ABSTRAK

Identifikasi citra produk jam mekanik menggunakan algoritma *Hidden Markov Model* (HMM) dilakukan untuk mempermudah pengguna dalam membedakan antara barang asli dan palsu. Dengan adanya pengujian identifikasi produk, kepercayaan pembeli dan citra produsen jam mekanik akan semakin terjamin dan diharapkan dapat meningkatkan penjualan produksi perusahaan. Penerapan algoritma HMM dalam tahap autentikasi jam mekanik memerlukan batasan penilaian standar perusahaan yang meliputi kesesuaian warna, kaca, dan jarum jam mekanik. Standar tersebut diterjemahkan kembali dalam bentuk persentase angka agar dapat dimengerti oleh sistem yang dibangun. Standar persentase dibagi menjadi probabilitas emisi dan probabilitas transisi HMM. Namun sebelum memasuki pengolahan menggunakan algoritma HMM, sistem perlu melalui tahapan pre-processing dan training data guna dapat melatih sistem dalam mengolah data jam mekanik. Hal yang mempengaruhi penelitian ini berupa jarak foto objek dengan kamera pada rentang 5-20 cm dan tidak buram maupun bergetar. Hasil penelitian akan berupa pernyataan jam mekanik masuk ke dalam kategori *Real* (asli), *Fake* (palsu), maupun *Further Inspection* (inspeksi lanjutan). Jam yang memiliki pernyataan kategori *Real* berarti dinilai sistem merupakan jam mekanik yang asli diproduksi oleh perusahaan Kailoka; *Fake* berarti jam mekanik dideteksi sebagai barang tiruan atau palsu; sedangkan *Further Inspection* berarti membutuhkan pendeteksian lebih lanjut oleh tim Kailoka. Pengujian sistem menggunakan metode black box dalam pengujian ini mendapatkan nilai akurasi sebesar 90% dari total data testing sebanyak 100 citra jam mekanik.

Kata Kunci — *Autentikasi, Hidden Markov Model, Jam Mekanik, Probabilitas Emisi, Probabilitas Transisi*

ABSTRACT

The identification of mechanical watch product images using the Hidden Markov Model (HMM) algorithm is carried out to help users distinguish between genuine and fake items. Through the product identification test, the trust of buyers and the reputation of mechanical watch manufacturers will be increasingly guaranteed, with the expectation of boosting sales of the company's production. The application of the HMM algorithm in the authentication stage of a mechanical watch requires the company's standard assessment limits, which include evaluating color suitability, glass integrity, and mechanical watch hands. These standards are then translated back into the form of a percentage number to be understood by the system being built. The percentage standard is divided into emission probability and HMM transition probability. However, before processing using the HMM algorithm, the system needs to go through the pre-processing and data training stages to effectively process mechanical hour data. An important factor influencing this research is the distance between the photographed object and the camera, which should fall within the range of 5-20 cm and should not be excessively blurry. The results of the research will be presented in the form of a statement categorizing mechanical clocks into Real, Fake, or Future Inspection categories. A clock that receives category Real statement indicates that the system judges it as a genuine mechanical clock produced by the Kailoka company. Fake means that the mechanical watch is detected as a counterfeit, and Future Inspection implies that it requires further evaluation by the Kailoka team. Testing the system using the black box method in this test yielded an accuracy value of 90% out of 100 mechanical clock images tested.

Keywords *— Authentication, Hidden Markov Model, Mechanical Clock, Emission Probability, Transition Probability*