Report Title :-
Using Machine Learning to Understand Temperature in different planes in 3D rectangular Fin

What I Read :-
I studied three research papers that talk about using computer models to study how heat moves through fin-type structures:

- Predicting heat flow in micro-pin fins using machine learning – This work used different models to guess how heat and pressure behave. The best results came from a type of model that can understand patterns from past examples.
- Mixing image and number data to predict heat *flow* – This paper used both shape images and data together to improve predictions. The method worked better than using just numbers alone.
- Designing better heat exchangers using computer models – This study tried different fin shapes and used computer programs to find the best one that cools better and uses less energy.

What I Understood :-

- These models can quickly tell how heat will behave without running long simulations.
- Using pictures (like geometry of fins) along with regular data helps the model do better.
- Changing the shape and arrangement of fins can improve cooling a lot, and these tools can help find the best setup.

My Own Project Idea :-

In my project, I am working with a 3D fin of infinite length that is cut in half from the middle. When I look at the front view of this cut, it looks like a 2D fin, and I have recorded temperature values on this middle plane. Let's say this is for a fixed value of $z = z_1$, so I have temperature values as $T(x, y, z_1)$.

Now I want to train a model using these values so that, in the future, if I want to know the temperature at another slice like $z = z_2$, the model can guess $T(x, y, z_2)$ based on the pattern it learned from the central slice.

I'm planning to use Support Vector Regression (SVR) or Artificial Neural Networks (ANN) and Multimodal ML Model for this, because they can learn patterns well from examples.

What I'm Looking For :-

- How to guess 3D data from a single slice or layer, given that I have trained the ML model with sufficient 3D plane data and now it can predict other planes line $z = z_2$ on its own.