Title : Flood Detection and Alert System for Proneness Flooding Regions in Myanmar

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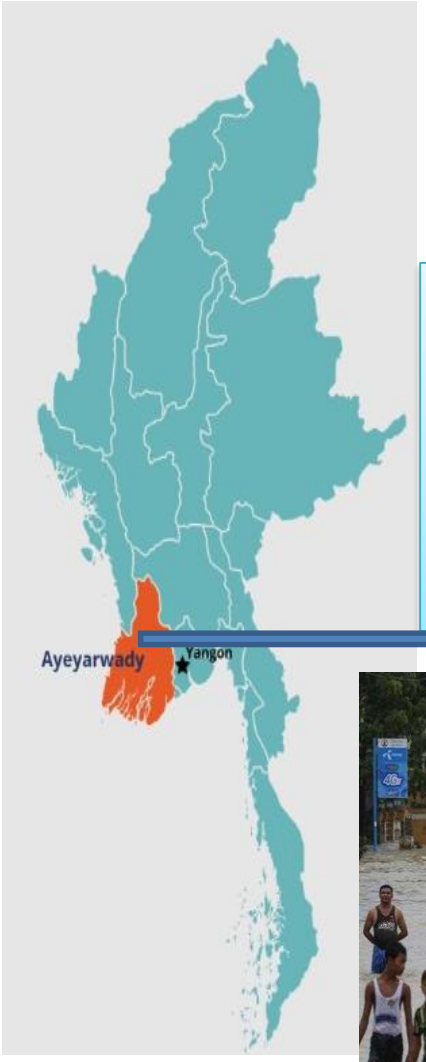
Flood Detection and Alert System for Proneness Flooding Regions in Myanmar

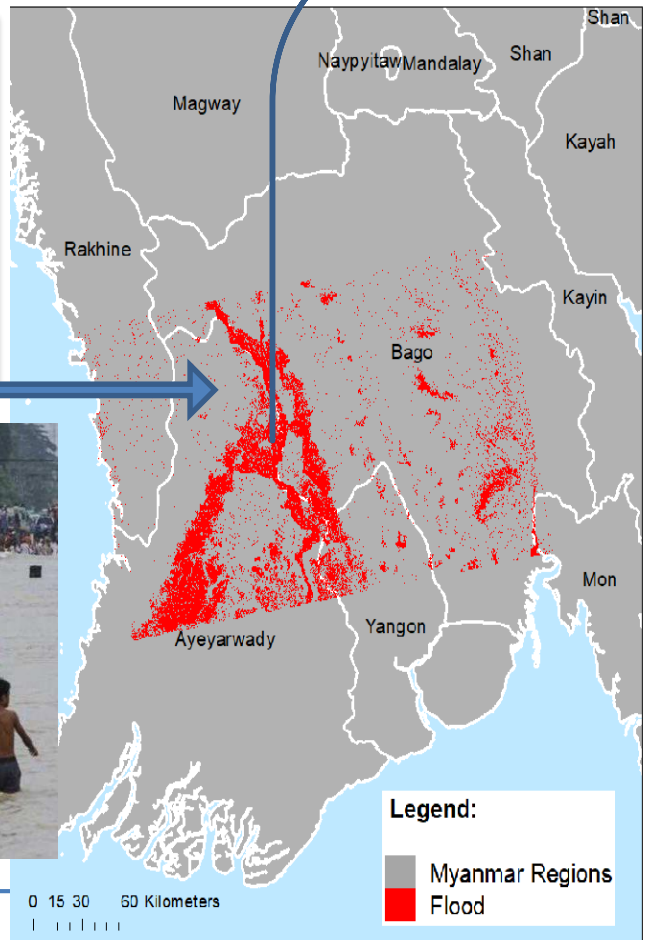
Flood Damage Status

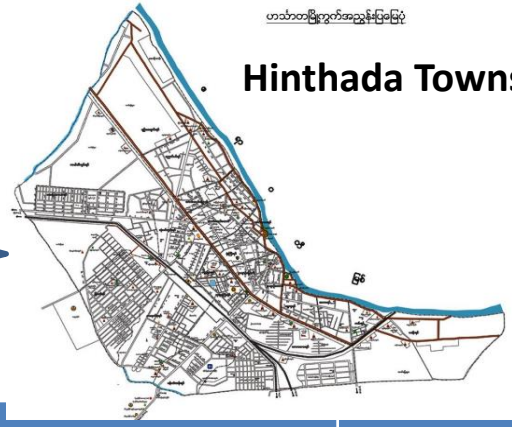


- Overview of Myanmar's vulnerability to natural hazards.
- Flooding as the most frequent natural hazard.
- Importance of timely flood predictions.

Flooding Cause

- river flooding
- riverbank erosion
- moonson rain
- storm





Hinthada Township

Type	2024 (June)	2021
Cliff collapse	22 (Times)	71 (Times)
Building damage	175 (quantity)	727 (quantity)
Agricultural Land Damage	5000 (arces)	
Loss Value (million kyats)	27. 00	91.27
Affected_ Households	1000	

Impacts of Flooding Affected in Myanmar

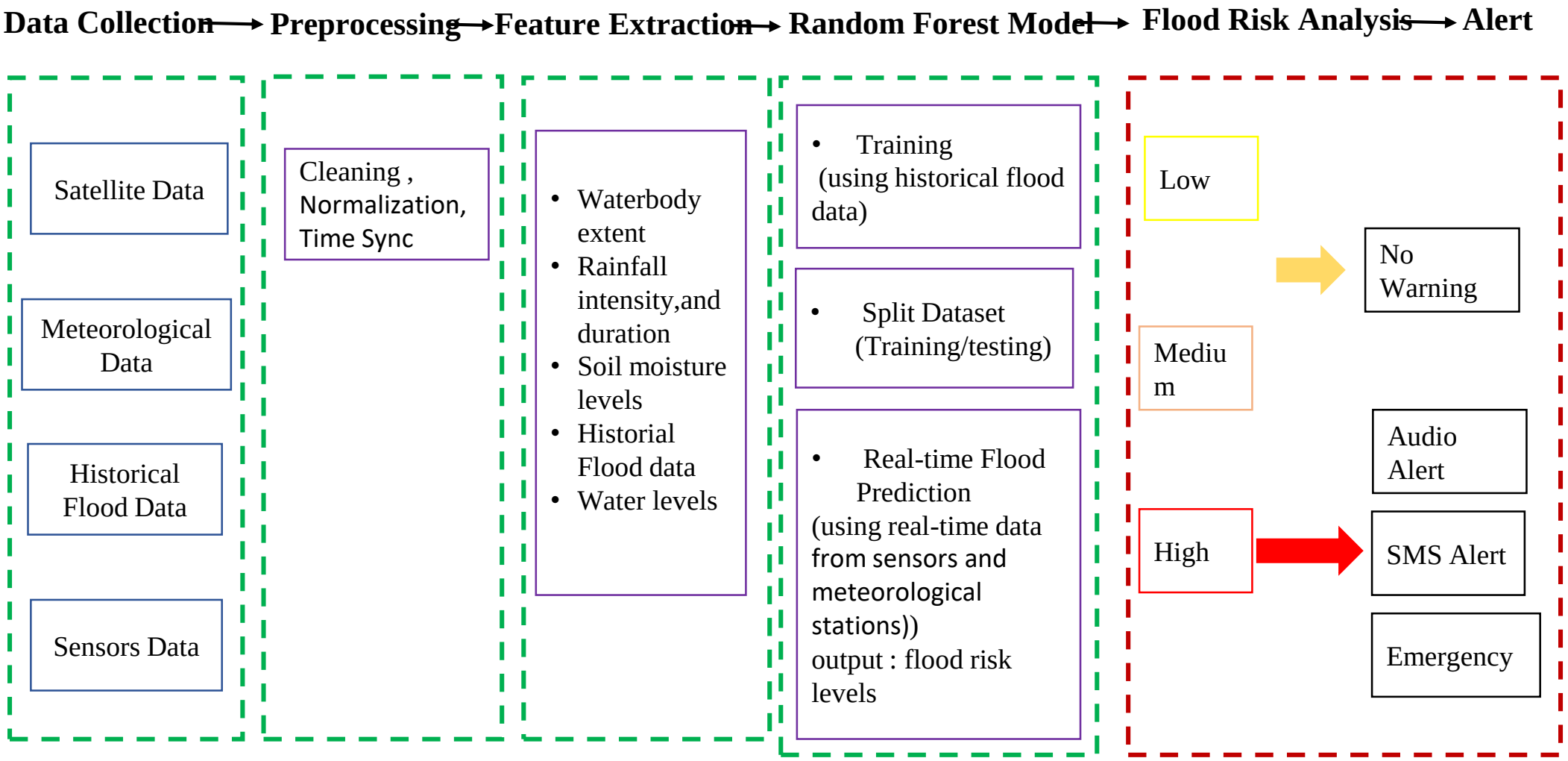
- Seasonal Occurrence from June to November.
- Impact on rural areas along major rivers: Ayeyarwady, Chindwin, and Sittaung .
- Consequences: loss of life, property damage, and agricultural disruption.

Targets: Need for a Flood Detection System

- Increasing frequency and intensity of floods.
- Urgent need for advance warning systems.
- Aim : Minimize impacts on communities and agriculture.

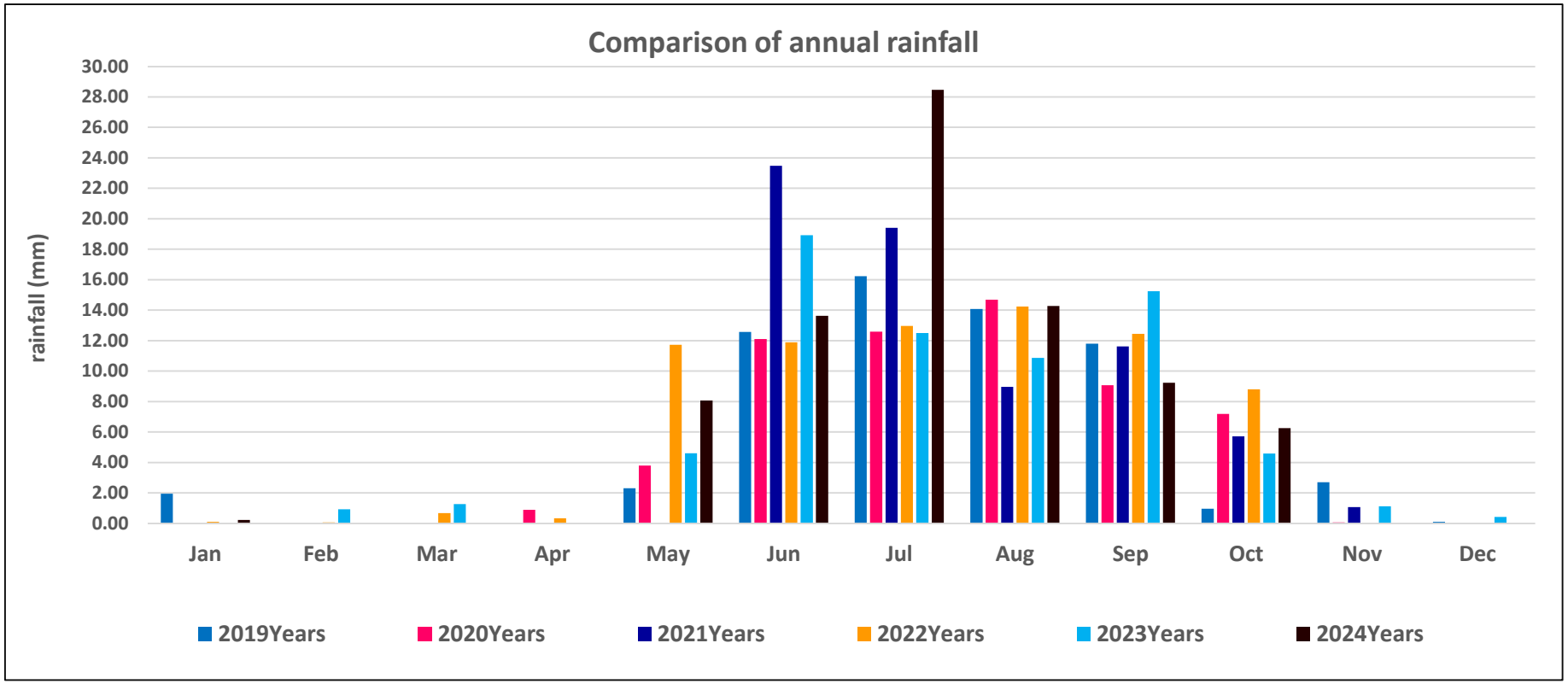
Proposed Method: Flood detection and alert system

- Utilizes machine learning techniques (Random Forest algorithm).
- Integrates various alternative data sources.
- **Goal:** Provide rapid and accurate flood risk predictions.



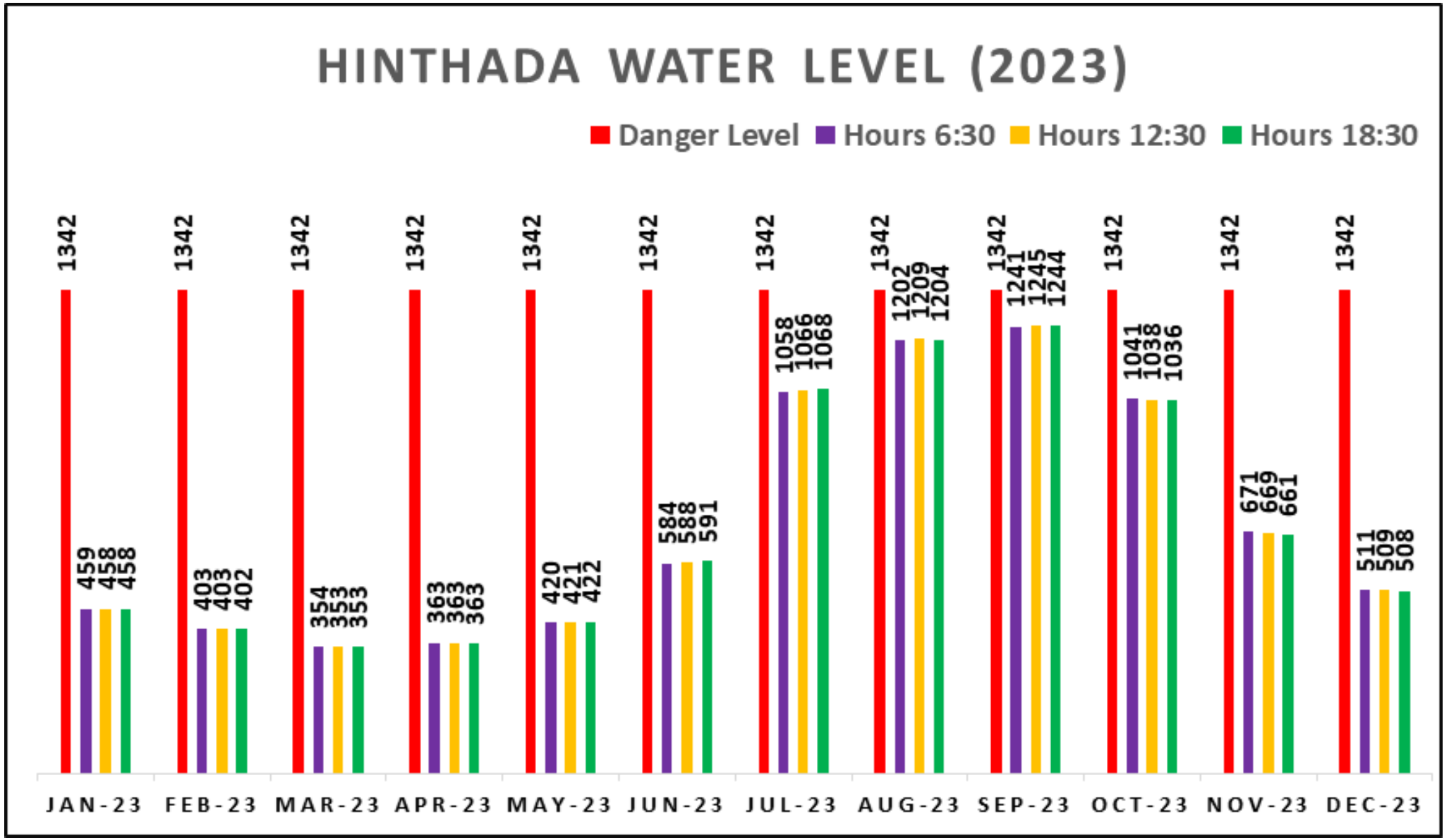
Process Flow Diagram of flood detection and alert system

Observation Hinthada Rainfall Data Analysis



Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2019Years	1.94	0.00	0.00	0.00	2.30	12.57	16.23	14.07	11.79	0.97	2.71	0.10
2020Years	0.00	0.00	0.00	0.89	3.79	12.10	12.59	14.68	9.07	7.19	0.07	0.00
2021Years	0.00	0.00	0.00	0.00	0.00	23.47	19.41	8.97	11.62	5.71	1.07	0.00
2022Years	0.10	0.07	0.68	0.33	11.73	11.89	12.97	14.23	12.44	8.80	0.00	0.00
2023Years	0.00	0.93	1.26	0.00	4.61	18.93	12.50	10.86	15.24	4.58	1.13	0.42
2024Years	0.23	0.00	0.00	0.00	8.07	13.62	28.47	14.28	9.24	6.25		

Observation Data of Water Level



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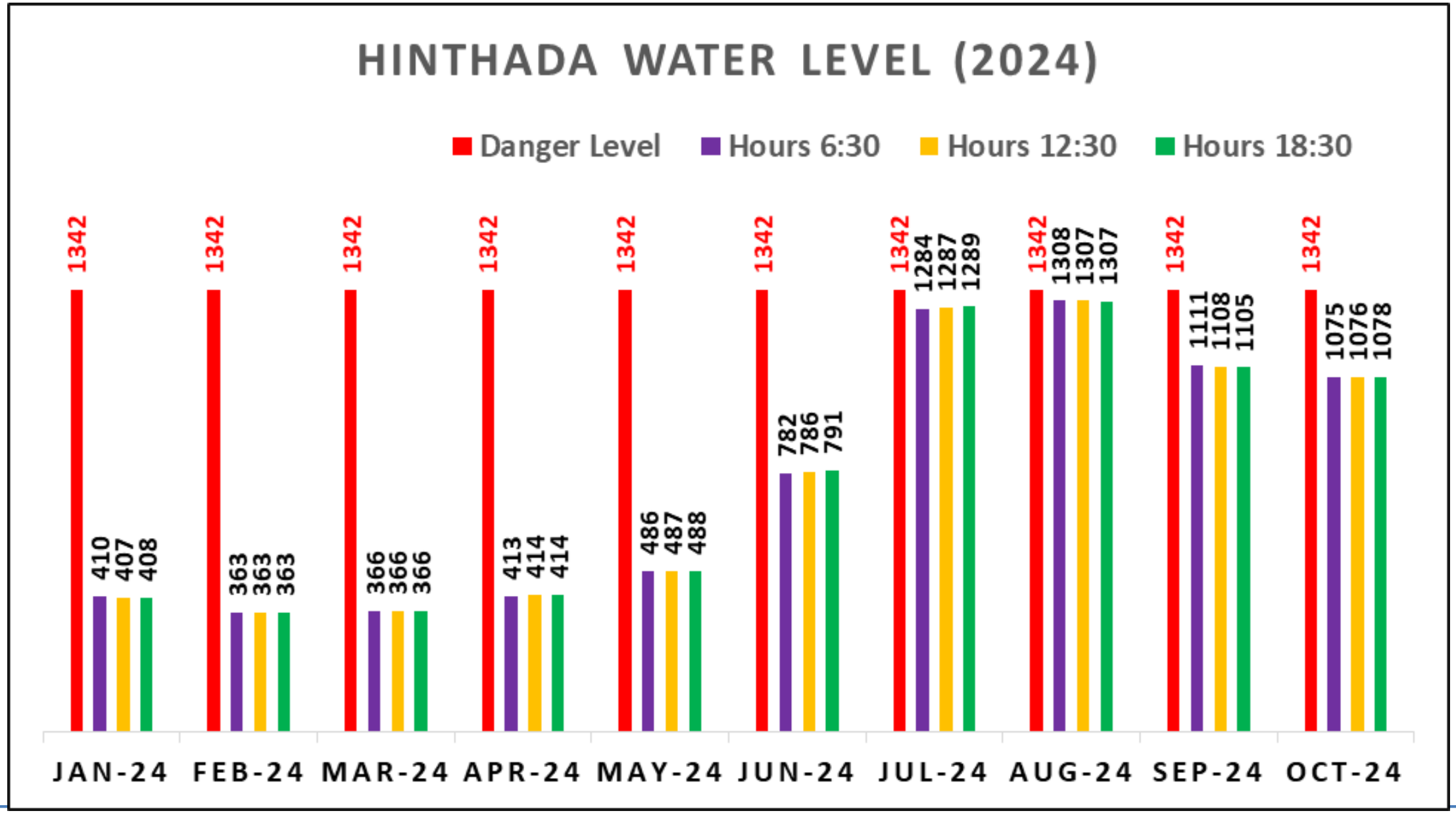
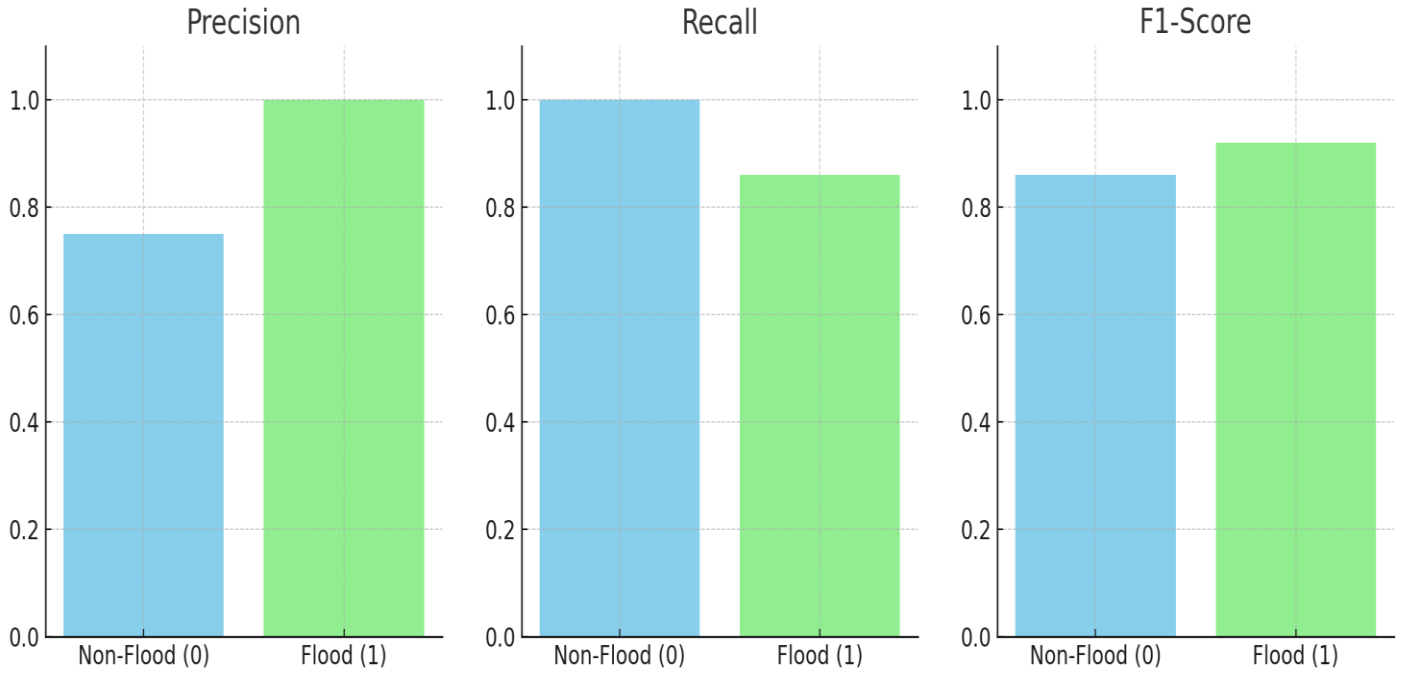


Performance of Random Forest Model on Rainfall data and Water levels

July	Rainfall	Water-level	Flood Label(Flood = 1, Non flood = 0)
1	1	1012	0
2	27	1024.67	0
3	37	1028	0
4	0	1030	0
5	0	1036	0
6	5	1049.33	0
7	1	1083	0
8	2	1122	0
9	30	1098	0
10	10	1204	0
11	9	1237.67	0
12	7	1273	0
13	0	1309.67	1
14	1	1347.67	1
15	18	1380	1
16	17	1408.67	1
17	43	1431	1
18	8	1438	1
19	10	1440	1
20	32	1438.67	1
21	35	1435.33	1
22	8	1429	1
23	34	1424	1
24	18	1417	1
25	43	1412	1
26	110	1411	1
27	93	1409.67	1
28	79	1404	1
29	105	1386.33	1
30	40	1362	1
31	31	1359.67	1



Benefits of the System

- Timely flood alerts for better disaster preparedness.
- Accurate flood predictions using diverse data sources.
- Proactive response to minimize flood damage.
- Adaptability to different flood-prone regions of Myanmar.

Output/Outcome:

- Transformative Effects on Communities and Nations
- Improved disaster preparedness and early warnings
- Reduced economic losses by safeguarding assets and infrastructure
- Saved lives through timely evacuation and response
- Enhanced resilience and faster recovery from floods
- Accurate real-time predictions with sensors, satellite imagery, meteorological data
- Utilized Random Forest for accurate flood predictions
- Collaboration with local authorities and emergency response teams

Conclusion:

- The proposed flood detection and alert system enhances disaster preparedness in Myanmar.
- Machine learning techniques, random forest provide reliable flood forecasting and timely alerts.
- By utilizing various data sources, the system enables proactive measures to minimize flood impacts.

Thank you so much.