Averaging Predictions

This method is the most straightforward. You simply calculate the life expectancy using each of your three models and then take the arithmetic mean of the three results.

Let's say you have three models, M1, M2, and M3, and you want to predict the life expectancy (LE) for a new person.

1. Run the person's data through **Model 1** to get a prediction, P1.
2. Run the person's data through **Model 2** to get a prediction, P2.
3. Run the person's data through **Model 3** to get a prediction, P3.
4. Calculate the final prediction by averaging: Final P=3P1+P2+P3.

This approach assumes that each of your models has an equal and valid contribution to the final prediction.

Meta-Model (Ensemble Learning)

A more advanced approach is to use a **meta-model**, also known as an **ensemble method** or **stacking**. This method involves training a new model to learn the optimal way to combine the predictions from your three initial models.

Here's how it works:

1. **Generate Predictions:** For each observation in your training data, get the predictions from your three initial linear regression models (P1, P2, P3).
2. **Create a New Dataset:** Create a new dataset where the input features are the predictions from your three models (P1,P2,P3) and the output is the actual life expectancy from the original dataset.
3. **Train the Meta-Model:** Train a new model (the **meta-model**) on this new dataset. A linear regression model is often a good choice here as it will learn the optimal weights for each of your three models.

The meta-model would look something like this: Final P=w1·P1+w2·P2+w3·P3.

The meta-model learns the values for the weights (w1,w2,w3), which will give more importance to the models that are more accurate. This approach is generally more robust than simple averaging if your initial models have different levels of predictive power.