IMPLEMENTASI TEKNOLOGI *DEEP LEARNING* UNTUK MONITORING PERTUMBUHAN *LEGUME COVER CROP* (LCC) DI PERKEBUNAN KELAPA SAWIT MENGGUNAKAN FOTO UDARA (STUDI KASUS: PERKEBUNAN PT MUSTIKA SEMBULUH I)

Adinda Dwi Humaira
21/478319/SV/19263

INTISARI

Replanting di perkebunan kelapa sawit merupakan kegiatan penting yang dilakukan untuk meningkatkan produktivitas tanaman kelapa sawit. Salah satu tahapan *replanting* adalah penanaman *Legume Cover Crop* (LCC) guna menutupi tanah agar tidak ditumbuhi gulma parasit. LCC bersifat memiliki pertumbuhan yang sangat cepat, namun belum adanya sistem untuk monitoring pertumbuhan LCC khususnya di perkebunan kelapa sawit PT Mustika Sembuluh I. Penelitian ini bertujuan untuk mengembangkan model *deep learning* guna mendeteksi pertumbuhan LCC di perkebunan kelapa sawit dan membangun dashboard untuk penyajian data hasil deteksi LCC.

Metode dalam penelitian ini yaitu menggunakan arsitektur *deep learning* U-Net untuk melakukan *semantic segmentation* dalam pembuatan model *deep learning*. Data hasil deteksi kemudian disajikan dalam *dashboard* melalui platform ArcGIS Dashboard untuk memudahkan dalam melakukan monitoring pertumbuhan LCC.

Hasil dari penelitian ini adalah *Deep Learning Package* (DLPK) model *deep learning* yang dapat mendeteksi LCC dengan akurasi nilai F1 *Score* sebesar 83% dan nilai *Dice Coefficient* sebesar 0,82. *Dashboard* yang dibuat berisi peta interaktif foto udara beserta data hasil deteksi dan informasi statistik terkait LCC. Adanya model *deep learning* dan *dashboard* ini diharapkan dapat membantu PT Wilmar International Plantation dalam manajemen perkebunan khususnya LCC sehingga mempermudah untuk pengambilan keputusan.

Kata Kunci: *deep learning,* U-Net, *semantic segmentation, Legume Cover Crop*

IMPLEMENTATION OF DEEP LEARNING TECHNOLOGY FOR MONITORING LEGUME COVER CROP (LCC) GROWTH IN OIL PALM PLANTATIONS USING AERIAL IMAGERY (CASE STUDY: PT MUSTIKA SEMBULUH I PLANTATION)

Adinda Dwi Humaira
21/478319/SV/19263

ABSTRACT

Replanting in oil palm plantations is a crucial activity aimed at enhancing the productivity of oil palm trees. One of the key stages in replanting is the planting of Legume Cover Crops (LCC) to cover the soil and prevent the growth of parasitic weeds. LCC has a very rapid growth rate; however, there is currently no established system for monitoring LCC growth, particularly in the PT Mustika Sembuluh I plantation. This study aims to develop a deep learning model to detect LCC growth in oil palm plantations and to build a dashboard for visualizing LCC detection results.

The method used in this study involves applying the U-Net deep learning architecture for semantic segmentation to develop the deep learning model. The detection results are then presented on a dashboard using ArcGIS Dashboard, enabling efficient monitoring of LCC growth.

The findings of this study include a Deep Learning Package (DLPK)—a deep learning model capable of detecting LCC with an F1 Score of 83% and a Dice Coefficient of 0.82. The developed dashboard features an interactive aerial imagery map along with detection results and statistical information related to LCC. The implementation of this deep learning model and dashboard is expected to assist PT Wilmar International Plantation in plantation management, particularly for LCC, thereby facilitating better decision-making processes.

Keywords: deep learning, U-Net, semantic segmentation, Legume Cover Crop