



WALES SIMULATOR
Water Level for the Future

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WALES SIMULATOR IS A COMPUTER PROGRAM THAT CAN FORECAST RIVER WATER LEVELS. THIS PROGRAM IS BASED ON THE HYDROLOGICAL AND METEOROLOGICAL DATA OF THE RIVER. IT CAN PREDICT THE FUTURE RIVER WATER LEVELS ACCORDING TO THE PRESENT AND PAST DATA. IT CAN ALSO PREDICT THE FUTURE RIVER WATER LEVELS ACCORDING TO THE PRESENT AND PAST DATA.

Patent:
+ B1 Pending

DR. I
GRANT NO: 10002023001 (P0027300)

Product Background

- More than 10 of consecutive missing days on existing water level stations
- Lack of water level station installed on site
- Uncertainty in the climate changes causes large changes to the streamflow pattern
- Requires complex hydrological and hydrological data for flood forecasting

Solution:

WALES Simulator

Product Features

- WALES SIMULATOR is a software to estimate river water level (WL) depends on meteorological variables such as rainfall and evaporation.
- The portable software that can be used to track current WL using real-time data.

Industrial Benefit

- River WL forecasting as indicator for the flood monitoring
- Potential to estimate the WL at un-gauged area

Marketability

- Price: RM15,000 (Software + Training + WL Probes)

Collaborators

Achievement:

Gold Medal in CITEX2023

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Ts. Dr. Nurul Nadrah Aqilah created software to predict river water levels to identify flood areas

4 March 2024

PEKAN, 1 January 2024 – Difficulty in analysing water level data which is important data for identifying flood areas sparked an idea to a researcher and lecturer of the Faculty of Civil Engineering Technology (FTKA), Ts. Dr. Nurul Nadrah Aqilah Tukimat, 38 to create WALES Simulator, a software that can predict river water levels based on meteorological variables such as rain and evaporation.

In identifying parameters and producing long-term water level equations, this research was conducted with Universiti Tun Hussein Onn Malaysia (UTHM) lecturer, Associate Professor Dr. Siti Nazahiyah Rahmat and two master students, Wan Zunairah Othman and Wan Amirul Syahmi Wan Mazlan.

In addition, several FTKA lecturers, Associate Professor Dr. Abdul Syukor Abd. Razak, Dr. Nur Farhayu Ariffin and Dr. Muhammad Khusyren Sulaiman also contributed ideas regarding this software.

According to Ts. Dr. Nurul Nadrah Aqilah, in current practice, water level stations are located in certain locations to detect changes in river water levels (WL).

“Information from WL is the best indicator for flood warning systems and forecasts of potential floods, flash floods and droughts.



WALES SIMULATOR

Water Level for the Future



INVENTOR:
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CO-INVENTORS

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: WAN ZURARAH BT OTMAN, WAN AMIRUL SYAHRI BIN WAN MAZLAN;
DR ABDUL SYAHID BIN ABD RAZAK, TS DR NORHARAH YAU BT ARIFIN;
AND DR MUHAMMAD JEG A KHUSHRON SULAIMAN

Patent
• IP number: LY2023C01900

TRL: 7
GRANT NO: RDU220338 (RM27,000)

Product Background

Product Features

- WALES SIMULATOR is a valuable software to estimate river water level (WL) depends on meteorological variables such as rainfall and evaporation.
- The portable software that can be used to track current WL using real-time data.

Solution

Novelty

- The WL is calculated based on multilinear regression equation
- The variables considered are rainfall, evaporation, and 4 coefficients (A, B, C, and D)
- The performances of simulated WL show a good result with >90% accuracy

Industrial Benefit

- River WL forecasting as indicator for the flood monitoring.
- Potential to estimate the WL at un-gauged area

Marketability

Price: RM15,000
(Software + Training + WL Projection)
(This package only for particular state)

Collaborators

Achievement

Gold Medal in CITREX2023

www.ump.edu.my

Results

Status of Innovation

TRL Level 7 – The product has been demonstrated in relevant industries. The LOI has been signed between NAHRIM and UMP

Publications

- Omar, I.B.S., Radzi, M.N., and Sharif, S. (2021). Estimation of the Present Trend Change on the Schematic and Orthogonal Regression Consideration. *ICF Conference Series*, 1(1), 1–10. doi:10.5281/zenodo.5411171
- Suhaimi, M.Z., Tahirah, H.M.Z., and A.H. Rosnida, S.H., and Wahid, R. (2022). Analysis of Climate Variability and Trends in New Climate Change Planning Case Study At Terengganu. *Journal of Geoscience and Geotechnology*, 1(1), 1–10. doi:10.5281/zenodo.5411172
- Omar, S.Z., and Tahirah, H.M.Z. (2023). Spatial Relationship of Water Level in Ungaed River Basin, situated in Terengganu, Malaysia. *Journal of Geoscience and Geotechnology*, 2(1), 1–10. doi:10.5281/zenodo.5411173

"However, the lack of WL stations installed on site, particularly in locations prone to flooding, creates challenges and problems in hydrological modelling, particularly for long-term monitoring and estimating the effects of climate change."

"Furthermore, the problem of missing data on existing WL stations due to network miscommunication also leads to biased results in hydrological modelling work," she said.

Therefore, she said WALES Simulator is the best software to solve the problem of filling in the missing WL, estimating the WL especially in uncontrolled areas and predicting the long-term changes of the WL.

The research, which began in 2021, was also collaborated by the National Water Research Institute of Malaysia (NAHRIM), which is one of the agencies that will adopt the software.

She explained that users can use this software by entering the amount of rainfall and evaporation per month including entering the information month and location and then the calculation section will perform calculations to estimate water levels.

For now, the price of the software is for one state only with a minimum cost of at least RM15,000 which includes the software, training and user guide.

However, the price changes depending on the location and number of stations required.

She also intends to expand the use of WALES Simulator to the relevant government agencies such as the Department of Irrigation and Drainage (DID), Tenaga Nasional Berhad (TNB) and others.

Previously, she created IIUVIA Converter – The Rainfall Solution software.

This product bagged a gold medal in the 2022 Creation, Innovation, Technology & Research Exposition (CITREx).

The research also won a gold medal at the International Invention, Innovation and Technology Exhibition (ITEX) 2023 which took place at the Kuala Lumpur Convention Centre (KLCC) on 11 and 12 May 2023.

By: Nur Hartini Mohd Hatta, Centre For Corporate Communications

Translation By: Dr. Rozaimi Abu Samah, Faculty Of Chemical And Process Engineering Technology