**Implementation of Marker-Based Augmented Reality as a Learning Tool for the Mamdani Fuzzy Algorithm**

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# ABSTRACT

*Technological developments demand innovation in delivering abstract and complex lecture materials, such as fuzzy logic. This study develops the "Fuzzy Fun" application, an interactive learning media based on Augmented Reality (AR) using a marker-based tracking method to improve students' understanding and interest in the Mamdani Fuzzy method. This application is capable of visualizing educational videos and processing case study calculation simulations in real-time. The system was developed using the Multimedia Development Life Cycle (MDLC) method. System evaluation was conducted through three stages: Black Box Testing to test functionality, User Acceptance Testing (UAT) for interface feasibility, and the One Group Pre-Test and Post-Test method to measure comprehension effectiveness. Black Box results indicated that all features were validated and functioned properly. Testing on 39 students at Politeknik Negeri Jember PSDKU Sidoarjo showed a 90.2% increase in understanding, with an average pre-test score of 3.56 which significantly increased to 6.77 in the post-test. The UAT evaluation of the application obtained an index of 69.95%, categorizing it as "Feasible". These results prove that the "Fuzzy Fun" application is effectively used as an interactive and non-monotonous alternative learning media for fuzzy logic.*

***Keywords**: Augmented Reality, Interactive Learning Media, Mamdani Fuzzy Method, Marker-Based Tracking, Multimedia Development Life Cycle (MDLC),*