NAVSARI AGRICULTURAL UNIVERSITY

NAHEP

भाकृअनुप
ICAR

National level Hackathon on Smart and Remunative Farming

March 05, 2022

THEMATIC AREA: AGRICULTURE SECTOR

PROBLEM STATEMENT: POST HARVEST INNOVATIONS IN AGRICULTURE AND HORTICULTURE CROPS

PROPOSED SOLUTION : POSTHARVEST DISEASE IDENTIFICATION BY CONVOLUTIONAL NEURAL NETWORK (CNN)AND AUGUMENTED BY SYNTHETIC DATA GENERATION BY GENERATIVE ADVERSARIAL NETWORK(GAN)

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OBJECTIVE

- To enhance the qualitative and quantitative losses during postharvest by deep learning techniques.

- To detect the post-harvest disease using Conditioinal GAN and supplemented by synthetic data generation using Generative Adversarial Network (GAN)

BACKGROUND

- Agricultural Sector and Post-Harvest Technology - **need to adopt strategies to curtail the post-harvest losses.**
- Post-Harvest losses are substantially high - **in developing countries**
- Postharvest diseases cause **qualitative and quantitative** losses of vegetables and make them unfit for human consumption due to **potential health risks**
- Good **postharvest management** practices supported by good **technologies** will maintain the quality of vegetables and reduce quantitative losses
- Post-Harvest management and technology addition, widely accepted and adopted by the **farmers, entrepreneurs, start-ups across the country.**

LEVEL OF INNOVATION OF SOLUTION

- Using images to determine the health of the leaves rather than physical examination
- When compared to manual labour, the proposed methodology has no effect on the entire plant
- More than the economical feasibility it is more user friendly

TECHNICAL FEASIBILITY

- Digital farming brings increased precision to crop production
- To implement the standardized solution for the farmers
- Farmers can now rely upon ML to assess complex patterns and accurately identify the plant disease

ALIGNMENT WITH CHALLENGES

UNANTICIPATED DISEASE

PRECISION

DATASET EXTRACTION

IMAGE RESOLUTION

BUSINESS VALUE & SCALABILITY

BUSINESS VALUE:

- The proposed method could be turned into a farmer-friendly application

- Application maintenance entails constantly updating, modifying, and re-evaluating software applications to correct flaws.

SCALABILITY:

- Providing services in vernacular languages can improve Scalability

POTENTIAL IMPACT

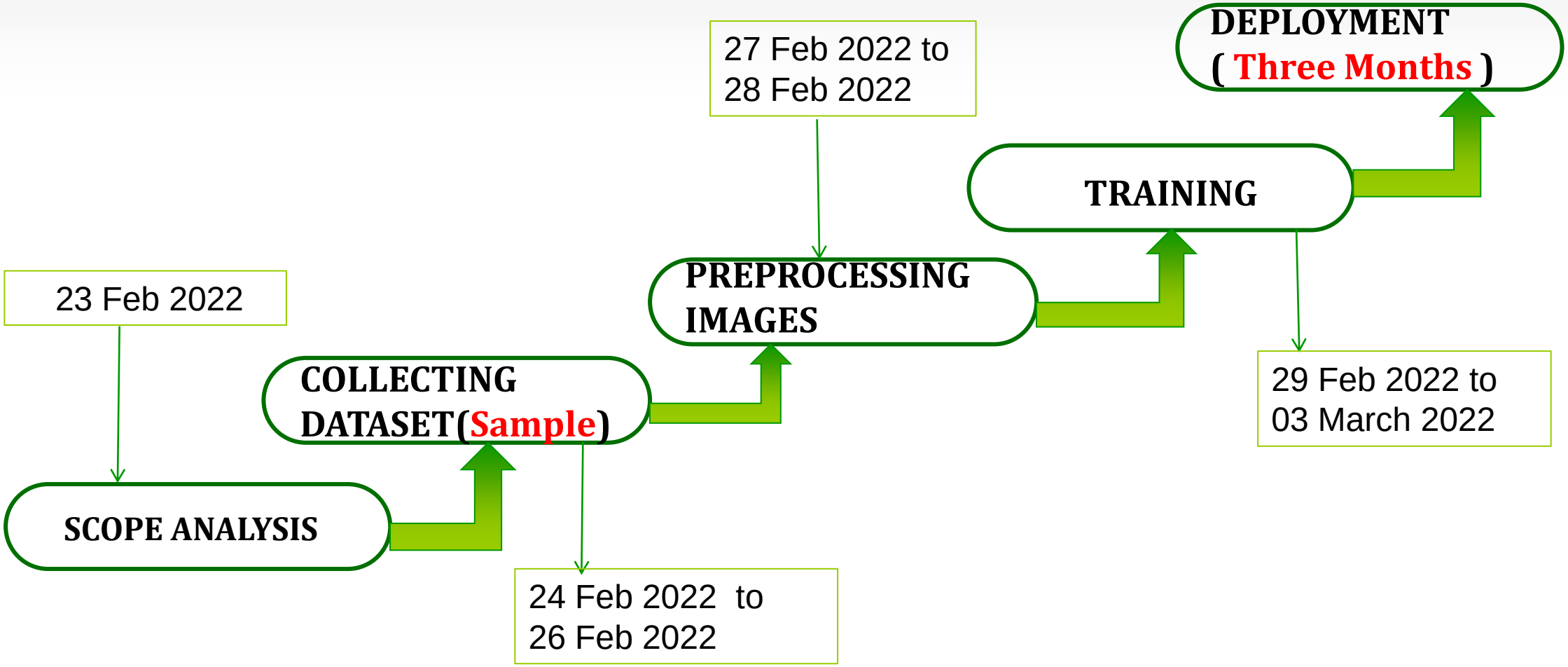
- ✓Avoids substantial management issues and economic losses in the agriculture
- ✓At least 10% of global food production is lost due to plant disease
- ✓ Crucial factors => Early detection, Timely mitigation and Disease management

BUDGET REQUIREMENT

S.no	Items	Amount
1	Stakeholder interaction and data collection	5000
2	GPU Training,compute sources	10000
3	Cloud/Big Data platform	15000
4	Testing the prototype & Deployment	20000
TOTAL		**50000**

STAGE OF DEVELOPMENT

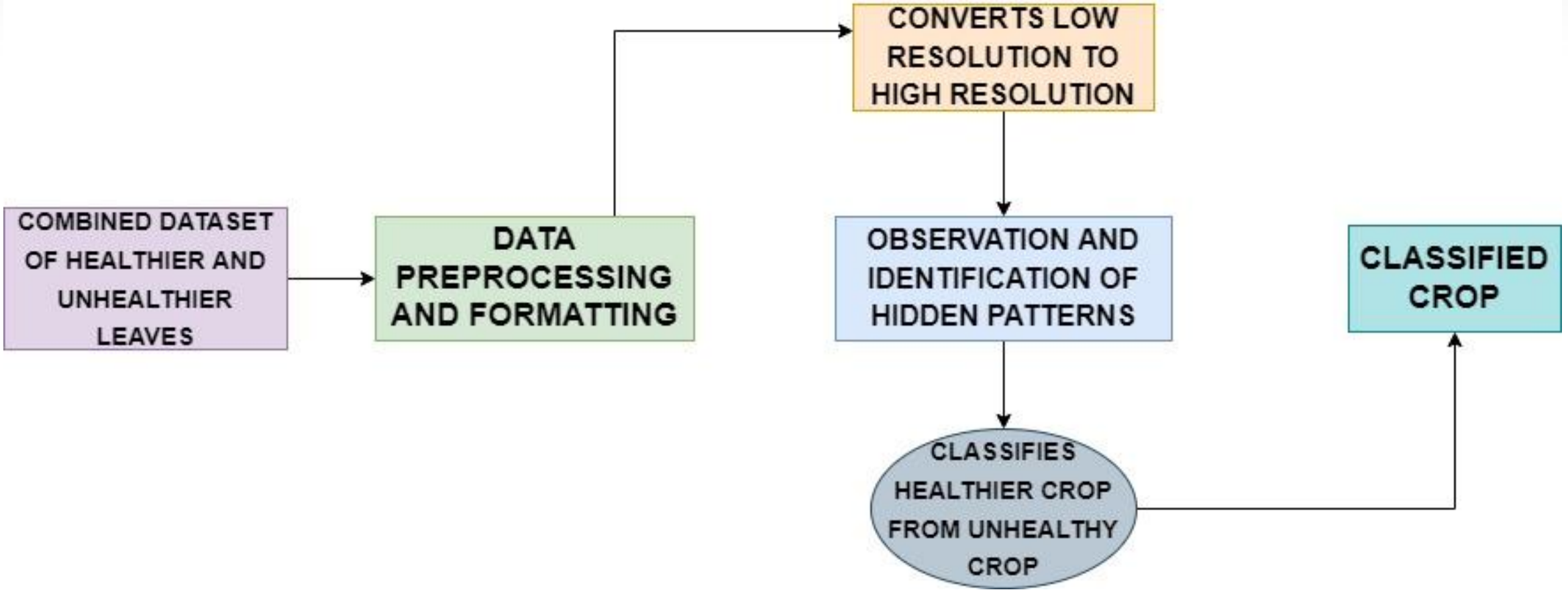
DEVELOPMENT STATUS OF THE PROPOSED METHODOLOGY:



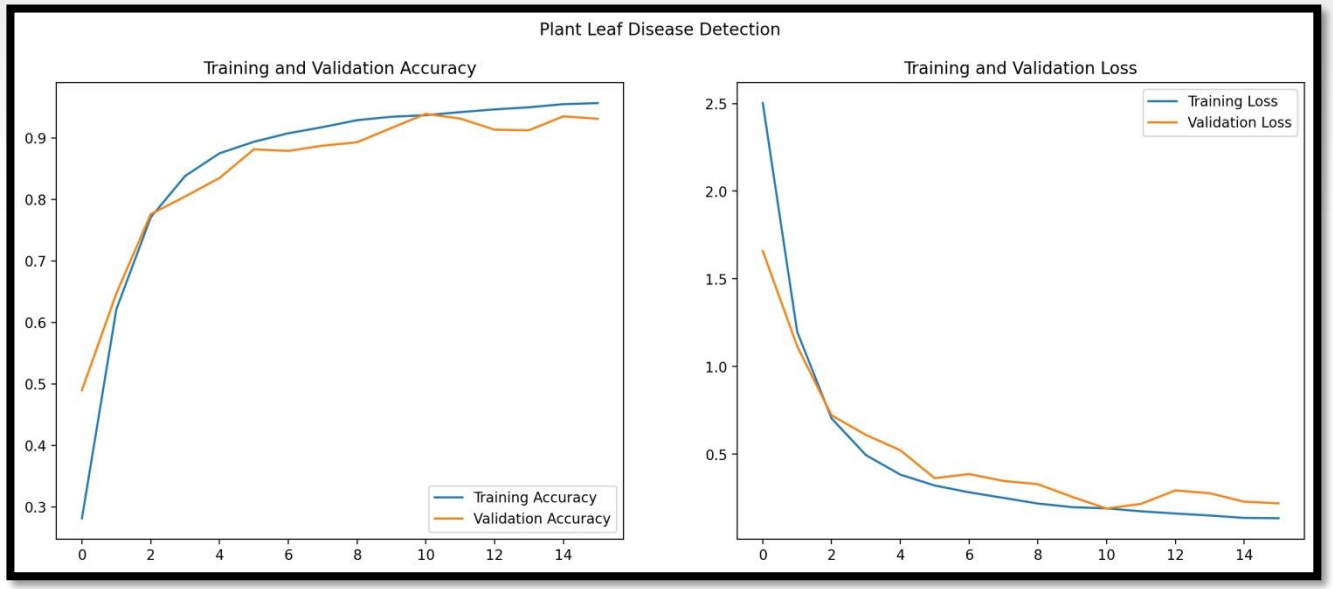
RISK FACTORS

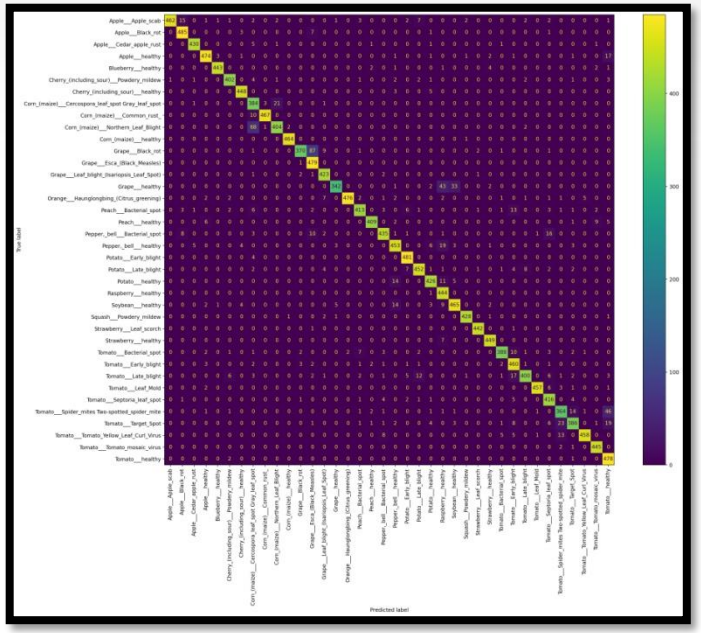
- **DATA MANAGEMENT-**unbalance of data between generator and discriminator causes overfitting.
- **DATASET AVAILABILITY**-the availability of real-time datasets is limited.
- **TRAINING-** to train the ML model with custom dataset.

ARCHITECTURE



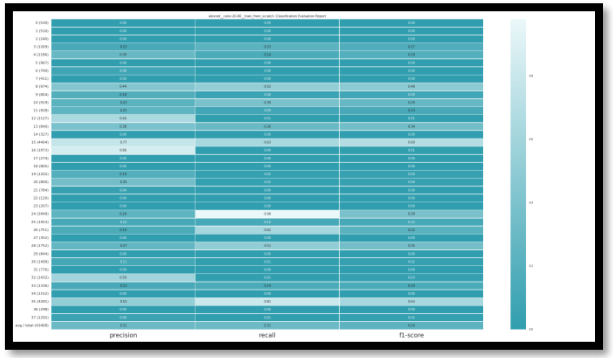
RESULT





Metrics

	Train	Validation	Test
Count of Records	70,295	17,572	33
Categorical Cross-entropy	0.1908	0.186	-
Categorical Accuracy	93.70%	93.91%	93.93%




Seeds of
GRATITUDE