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(71)**Name of Applicant :**
**1)Geetha Kurikala, Assistant Professor**
Address of Applicant :Gurunanak University, Hyderabad, Telangana 501506. ---------- ----------
**2)Dr. V. Rathikarani, Assistant Professor, Dept. of CSE**
**3)S. Bavankumar, Assistant Professor, Dept. of CSE**
**4)Peer Mohideen, Assistant Professor, Dept. of AI&DS**
**5)R. Rajeshwaran, Assistant Professor, Dept. of AI&DS**
**6)Aarini. Rajeshwari, Assistant Professor, Dept. of CSE**
**7)K. Ganapathi Babu, Assistant Professor, Dept. of CSE**
**8)Podila Vanaja, Assistant Professor, Dept. of CSE**
**9)Kandhibanda Kalpana, Assistant Professor, Dept. of CSE**
**Name of Applicant : NA**
**Address of Applicant : NA**
(72)**Name of Inventor :**
**1)Geetha Kurikala, Assistant Professor**
Address of Applicant :Gurunanak University, Hyderabad, Telangana 501506. ---------- ----------
**2)Dr. V. Rathikarani, Assistant Professor, Dept. of CSE**
Address of Applicant :Annamalai University, FEAT, Chidambaram, Tamilnadu, 608002 ---------- ----------
**3)S. Bavankumar, Assistant Professor, Dept. of CSE**
Address of Applicant :St.Martin's Engineering College, Dhulapally, Secunderabad-500 100, Telangana, India. ---------- ----------
**4)Peer Mohideen, Assistant Professor, Dept. of AI&DS**
Address of Applicant :St.Martin's Engineering College, Dhulapally, Secunderabad-500 100, Telangana, India. ---------- ----------
**5)R. Rajeshwaran, Assistant Professor, Dept. of AI&DS**
Address of Applicant :St.Martin's Engineering College, Dhulapally, Secunderabad-500 100, Telangana, India. ---------- ----------
**6)Aarini. Rajeshwari, Assistant Professor, Dept. of CSE**
Address of Applicant :St.Martin's Engineering College, Dhulapally, Secunderabad-500 100, Telangana, India. ---------- ----------
**7)K. Ganapathi Babu, Assistant Professor, Dept. of CSE**
Address of Applicant :St.Martin's Engineering College, Dhulapally, Secunderabad-500 100, Telangana, India. ---------- ----------
**8)Podila Vanaja, Assistant Professor, Dept. of CSE**
Address of Applicant :St.Martin's Engineering College, Dhulapally, Secunderabad-500 100, Telangana, India. ---------- ----------
**9)Kandhibanda Kalpana, Assistant Professor, Dept. of CSE**
Address of Applicant :St.Martin's Engineering College, Dhulapally, Secunderabad-500 100, Telangana, India. ---------- ----------

(57) Abstract :
Software defect prediction is essential for improving software quality and realizing cost efficiencies in testing. The main aim is to identify and forward only defective modules to the testing phase. This study presents an intelligent ensemble-based model for software defect prediction that integrates various classifiers. The proposed model utilizes a two-stage prediction process to identify defective modules. Initially, four supervised machine learning algorithms are utilized: Random Forest, Support Vector Machine, Naïve Bayes, and Artificial Neural Network. These algorithms undergo iterative parameter optimization to attain maximum accuracy. In the subsequent phase, the predictive accuracy of the individual classifiers is amalgamated into a voting ensemble to generate the final predictions. This ensemble method enhances the precision and dependability of defect predictions. Seven historical defect datasets from the NASA MDP repository CM1, JM1, MC2, MW1, PC1, PC3, and PC4—were employed to implement and assess the proposed defect prediction system. The findings indicate that the proposed intelligent system for each dataset attained exceptional accuracy, surpassing twenty advanced defect prediction techniques, encompassing both base classifiers and ensemble methods.

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