http://www.macworld.co.uk/how-to/iosapps/how-win-at-hill-climb-racing-3508741/>
- [12] "The Tank Tread Was His Baby". *Popular Science (June)*: 63. 1944. Retrieved 2011-08-24.
- [13] <https://www.revolv.com/main/index.php?s=Continuous%20track>
- [14] <https://www.intorobotics.com/wheels-vs-continuous-tracks-advantages-disadvantages/>