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CSIRO Image2Biomass Prediction

ugm.ac.id



Our Team



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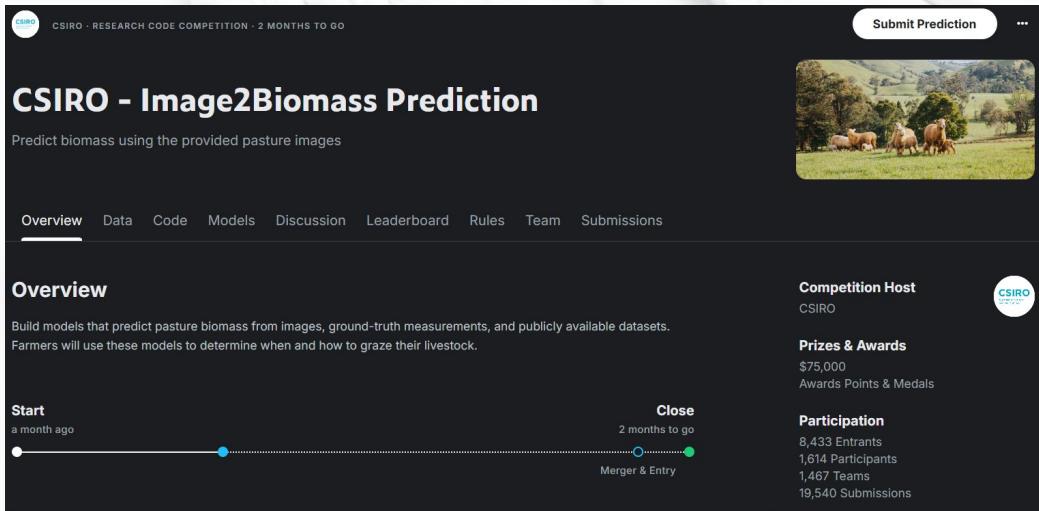


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Introduction



The screenshot shows the overview page of the CSIRO - Image2Biomass Prediction competition. At the top, it says "CSIRO - Image2Biomass Prediction" and "Predict biomass using the provided pasture images". Below this are navigation links: Overview (underlined), Data, Code, Models, Discussion, Leaderboard, Rules, Team, and Submissions. The main content area has a heading "Overview" and a sub-section "Start a month ago" followed by a timeline bar. To the right, there's a section titled "Close 2 months to go" with a "Merger & Entry" button. On the far right, there's a sidebar with "Competition Host CSIRO", "Prizes & Awards \$75,000 Awards Points & Medals", and "Participation 8,433 Entrants, 1,614 Participants, 1,467 Teams, 19,540 Submissions". At the very top right of the page is a "Submit Prediction" button.

Kompetisi ini bertujuan memecahkan masalah krusial dalam manajemen peternakan, yaitu sulitnya mengestimasi ketersediaan pakan (biomassa) secara akurat dan efisien. Metode konvensional saat ini dinilai terlalu lambat, sulit diterapkan dalam skala besar, atau kurang andal pada kondisi lahan yang bervariasi.

 <https://www.kaggle.com/competitions/csiro-biomass>



Tentang Dataset

Image



5 kelas target (continuous data)

Scoring Weight:

- Dry_Green_g: **0.1**
- Dry_Dead_g: **0.1**
- Dry_Clover_g: **0.1**
- GDM_g: **0.2**
- Dry_Total_g: **0.5**



submission.csv (test data)





Preprocessing

- **Transformasi Target**
- **Augmentasi:** Menggunakan teknik Random Rotation (30°), Horizontal/Vertical Flip, dan Color Jitter untuk membuat model lebih tahan terhadap variasi kondisi pencahayaan lahan.
- **Normalisasi menggunakan ImageNet**
- **Resize (224x224 untuk ResNet, 380x380 untuk EfficientNet).**



Eksperimen



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Fitur / Konfigurasi	Skenario 1	Skenario 2	Skenario 3	Skenario 4
Model Arsitektur	ResNet50	EfficientNet-B4	EffNet-B4 + XGBoost	DINOv2-Giant + SigLip
Pendekatan	Standard Transfer Learning	High-Res & Robust Loss	Deep Feature Extraction	Zero-shot Vision Feature Extraction + Classical Ensemble Regression (LGBM + GBR + Ridge)
Input Size	224 x 224 px	380 x 380 px	380 x 380 px	DINOv2: 518x518 px, SigLIP: 384x384 px
Optimizer	AdamW (lr=1e-4)	AdamW (lr=1e-4)	-	
Loss Function	MSE Loss	Huber Loss (delta=1.0)	Squared Error	L2 loss, squared error loss, L2 regression objective
Scheduler	-	Cosine Annealing	-	
Epochs / Estimators	25 Epochs	15 Epochs	100 Trees (Estimators)	5-Fold GroupKFold Cross-Validation
Batch Size	16	8	32 (Feature Extraction)	
Regularisasi	Dropout 0.3	Dropout 0.4	Max Depth 5, lr=0.005	L2 ($\alpha = 1.0$), subsample=0.8, subsample=0.9
Validasi Score	High Error (MSE ~300+)	Best CV Loss (0.2965)	RMSE ~11.2 - 20.7	Average RMSE: 14.93



Result

Metrik	ResNet50 (Baseline)	EfficientNet-B4 (E2E)	EffNet-B4 + XGBoost	DINOv2-Giant + SigLIP
Input Size	224 x 224	380 x 380	380 x 380	DINOv2: 518×518 px, SigLIP: 384×384 px
Loss Function	MSE Loss	Huber Loss	Squared Error (XGB)	L2 loss, squared error loss, L2 regression objective
Val RMSE (Avg)	~22.3 (High)	~12.9 (Best)	~18.1	~14.93
Kelebihan	Training Cepat	Paling Akurat	Training Head Cepat	

569

mr.nobody



0.59



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“Terima Kasih”

“Fortis Fortuna Adiuvat,
keberuntungan berpihak pada yang
berani.”

