**DEVELOPMENT OF A MULTI-SENSOR SYSTEM FOR EVALUATING URINE QUALITY**

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| **ABSTRACT**  Multiple infections and diseases have strong, reliable biomarkers in human urine. Diabetes mellitus, urinary tract infection, and hepatovirus are the main disorders that relate to changes in urine composition and quality. Utilizing such characteristics of these diseases, urine quality evaluation can be a very reliable, non-invasive method to perform early diagnosis of diseases like diabetes. Both non-invasive and point-of-care systems can be considered major steps forward in the early diagnosis of diabetes. The objective of this study is to assess the quality of human urine by utilizing a multi-sensor system that measures two key parameters: ammonia concentration using the MQ137 sensor and urine turbidity using the SEN0189 sensor. The measurements of these sensors were collected by a microcontroller board and displayed on an LCD screen. The study utilized pre-tested real urine samples to display and verify the functionality of the application. An extensive evaluation of the sensitivity, accuracy, and error margins of the sensory application was performed to verify adequate results. Finally, this study presents a new, reliable, and cost-effective method for early diagnosis of diabetes. It has a great potential for implementation and customization for different urinalysis-related diseases. |

# Keywords: Urine quality, Diabetes, Ammonia, Turbidity, Sensor

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