

# Vinayaka Gude

Assistant Professor, Dept. of Marketing and Business Analytics  
Texas A&M University - Commerce

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[Vinayaka.gude@tamuc.edu](mailto:Vinayaka.gude@tamuc.edu) | (903) 886 - 5692 | 315 F, McDowell Administration Building, Commerce, TX - 75428

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## Education

### **PhD in Systems Engineering**

2020

Missouri University of Science and Technology

Dissertation title: *"Hybrid computational intelligence techniques for prediction complex system behavior"*

Committee: *Steven Corns, Suzanna Long, Cihan Dagli, Ruwen Qin, XianBiao Hu*

### **MS in Systems Engineering**

2017

Missouri University of Science and Technology

Thesis title: *"Artificial Intelligence for Predicting Fetal Outcomes from Heart Rate Patterns"*

Committee: *Steven Corns, Suzanna Long, Ruwen Qin*

### **BTech in Chemical Engineering**

2015

Jawaharlal Nehru Technological University

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## Academic & Research Experience

### **Assistant Professor in Business Analytics**

Fall 2021

*Texas A&M University - Commerce*

- Classes taught: **BUSA 511 – Business Analytics for Managers**, **BUSA 379 – Business Process Management & ERP Systems**, **BUSA 597 – Data Visualization** and **BUSA 423,523 – Business Analytics Programming**.
- Developed **BUSA 597 – Data Visualization** course.

### **Assistant Professor in Data Visualization**

Fall 2020

*Louisiana State University – Shreveport*

- Developed **Introduction to Data Analysis** and **Data-driven storytelling** courses.
- Classes taught: **Data-driven storytelling** (*MCOM 290, MCOM 260*), **Introduction to Social Media Analytics** (*MCOM 249*), **Introduction to Data Analysis** (*MCOM 160*) and **Research Methods** (*MCOM 320*).

### Doctoral Research Assistant

2017-2020

*Missouri University of Science and Technology*

- Development of traffic management strategies and economic analysis of floods in Missouri.
  - Developed **LSTM** to predict floods at **85%** better accuracy than USGS.
  - Performed Road **Network Analysis** using GIS Shapefiles in **python**.
  - Conducted **Simulation** for what/if scenarios using **SUMO**.
  - Modeled a System of Systems architecture design for a smart traffic management.
- Development of GUI for Post-Disaster Infrastructure Restoration System
  - Developed an **application** to estimate resources required to restore a city post disaster.
  - **Validated** the results using the data available from **Joplin Tornado**.

### Graduate Teaching Assistant

2018-2020

*Missouri University of Science and Technology*

- Taught **Introduction to Systems Engineering** (SYS 2310)
- Planned lessons and assignments, led discussion sections, graded papers and exams.
- Maintaining records on student progress/grades
- Leading class discussions and answering student questions

### Graduate Research Assistant

2016-2017

*Missouri University of Science and Technology*

- Machine Learning Decision Support System fetal acidosis.
  - Performed exploratory data analysis for Fetal Heart Rate – **data smoothing, statistical analysis and data visualization** in python.
  - Implemented **Support Vector Machine** and **Random Forest** to predict Fetal States and achieved a classification accuracy of **97.68%**. The project is aimed at improving the accuracy and aiding the Hospitals in diagnosis to prevent asphyxia.
  - Developed a methodology to use umbilical cord pH data to **predict fetal acidosis** based on the CTG data and achieved an accuracy of **72.22%**.

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### Professional Experience

#### Research Intern

May 2016 - June 2016

*Missouri University of Science and Technology*

Developed and analyzed the production of Perovskite Solar cells using Spray/spin coating and various annealing techniques to identify suitable parameters for large-scale manufacturing of the solar cells.

Trained in performing process operations, monitoring the control systems, testing products, developing and evaluating Lean/Six-Sigma opportunities.

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### Publications

- **V. Nagendra, H. Gude, D. Sampath, S. Corns** and S. Long, "Evaluation of support vector machines and random forest classifiers in a real-time fetal monitoring system based on cardiocography data," 2017 IEEE Conference on Computational Intelligence in Bioinformatics and Computational Biology (CIBCB), Manchester, 2017, pp. 1-6, doi: 10.1109/CIBCB.2017.8058546.
  - **Gude, V.;** Corns, S.; Long, S. Flood Prediction and Uncertainty Estimation Using Deep Learning. *Water* 2020, 12, 884.
  - **Gude, V.,** Corns, S., Dagi, C., & Long, S. (2020). Agent based modeling for flood Inundation mapping and rerouting. *Procedia Computer Science*, 168, 170-176.
  - J.Goldschmid, **V. Gude,** and S. Corns, "SoS Explorer Application with Fuzzy-Genetic Algorithms to Assess an Enterprise Architecture – A Healthcare Case Study," *Procedia Computer Science*, vol. 185, pp. 55–62, 2021.
  - M. M. Islam, M. Rahman, F. Heidari, and **V. Gude,** "Optimal onsite microgrid design for net-zero energy operation in the manufacturing industry," *Procedia Computer Science*, vol. 185, pp. 81–90, 2021.
  - J. Hale, S. Long, **V. Gude,** and S. Corns, "Using Trend Extraction and Spatial Trends to Improve Flood Modeling and Control," *Data Visualization [Working Title]*, 2021.
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### Research submitted and in progress

- **Gude,V,** et al.. " Evaluating the impact of Covid-19 on Small Business Enterprises" (outlet to be determined)
  - **Gude,V,** et al.. " Modelling a decision support system for Covid-19 using System dynamics and Fuzzy Inference " (submitted to Health Policy Research journal)
  - **Gude,V,** et al.. "Fetal acidosis prediction using Deep Learning" (to be submitted to Biosystems journal)
  - **Gude,V,** et al.. "Computational intelligence methodology for determining the delay association with gauge height and precipitation" (outlet to be determined)
  - **Gude,V,** et al.. System of Systems Architecture Assessment for a Smart Emergency Response System (outlet to be determined)
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### Conference presentations

- 'Reinforcement Learning Framework for Road Restoration Planning' - **ASEM 2019**
  - 'Predictive Deep Learning for road flooding and dynamic traffic rerouting' - **CEGIS 2019**
  - 'Evaluating uncertainty in acidosis predictions' – **IISE 2020**
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### Professional Memberships

- ASEM (American Society for Engineering Management)
- IEEE (Institute of Electrical and Electronics Engineers)
- IISE (Institute of Industrial and Systems Engineers)

## Research skills

- Competent in Computational Intelligence techniques (Machine Learning, Deep Learning, Fuzzy Systems and Evolutionary Algorithms)
  - Proficient in Statistical programming languages and data analysis softwares (Python, R, Matlab, AMPL,
  - Tableau)
  - Basic use of Geographic Information Systems (ArcGIS, QGIS, HEC-RAS)
  - Experienced in developing simulations.
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## Current Research Interests

- Machine Learning and Deep Learning
  - Complex Systems Analysis and Simulations
  - Computational Intelligence for Health Care and Disaster Management
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## University Service

### **Peer Educator**

**May 2016 - May 2019**

*Missouri University of Science and Technology*

- Giving presentation on how to avoid high-risk behavior related to alcohol, drugs, tobacco, violence and unhealthy eating habits on campus
  - Providing education and advising students on overall wellness
  - Serve as a resource for students to connect with the University advising and counselling services.
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## References

- Steven Corns, Associate Chair of Graduate Studies and Associate Professor  
Department of Engineering Management and Systems Engineering  
Missouri University of Science and Technology  
(573) 341 - 6367, cornss@mst.edu
- Suzanna Long, Department Chair and Professor  
Department of Engineering Management and Systems Engineering  
Missouri University of Science and Technology  
(573) 341 - 7621, longsuz@mst.edu
- Cihan Dagli, Professor and Founder and Director of Systems Engineering Graduate Program  
Department of Engineering Management and Systems Engineering  
Missouri University of Science and Technology  
(573) 647 - 9125, dagli@mst.edu