# Project Description: Zombie Detection

**Objective:**

This project aims to create a robust system for detecting zombies in images through advanced object detection techniques. The primary objective is to fine-tune an SSD ResNet50 model using TensorFlow, specifically tailored for identifying zombies. The model's performance is evaluated by applying it to new images, and the project provides insights into the effectiveness of the detection process.

**Tools and Techniques**:

**1. TensorFlow and TensorFlow Model Garden**:

* Utilizing TensorFlow as the core framework for building and training the object detection model.
* Leveraging resources from the TensorFlow Model Garden, including pre-trained models and utility functions.

**2. Object Detection API:**

* Employing the Object Detection API from TensorFlow Model Garden to streamline the creation, training, and deployment of object detection models.

**3. SSD ResNet50 Model**:

* Adopting the SSD ResNet50 model as the foundation for object detection, fine-tuned on a custom dataset containing images featuring zombies.

**4. Data Preparation**:

* + Curating a training dataset comprising images depicting diverse scenarios with zombies.
  + Annotating ground truth bounding boxes to guide the training process effectively.

**5. Fine-Tuning:**

- Fine-tuning the pre-trained SSD ResNet50 model to specialize in detecting zombies within images.

**6. Training Process**:

* + Implementing stochastic gradient descent (SGD) as the optimizer for model training.
  + Executing the training loop over multiple batches, dynamically adjusting the model's weights to minimize total loss, including both localization and classification losses.

**7. Inference:**

* Applying the trained model to new images for inference, detecting zombies through bounding boxes and confidence scores.
* Visualizing the detection results to assess the model's performance.

**8. Results and Evaluation:**

* Evaluating the model's effectiveness by comparing predicted bounding boxes with ground truth annotations.
* Calculating the percentage of frames where a zombie is detected to quantify the model's accuracy.

**Summary**:

This project showcases the development and fine-tuning of an object detection model tailored for zombie detection. Utilizing TensorFlow, the Object Detection API, and the SSD ResNet50 model, the project provides valuable insights into the model's accuracy and its capability to identify zombies in diverse image scenarios. The inclusion of evaluation metrics enhances the understanding of the model's performance.