TANGONET SOLUTIONS

CASE STUDY

ISV Leverages Tangonet's Expertise in Video Analytics, AI/ML to Extract Nutritional Information from Prepared Food Images

1. The Challenge: Extracting Nutritional Data from Visual Food Representations

Introduction of the Client:

ISV, a leading innovator in the food and technology sector, has been pioneering solutions to bridge the gap between dietary needs and food consumption for those with Type 1 Diabetes. However, extracting accurate nutritional data from mere visuals of prepared food has presented a challenge for diabetics and others who must accurately measure their food and nutritional intakeintake.

The Problem Statement:

While many solutions exist for pre-packaged foods with nutritional labels, getting the same data for a plate of freshly prepared food was always a guess. The traditional method of manual user tracking and input was prone to inaccuracies.

Client's Objective:

To develop an innovative solution capable of capturing and interpreting data taken from photos of prepared foods to extract accurate nutritional information, thereby enhancing the user experience, health awareness and reduced risk of the consequences of improper nutritional intake.

2. The Solution: Harnessing the Power of Machine Learning and Cloud Computing

Initial Interaction:

Tangonet recognized the potential and the challenges in the ISV's vision. Through a series of brainstorming sessions, both teams agreed on a data-driven solution utilizing the latest in image recognition, machine learning and artificial intelligence technologies, that also needed to be built in alignment with the Client's scientific patents.

Our Proposed Solution:

Tangonet assembled a specialized team of three engineers: a Data Scientist, a Cloud Engineer, and a Python Developer. The proposal was to use RGB and near Infrared image (NIR) captures, using custom-developed camera and illumination technology, to recognize and analyze the food on the plate in several dimensions.

Using AWS Sagemaker and a Python-based pre-processor, a machine learning process was developed to identify food types, density, and volume based on the captured images.

Implementation Details:

The Python Developer worked on building the image capture and pre-processor mechanism, aligned with the patented nutritional capture system. He also built a map of histograms necessary for the pixel by pixel analysis over the food surface.

The Data Scientist focused on creating machine learning models trained on a diverse dataset of food images and their nutritional values, creating a food classification and segmentation tool. The Cloud Engineer ensured seamless and scalable deployment of the solution on AWS, allowing real-time data processing and feedback, using AWS services such as Sagemaker, Lambda, Rekognition Augmented AI (A2I) as well as other standard AWS infrastructure services.

All team members worked together with the client's team to create a continuous learning process to improve the ML algorithms

3. The Results: A Revolutionary Approach to Dietary Awareness Immediate Outcomes:

In the first phase of the project (Proof of Concept), the ML/AI algorithms consistently achieved 90%+ accuracy in the recognition of the food type, classes, weight, volume. This was done using a relatively limited dataset. The next versions will use much more advanced camera technology to increase the image quality (and resulting data) and to improve the control over key environmental variables such as light conditions, to help "train up" the model even faster. In addition, we are accompanying the client to expand the technology into other domains such as seafood analysis and traceability.

Long-Term Benefits:
The models will be improved greatly thanks mainly to the improved camera technology. In the next phase of the project, new functionality and improved accuracy will help to expand food classes, types and variations that will lead to a game-changing application in the area of health and wellness.

4. Testimonials:

Client CEO: "Tangonet's innovative approach and technological expertise have been instrumental in turning our vision into a reality, using the very latest technologies in machine learning and artificial intelligence to help make our dream a reality. We look forward to deepening our partnership in the next phases of this project and the expansion into other domains."

Systems Integrator CEO: "The Tangonet nearshore team made this possible with a diverse yet cohesive group of tech professionals that worked collaboratively to bring the ambitious project to life. They seamlessly integrated into our team to provide a unique, cutting edge solution. "

5. Conclusion:
Tangonet's collaborative approach and technological prowess enabled ISV to offer a ground-breaking solution in the realm of dietary technology with applied AI and ML. With the successful implementation of this project, both companies have showcased the transformative power of technology when applied innovatively to real-world challenges.