

Multi-cuisine and Multi-data Screening of Food quality at Service Points using Object Detection capabilities of YOLO NAS AND 60

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Key Contextual Details

- Title: Multi-cuisine and Multi-data Screening of Food quality at Service Points using Object Detection capabilities of YOLO NAS
- Paper Id: 60
- Nationality: India
- Domain: Other topics->Data Analytics
- Number of Authors: 5
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- Research Method: Mixed Methods Research

Motivation- Some Key Points of Pre-Study Survey

- The survey is segregated into two phases for the comprehensive start of the current study:
 - Problem Identification
 - Relevant Survey-type data collection
- Major problems are insects in food, unhygienic containers, and miscellaneous impurities.
- Data collection is done only from our organization for unit-wise/bottom-up approach to our proposed solution
- Though the rate of food poisoning is 43.2%, it is still significant.

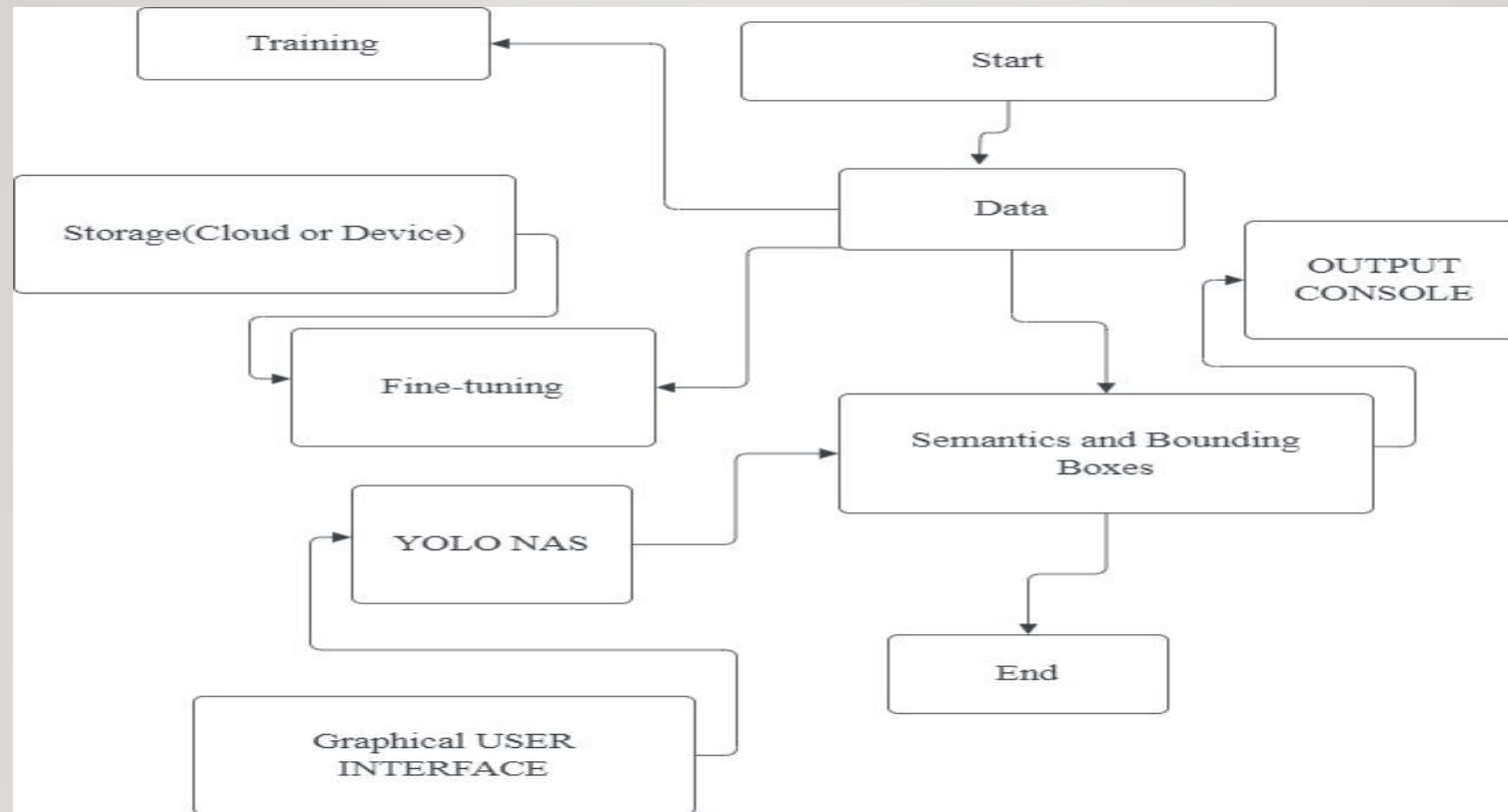
Introduction

- Food contamination is adversely affecting the quality of food, thus contributing to entirely new problem which may be appropriately termed “**Food Pollution**”.
- There are many existing methods and techniques to analyze grain quality, standards of the agricultural produce, etc., but still there is a need for developing sophisticated computational methods for the analysis of food quality.
- The current method involves computer vision technique of YOLO NAS to analyze the foreign substances, impurities, etc.
- There are also sustainable techniques like biomass and animal feed alternatives

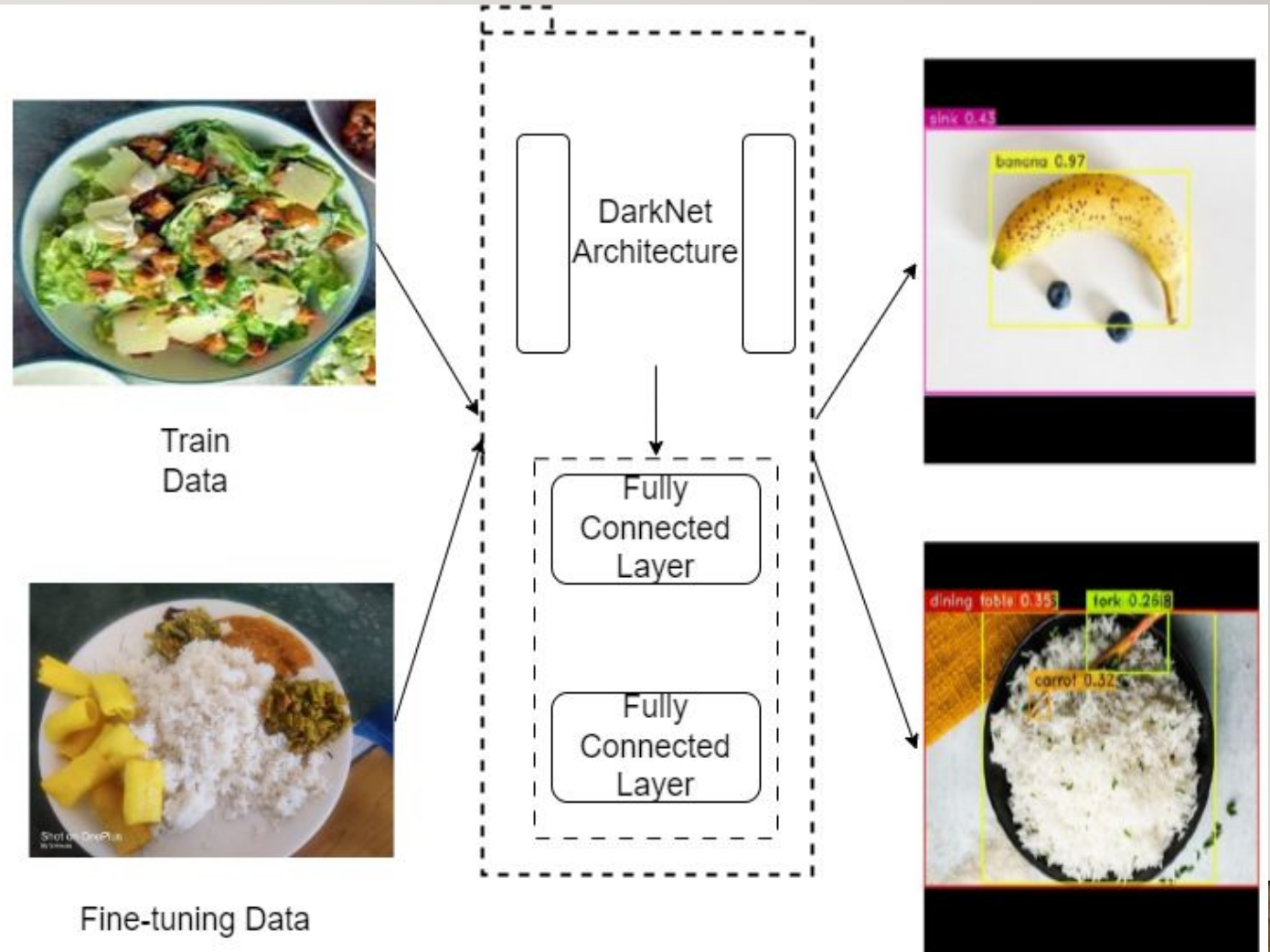
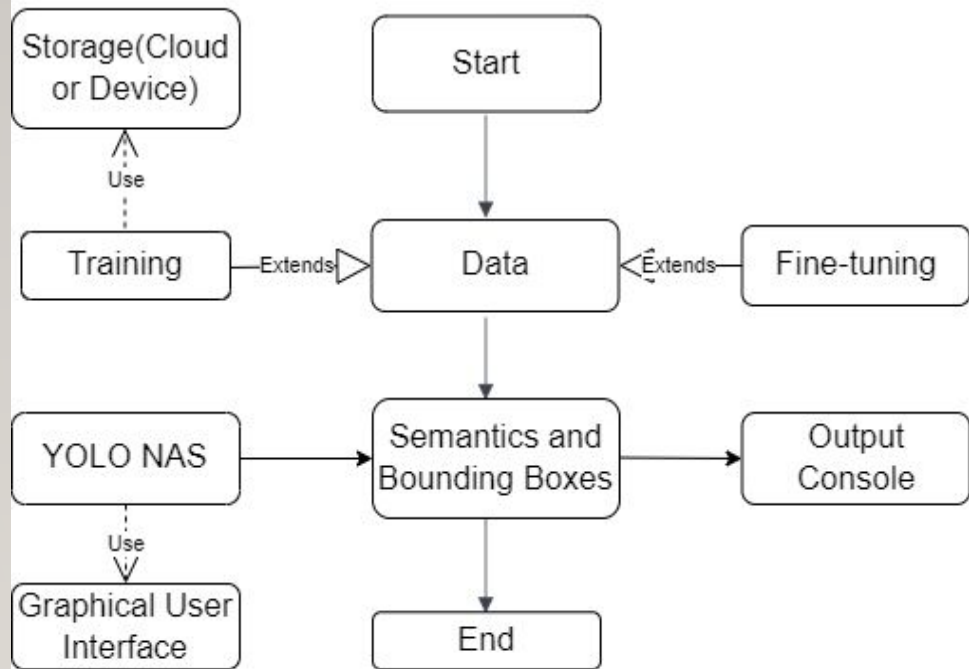
Existing System

- Radiographic moot for non-invasive testing
- IoT devices to analyze the quality of food physically
- Food Standardization and Benchmarking
- Contract and evaluation based models for food quality prediction

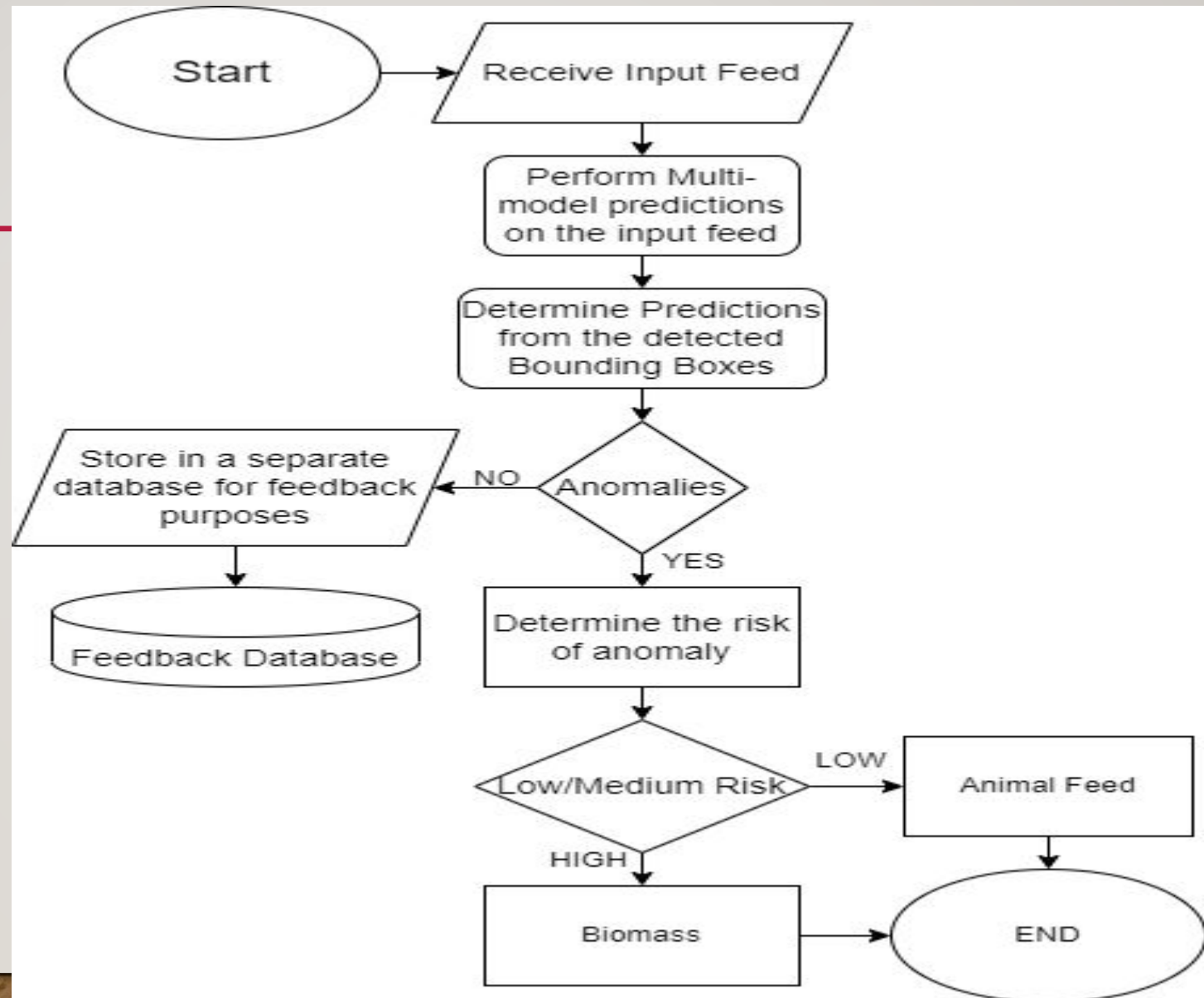
Data Collection



Tech Stack



Methodology



Tech Stack- Continued

- This is a Neural Architecture Search.
- An improved version over YOLO V8
- Improved Accuracy and less errors
- Confidence interval too is broad

Results

- Deciding Factors identified
 - orientations
 - Spatial considerations
 - Luminous factors
 - Quality of the feed
 - Nature of the food and impurities
- Latent representations got better results in YOLO NAS compared to its predecessors
- No need of filters for better accuracy which serves a benefit
- Since this is a solution-driven research, accuracy numerical evaluations not presented.

Further Extensions proposed

Thermal Images

- Temperature based estimation
- Specific to material based thermal properties like thermal heat capacity, specific heat capacity, etc.
- Thermographic fragments as a future part of the current research.

Radio Images

- Purely physical-based matter analysis and quality estimation
- Based on the existing system which uses Radiographic Moot
- Physical density, radial size, and reflectivity of the surface of the materials are the deciding factors

Conclusion

- Reiteratable points is that the food quality is at multiple times ignored
- Quality assessment products greatly and largely confined to Food Processing industries
- Thus, the current solution focusses on bringing and disbursal simple technologies across a wider domestic audience rather than miniscule industrial customers.
- This research also leaves a positive connotation on the health sector due to intricate interdependencies between lifestyles and various societal sectors

Future Work

- Theoretical formulation of the **Food Neural Network**.
- Practical implementation of the proposed extensions in the previous slide.
- Increase in the number of plausible sustainable goals and solutions of the proposed solution
- Radicalization of Electromagnetic Spectrum potential influence on the field of food quality.

Thank you for your time

Happy to Receive your Questions and Suggestions