DEMATEL DIGRAPH:

A Decision Making Tool for Project Practitioners and Researchers during COVID-19 Pandemic

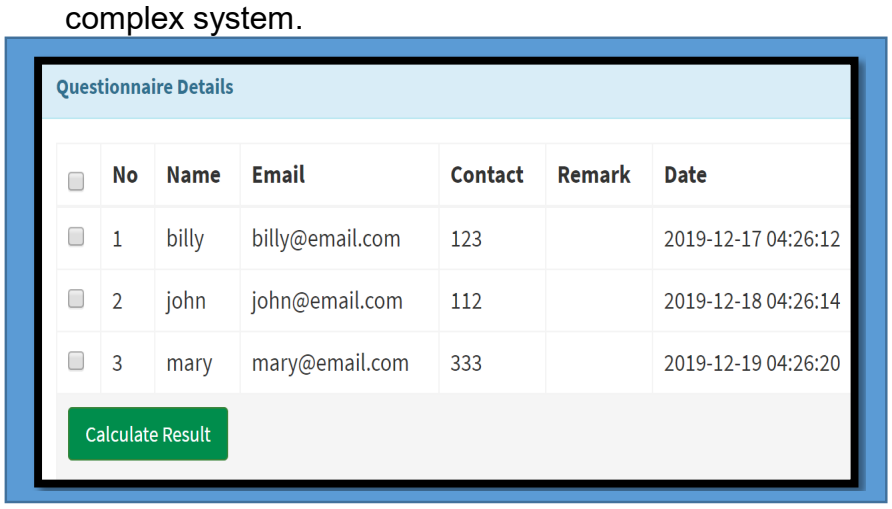
ITREX 2021

INVENTOR: Dr. Lee Chia Kuang
FACULTY: Faculty of Industrial Management
UNIVERSITY: Universiti Malaysia Pahang
EMAIL: chia@ump.edu.my
CO-INVENTORS: Dr. Tay Joo Hui, Dr. Liew Siau Chuin

Product Background

✓ DEMATEL DIGRAPH is a **new invention** that generates directed graph (**Digraph**) based on DEMATEL (Decision Making Trial and Evaluation Laboratory) algorithm.

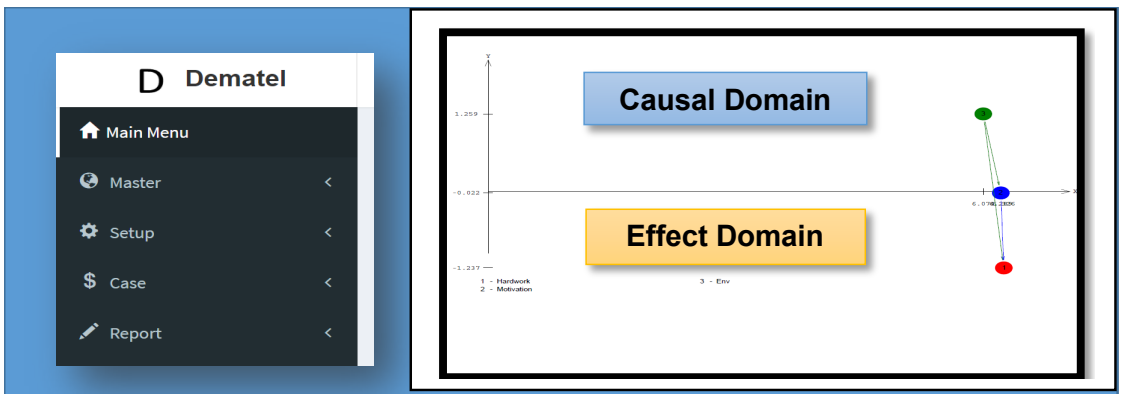
✓ Helps students and project practitioners in **solving complex decision problems**, identifying critical risks and analyzing cause-effect chain components of a complex system.



State of the Art

Concept of DEMATEL DIGRAPH

- ❑ Generates and maps the relationships between critical factors with **directed graph**, in **PDF Format**. Separates factors into **causal and effect domain.**
- ❑ State of the art in decision science and project risk management.
- ❑ Collects inputs from decision makers and experts through questionnaire (available in online), **avoiding physical contact** during **COVID-19 pandemic.**



Novelty

It is currently the **first and only** cloud based system design using Cascading Style Sheets (CSS) and html by Bootstrap.

Originality

Performs Reliability Analysis [Corrected Item Total Correlation (CITC) & Cronbach Alpha].

Calculates Z, D, T Matrix values.

Inventiveness

Converts **DEMATEL algorithm** into Directed Graph (Digraphs in PDF Format).

Publication

1. Selection and use of alternative dispute resolution (ADR) in construction projects - Past and future research. *International Journal of Project Management*. (2016). 34 (3), 494-507. (***Web of Science Indexed: Impact Factor 4.034, Q1***)

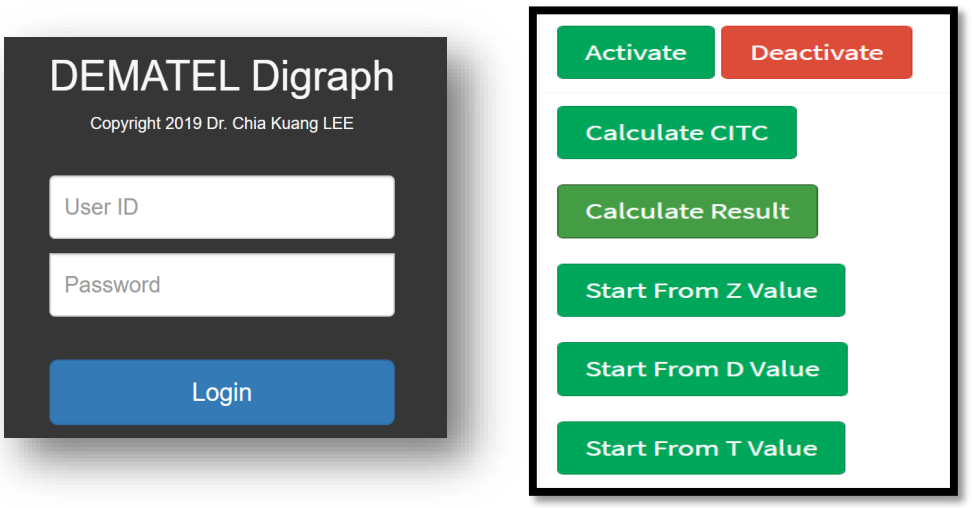
2. Predicting Intention to Use Alternative Dispute Resolution (ADR): An Empirical Test of Theory of Planned Behaviour (TPB) Model. *International Journal of Construction Management*. (2021). 21 (1), 27-40 (***Scopus, SJR 0.57, Q2***)

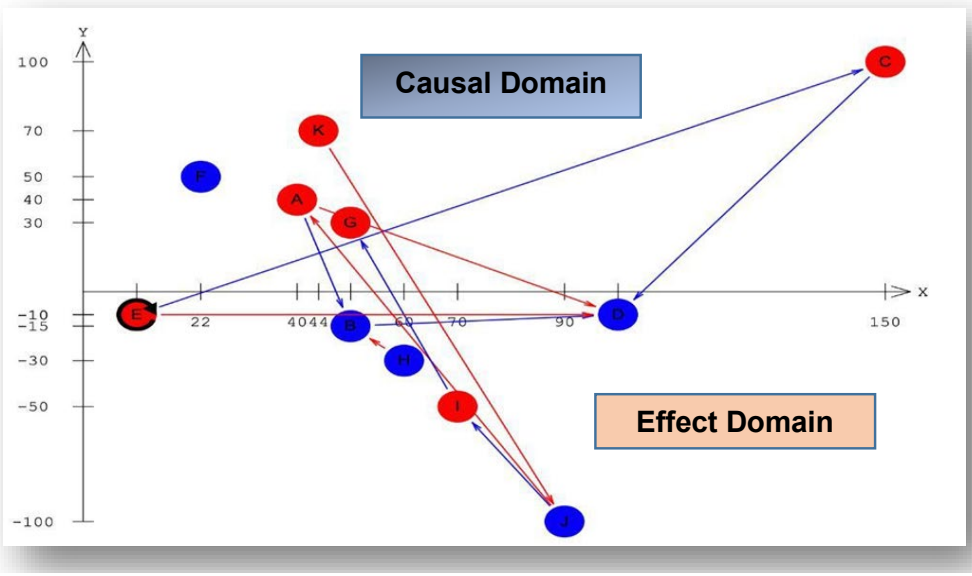
3. Application of the Theory of Planned Behavior to Alternative Dispute Resolution Selection and Use in Construction Projects. *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*. (2018). 10 (2), 04518003 (1-12). (***ESCI Indexed, Web of Science 2019'***)

4. Understanding Intention to Use Alternative Dispute Resolution in Construction Projects: Framework Based on Technology Acceptance Model. (2017). *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*. 10 (1), 04517021 (1-12). (***ESCI Indexed, Web of Science 2019', Best Paper Award Runner Up, ASCE***)

5. Understanding Decisions to Suspend Works: When Employers Do Not Pay. (2018). *E3S Web of Conferences*. 65, 03001 (1-16), https://doi.org/10.1051/e3sconf/20186503, November 2018. (***Scopus conference***)

Product Image and Product Characteristics





Status of Innovation

TRL Level 9: Actual system proven in operational environment.

Market Readiness

17 existing DEMATEL training clients, 6 undergraduate, 6 alumni & 2 postgraduate students.

Environmental Impact

Environmental green and avoids physical contact.

Development Cost: USD 5000; **Price**: USD 150 per year (License).

Marketability & Commercialisation

Technology Transfer Potential
Transferable through Micro credential courses, academic and commercial software.

Benefits the Academic Community
Comprehensive DEMATEL analysis.

Benefits the Project Practitioners
Empowers project practitioners with better decision making solutions.

Identifies critical project criteria and risks.

Usefulness & Applicability

Accessible through mobile and personal computer, and **useful** in solving **global complex project decision-making issues.**

Achievement/Award

CITREX 2020 (Silver)
MTE 2020 Special Edition (Gold & Best Innovation Award)

Industrial Partner

Edustats Solutions