BAB VI
KESIMPULAN DAN SARAN

6.1. Kesimpulan

Penelitian yang dilakukan berhasil mengembangkan model dan aplikasi manajemen persediaan berbasis kecerdasan buatan dan IoT untuk mendukung praktik retail berkelanjutan. Model dan aplikasi yang dirancang bekerja dengan cara memberikan notifikasi kepada pengelola retail untuk melakukan pengisian ulang persediaan pada *cold storage*. Notifikasi tersebut dihasilkan berdasarkan gambar persediaan yang diambil dengan menggunakan kamera dan diproses dalam model CNN yang telah dilatih. Pembagian kelas pada pelatihan model CNN untuk menentukan keputusan pengisian ulang dilakukan berdasarkan penentuan ambang batas laju penurunan biaya energi per unit per satuan waktu yang dapat mengoptimalkan biaya energi total per unit selama penyimpanan dan biaya total persediaan. Model dan aplikasi tersebut memberikan kontribusi terhadap operasi retail, khususnya dalam pengelolaan persediaan pada *cold storage*, dengan menjaga tingkat persediaan pada *cold storage*. Tingkat persediaan harus dijaga agar *cold storage* dapat bekerja dengan efisien, mengurangi konsumsi energi, dan menekan biaya energi per unit. Ketika tingkat persediaan pada *cold storage* terjaga, maka akan menghilangkan kemungkinan terjadinya *lost sales* serta kekosongan pada *cold storage* yang juga mengurangi pemborosan energi akibat *cold storage* yang bekerja tetapi tidak digunakan untuk mendinginkan produk. Model dan aplikasi manajemen persediaan yang diusulkan juga dievaluasi performanya dan dibandingkan dengan model manajemen persediaan tradisional berbasis pemantauan berkala dengan menggunakan model simulasi berbasis peristiwa. Hasil evaluasi menunjukkan bahwa model dan aplikasi manajemen persediaan berbasis kecerdasan buatan dan IoT dapat mengurangi biaya energi total per unit dan biaya total persediaan.

6.2. Saran

Terdapat beberapa saran bagi penelitian yang telah dilakukan dan dapat digunakan sebagai penelitian lanjutan. Pertama, model kecerdasan buatan yang digunakan untuk mendeteksi tingkat persediaan dapat dikembangkan menggunakan metode *object detection* yang dapat menghitung jumlah produk dengan lebih akurat sehingga dapat menangani batas pengisian ulang yang

dinamis, tidak seperti *image classification* yang harus dilatih ulang jika batas pengisian ulang berubah. Kedua, model manajemen persediaan yang diusulkan pada penelitian ini mengharuskan adanya pengisian ulang sesegara mungkin ketika terdapat notifikasi pengisian ulang. Penelitian selanjutnya dapat mempertimbangkan adanya toleransi rentang waktu pengisian ulang dari semenjak notifikasi pengisian ulang diterima. Adanya toleransi waktu pengisian ulang dapat berguna jika terdapat beberapa *cold storage*, sehingga dapat diputuskan waktu optimal untuk melakukan pengisian ulang pada beberapa *cold storage* secara bersamaan.

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