7th UNESCO UNITWIN International Conference on Quality Teacher Education 2023
"A New Horizon Towards Digital Transformation in Teacher Education"
Korea National Unviersity of Education and Mahidol University Kanchanaburi Campus
6 July 2023 | Mahidol University, Salaya Campus

A Machine Learning Model of Factors Influencing STEM Teachers' Growth Mindset: Implications on Teacher Education and Lifelong Learning

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Context: Why are we interested in Growth Mindset?

Teachers' growth mindset significantly and positively predicts student growth mindset

Student Mindset

Belief that one's skills and qualities can be cultivated through effort, good strategies, and support from others

- higher academic performance
- better score gain for girls, disadvantaged, and immigrant students
- more ambitious learning goals
- higher level of self-efficacy and motivation
- lower level of fear of failure
- positive influence on overall well-being

Source: OECD (2021), Sky's the Liimit: Growth mindset, students, and schools in PISA 2018

UP NISMED

Inquiry: What factors influence teacher growth mindset?

Process

495 respondents

Respondents who are teaching STEM in high school or involved in teacher training

Variables

- hours spent teaching, preparing lesson plans, doing clerical work, checking papers
- science teaching belief
- teaching practice
- teacher self-efficacy
- communicating academic expectations
- use of language of thinking

Machine Learning

- modeling thinking
- providing opportunities for thinking
- structuring physical environment to inspire learning
- facilitating positive student interactions
- school climate
- overall teacher job satisfaction

Rationale: Why use machine learning in modeling teacher growth mindset?

COMPLEXITY

Research Article

Characterizing the effect of seating arrangement on classroom learning using neural networks

C. Monterola, R. M. Roxas, S. Carreon-Monterola

ELSEVIER

International Journal of Educational Research

Volume 92, 2018, Pages 20-29

School hazard vulnerability and student learning

Clarissa C. David [a], Sheryl Lyn C. Monterola [b], Antonino Paguirigan Jr. [d], Erika Fille T. Legara [d], Anjali B. Tarun [c], Rene C. Batac [c], Jeriesa P. Osorio [a]

Source of Solution Grant

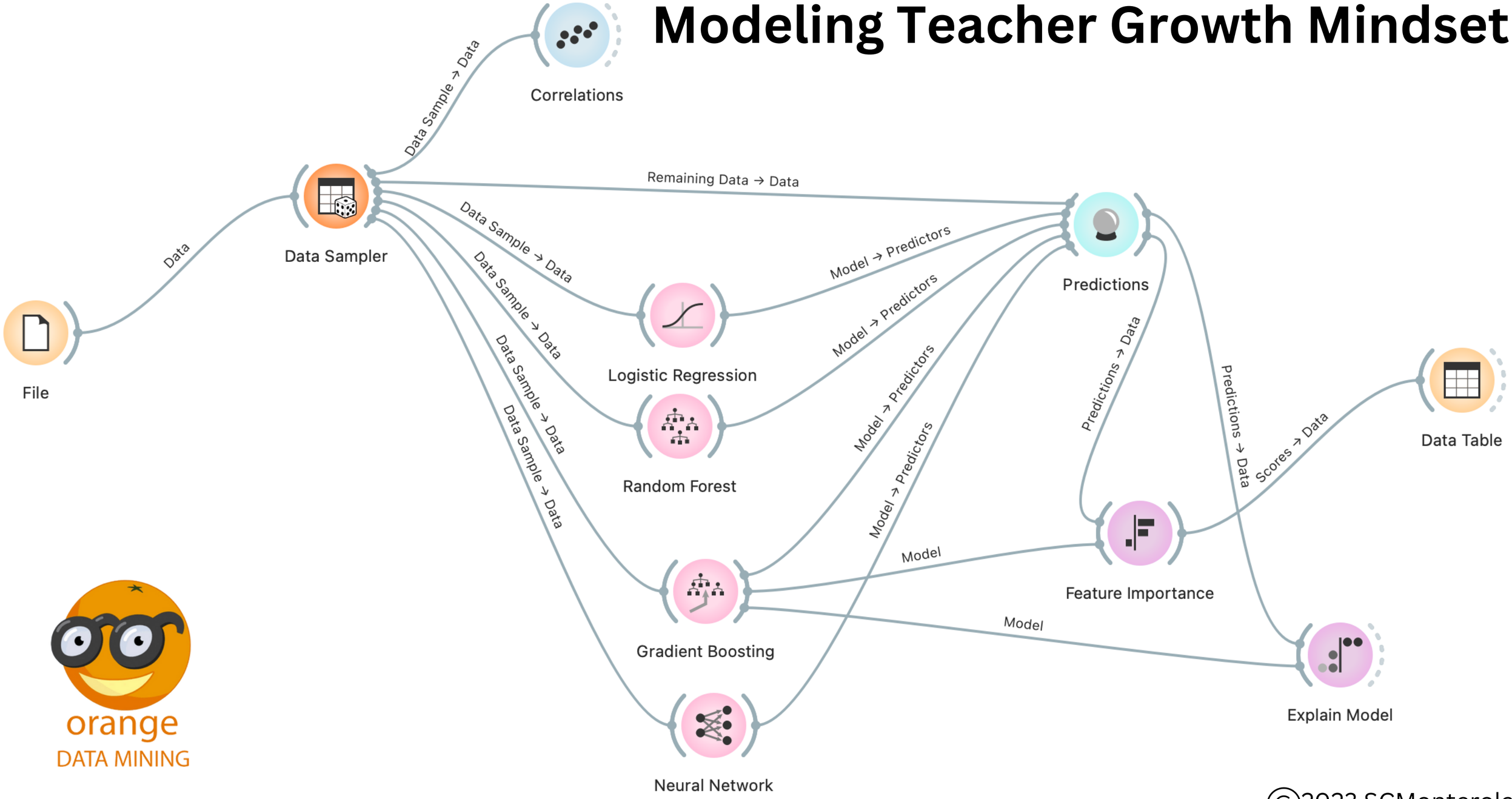
University Admission of Laboratory School Graduates

ASIAN INSTITUTE OF MANAGEMENT

DepED DEPARTMENT OF EDUCATION

AI-Based Action Points for Improving Filipino Students' Performance in PISA

Modeling Teacher Growth Mindset

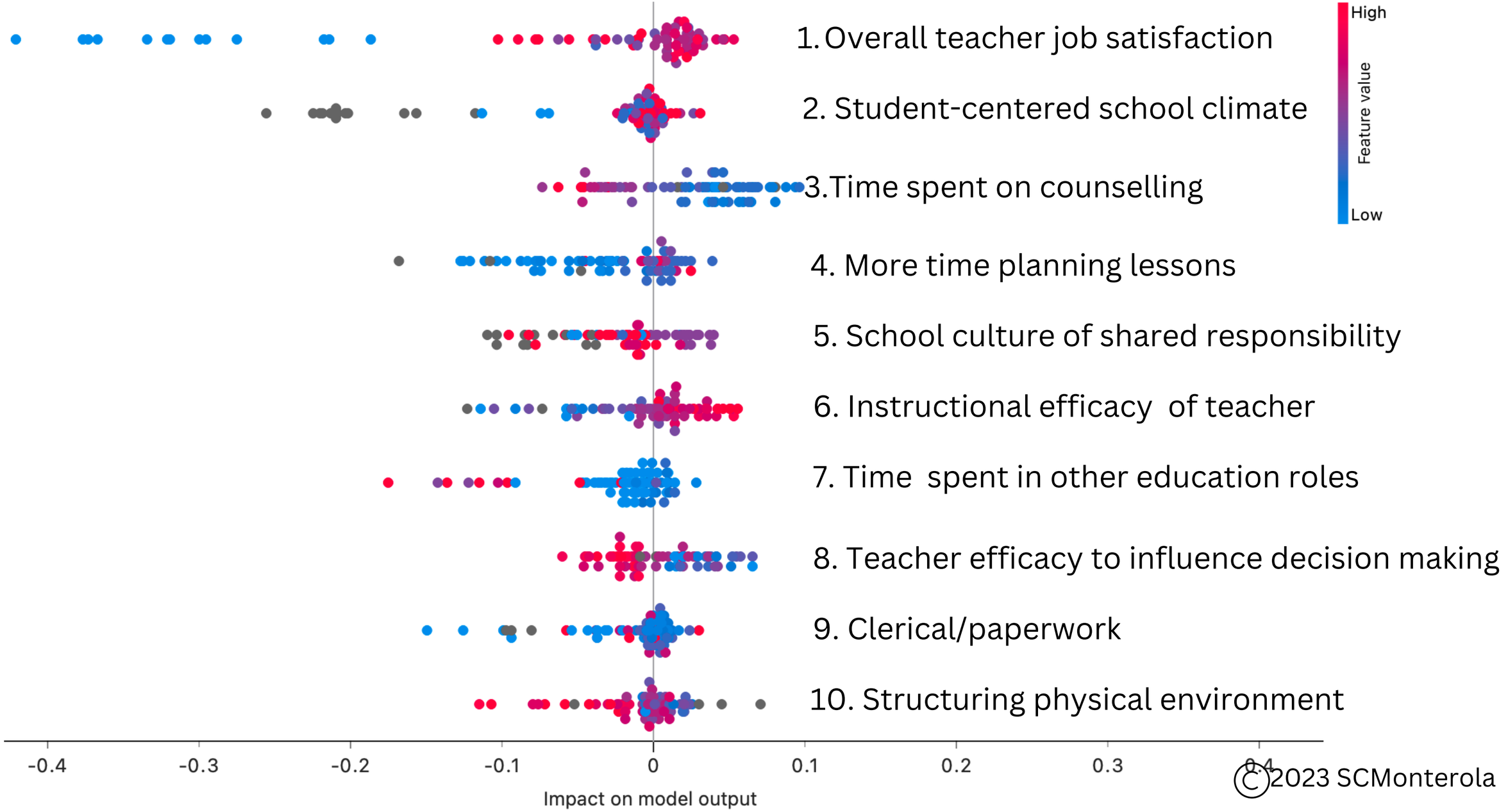


orange
DATA MINING

Comparison of Precision of Models

Method	Precision
Gradient Boosting	86.7%
Random Forest	82.1%
Logistic Regression	78.8%
Neural Network	75.7%

Top 10 Factors Influencing Teacher Growth Mindset



Implications:

Teacher Preparation, Professional Development, and Lifelong Learning

- Cultivating joy of teaching
- Understanding learner-centered approaches
- Strengthening lesson planning
- Developing a culture of shared responsibility
- Improving teacher efficacy
- Streamlining clerical/paper work

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