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CSIRO Image2Biomass Prediction

LOCALLY ROOTED,
GLOBALLY RESPECTED

ugm.ac.id



Our Team



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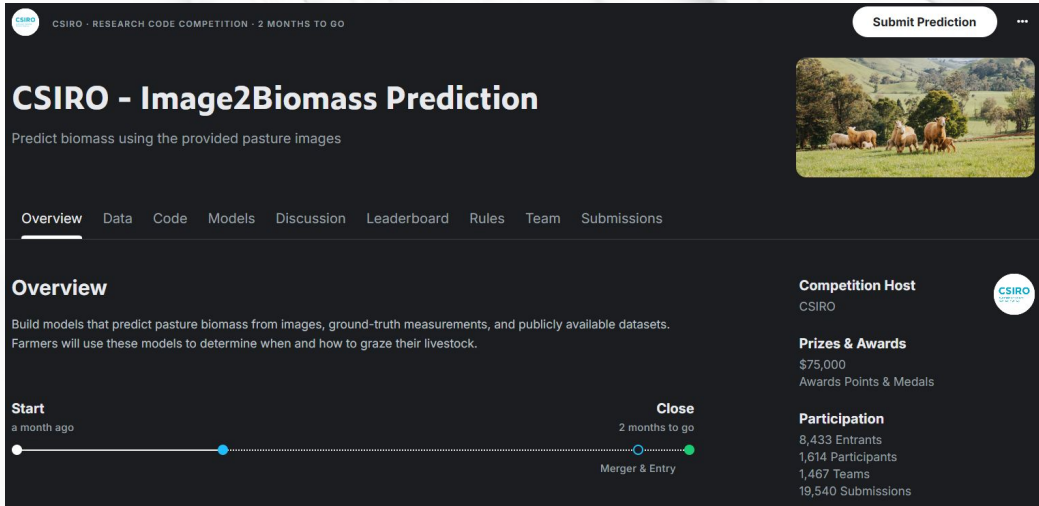


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Introduction



The screenshot shows the CSIRO Image2Biomass Prediction competition page. At the top, it says "CSIRO - RESEARCH CODE COMPETITION - 2 MONTHS TO GO" and has a "Submit Prediction" button. The main title is "CSIRO - Image2Biomass Prediction" with the subtitle "Predict biomass using the provided pasture images". Below this is a navigation bar with links: Overview, Data, Code, Models, Discussion, Leaderboard, Rules, Team, and Submissions. The "Overview" section is active, showing a description: "Build models that predict pasture biomass from images, ground-truth measurements, and publicly available datasets. Farmers will use these models to determine when and how to graze their livestock." There is a timeline at the bottom with "Start" (a month ago) and "Close" (2 months to go) markers, with a "Merger & Entry" point in between. On the right, there are sections for "Competition Host" (CSIRO), "Prizes & Awards" (\$75,000 Awards Points & Medals), and "Participation" (8,433 Entrants, 1,614 Participants, 1,467 Teams, 19,540 Submissions).

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_Death_g: **0.1**
- Dry_Clover_g: **0.1**
- GDM_g: **0.2**
- Dry_Total_g: **0.5**



submission.csv (test data)





Preprocessing



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- **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 + SigLlip
Pendekatan	<i>Standard Transfer Learning</i>	<i>High-Res & Robust Loss</i>	<i>Deep Feature Extraction</i>	<i>Zero-shot Vision Feature Extraction + Classical Ensemble Regression (LGBM + GBR + Ridge)</i>
Input Size	224 x 224 px	380 x 380 px	380 x 380 px	DINOv2: 518×518 px, SigLIP: 384×384 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 (<i>Estimators</i>)	5-Fold GroupKFold Cross-Validation
Batch Size	16	8	32 (<i>Feature Extraction</i>)	
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 + SigLlip
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.”

