Data Mining dalam prediksi pengembangan karier karyawan: Studi kasus Direktorat Human Capital Management PT XYZ = Data Mining for employee career development prediction: A Case study of the Human Capital Management Directorate at PT XYZ

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Abstrak

Manajemen karir merupakan elemen penting dalam mendukung kemajuan individu dan keunggulan kompetitif organisasi. Direktorat Human Capital Management (HCM) adalah direktorat yang bertanggung jawab dalam pengelolaan talent management pada PT XYZ. Namun, pengelolaannya saat ini masih dilakukan secara manual, yang tidak hanya memakan waktu lama tetapi juga rentan terhadap subjektivitas. Kondisi ini berkontribusi pada ketidaksesuaian penempatan karyawan dengan kompetensi yang dimiliki, serta berdasar pada data histori HRIS menunjukan penurunan 38% karyawan yang mengalami promosi atau rotasi dalam periode 2022 sampai dengan 2024. Penelitian ini bertujuan untuk membangun model prediksi pergerakan karir karyawan berbasis algoritma klasifikasi serta mengidentifikasi atribut data yang dapat digunakan dalam prediksi data talent pool. Teknik feature selection, seperti correlation coefficient, information gain, dan gain ratio, digunakan untuk memilih atribut yang relevan dari data personal, posisi organisasi, dan profesionalisme karyawan. Pemodelan dilakukan menggunakan lima algoritma klasifikasi, yaitu decision tree, random forest, naïve bayes, neural network, dan support vector machine. Evaluasi model dilakukan menggunakan stratified 10-fold cross-validation dengan metrik akurasi, precision, recall, F1-score, dan AUC. Penelitian ini mnghasilkan neural network dengan correlation coefficient memberikan nilai akurasi tertinggi dengan nilai akurasi 94.8%, precision 93.9%, recall 80%, AUC 0.955, dan F1-Score 86.4%. Kombinasi atribut dengan correlation coefficient menghasilkan 17 atribut yang dapat digunakan kedepannya dengan analisis shap values yang mengidentifikasi atribut utama seperti OLD_BP , LOS_BAND, NILAI_PERFORMANCE, LOS_POS, dan JENIS_JABATAN sebagai kontributor signifikan terhadap prediksi kelas promosi. Selain itu, hasil menunjukkan perlunya mempertimbangkan atribut tambahan, seperti penilaian kompetensi dan perilaku karyawan, untuk penggunaan atribut data tersebut dalam prediksi data talent pool kedepannya dan mendukung proses pengelolaan talent management dan pada PT XYZ.
.....Career management is essential things for progression of individual careers and the competitive edge of organizations. Human Capital Management (HCM) Directorate holds the responsibility for overseeing talent management and human resource management at PT XYZ. However, in its implementation of talent pool data, the process of data analysis and career movement placement is still carried out manually, which requires significant time to complete and cause subjectivity. This condition contributes to mismatches in employee placement based on their competencies and based on HRIS historical data has led to a 38% decline in employee performance following promotions or rotations during the 2022 to 2024 period. This study aims to develop a career movement prediction model based on classification algorithms and identify key data attributes for talent pool predictions. Feature selection techniques such as correlation coefficient, information gain, and gain ratio were used to identify relevant attributes from personal data, organizational position, and employee professionalism.Classification algorithms were used to build predictive career movement data for promotion or rotation employee, including decision tree, random forest, naïve bayes,

neural network, and support vector machine. Model evaluation was performed using stratified 10-fold cross-validation with metrics such as accuracy, precision, recall, F1-Score, and AUC. The study results indicate that the combination of Neural Network with the correlation coefficient technique provided the highest accuracy, with an accuracy of 94.8%, precision of 93.9%, recall of 80%, AUC of 0.955, and an F1-Score of 86.4%. Feature selection with correlation coefficient produced 17 attributes for future use, with SHAP values analysis identifying key attributes such as OLD_BP, LOS_BAND, NILAI_PERFORMANCE, LOS_POS, and JENIS_JABATAN as significant contributors to promotion class predictions. Additionally, the findings highlight the importance of incorporating additional attributes, such as competency and behavioral assessments, for future talent pool predictions and to support the talent management process at PT XYZ.