# INTISARI

## RANCANG BANGUN SISTEM *MONITORING* TINGKAT KEPEKATAN KANDUNGAN GAS LPG DAN METANA PADA RUANG PENYIMPANAN TABUNG GAS ELPIJI DENGAN *FUZZY LOGIC* BERBASIS *INTERNET OF THINGS*

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*Liquefied Petroleum Gas* (LPG) merupakan bahan bakar alternatif yang digunakan masyarakat untuk kebutuhan sehari-hari. Namun,maraknya kebakaran yang disebabkan oleh kebocoran tabung gas LPG seringkali menjadi hal yang menakutkan bagi masyarakat pengguna gas tersebut, maka dibutuhkan sistem *monitoring* untuk mendeteksi kebocoran tabung gas. Pada penelitian ini menggunakan sensor gas yaitu TGS2610 dan TGS2611. Sistem ini menggunakan metode logika *fuzzy* Mamdani. Logika *fuzzy* Mamdani digunakan untuk menentukan kondisi dari ruang penyimpanan tabung gas LPG. Masukan dari sistem ini terdiri dari nilai kadar gas iso-butana/propana (LPG) dan nilai kadar gas metana. Masukan nilai kadar gas iso-butana/propana (LPG) didapatkan dari sensor TGS2610, sedangkan nilai kadar gas metana didapat dari sensor TGS2611. Hasil dari proses *fuzzy* berupa pengelompokan kondisi pada ruang penyimpanan tabung gas LPG sebagai keluaran sistem. Data yang telah diolah dikirimkan ke *database* untuk kemudian ditampilkan pada aplikasi *Android* untuk *monitoring*.

Berdasarkan hasil pengujian yang telah dilakukan, sistem sudah dapat berjalan dengan lancar. Akurasi data dari logika fuzzy yang dikirimkan dari Raspberry Pi ke MIT App Inventor sudah bekerja dengan sangat baik. Kinerja sensor gas LPG TGS2610 dapat mengukur kadar gas LPG antara 500 ppm – 10.000 ppm dan sensor gas metana TGS2611 dapat mengukur kadar gas metana antara 500 ppm – 10.000 ppm. Sensor gas LPG dalam keadaan normal ketika bernilai 1.800 ppm dan sensor gas metana dalam keadaan normal ketika bernilai 5.000 ppm. Sensor gas LPG dan metana kembali ke keadaan normal setelah mencapai titik jenuh pembacaan kadar gas pada ruang penyimpanan tabung gas rata-rata 3,09 menit. Sistem monitoring dapat bekerja menampilkan kondisi pada ruang penyimpanan tabung gas LPG secara *realtime* dengan menggunakan *smartphone*.

**Kata kunci** : Gas LPG, Gas Metana, Logika Fuzzy Mamdani, *IoT*

# ABSTRACT

## DESIGN AND BUILD MONITORING SYSTEM OF CONCENTRATION CONTENT OF LPG AND METHANE IN THE STORAGE ROOM OF ELPIJI GAS WITH FUZZY LOGIC BASED ON INTERNET OF THINGS

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Liquefied Petroleum Gas (LPG) is an alternative fuel that people use for their daily needs. However, the rampant fires caused by leaks of LPG gas cylinders are often a frightening thing for the people who use the gas, so a monitoring system is needed to detect gas cylinder leaks. In this study using gas sensors namely TGS2610 and TGS2611. This system uses the Mamdani fuzzy logic method. Mamdani fuzzy logic is used to determine the condition of the LPG gas cylinder storage room. The input from this system consists of iso-butane/propane (LPG) gas content values and methane gas content values. Enter the iso-butane/propane (LPG) gas content value obtained from the TGS2610 sensor, while the methane gas content value is obtained from the TGS2611 sensor. The result of the fuzzy process is a grouping of conditions in the storage room for LPG gas cylinders as system output. The processed data is sent to the database and then displayed on the Android application for monitoring.

Based on the results of the tests that have been done, the system can run smoothly. Data accuracy from fuzzy logic sent from Raspberry Pi to MIT App Inventor has worked very well. The performance of the TGS2610 LPG gas sensor can measure LPG gas levels between 500 ppm – 10,000 ppm and the TGS2611 methane gas sensor can measure methane gas levels between 500 ppm – 10,000 ppm. The LPG gas sensor is in normal condition when it has a value of 1,800 ppm and the methane gas sensor is in normal condition when it has a value of 5,000 ppm. LPG and methane gas sensors returned to their normal state after reaching the saturation point for reading gas levels in the gas cylinder storage room for an average of 3.09 minutes. The monitoring system can work to display conditions in the LPG gas cylinder storage room in real time using a smartphone.

**Keywords**: LPG Gas, Methane Gas, Mamdani Fuzzy Logic, IoT