

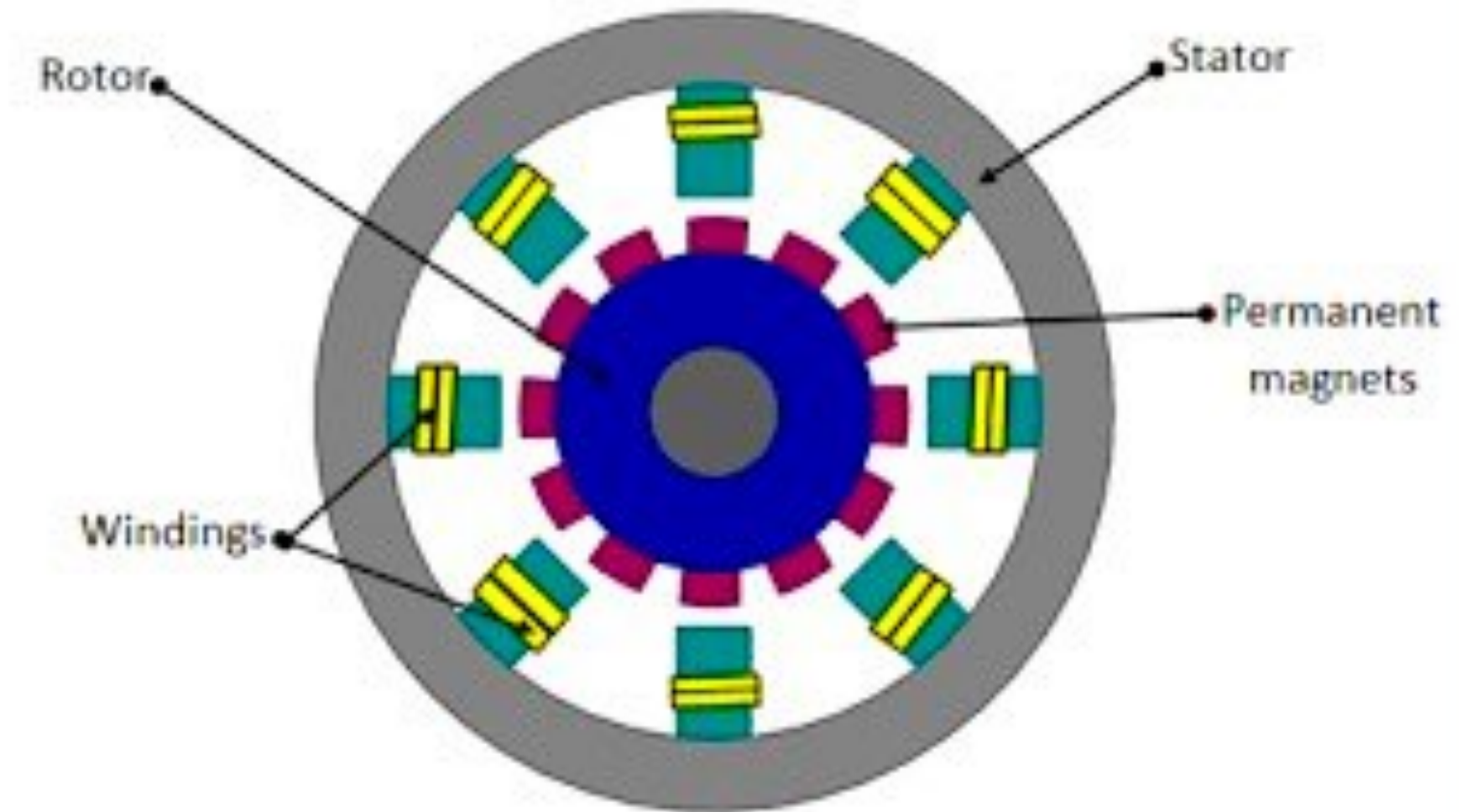
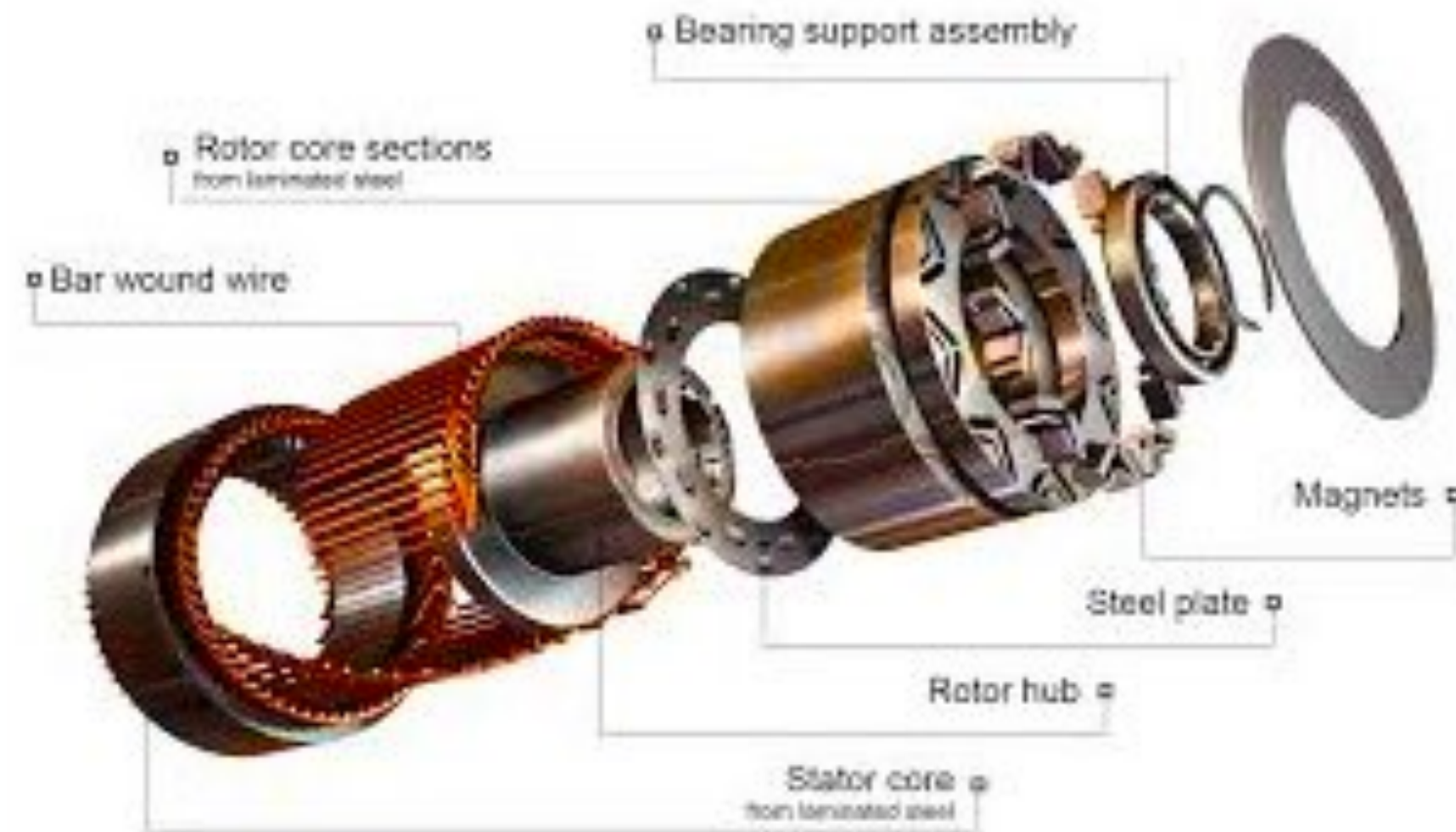
# ELECTRIC MOTOR TEMPERATURE



Abigail  
Sixto

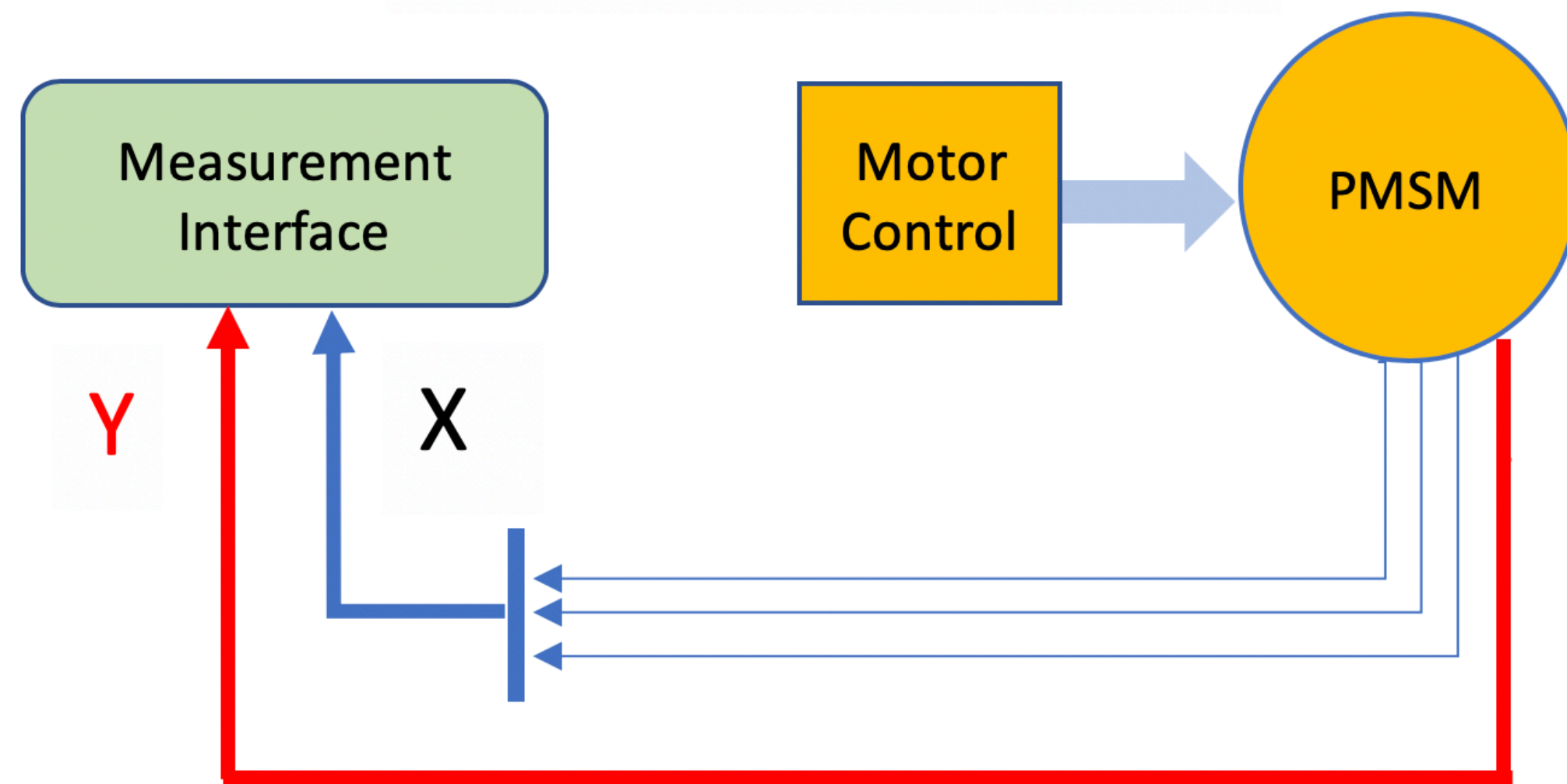


# Permanent Magnet Synchronous Motor

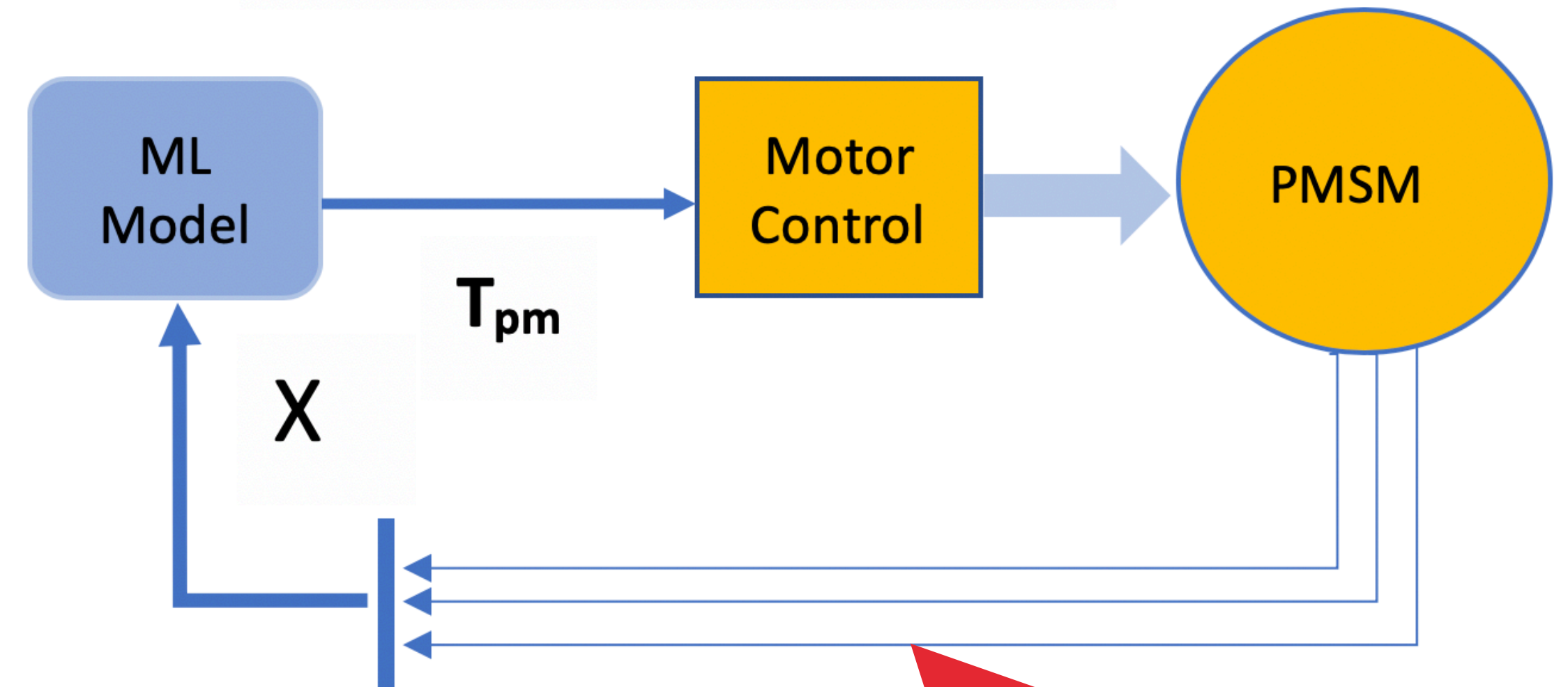


- ✓ Temperature is an important factor to control in motor components
- ✓ High temperatures can melt stator windings and demagnetise permanent magnets
- ✓ Complicated internal structure of the motor discourage sensors based monitoring

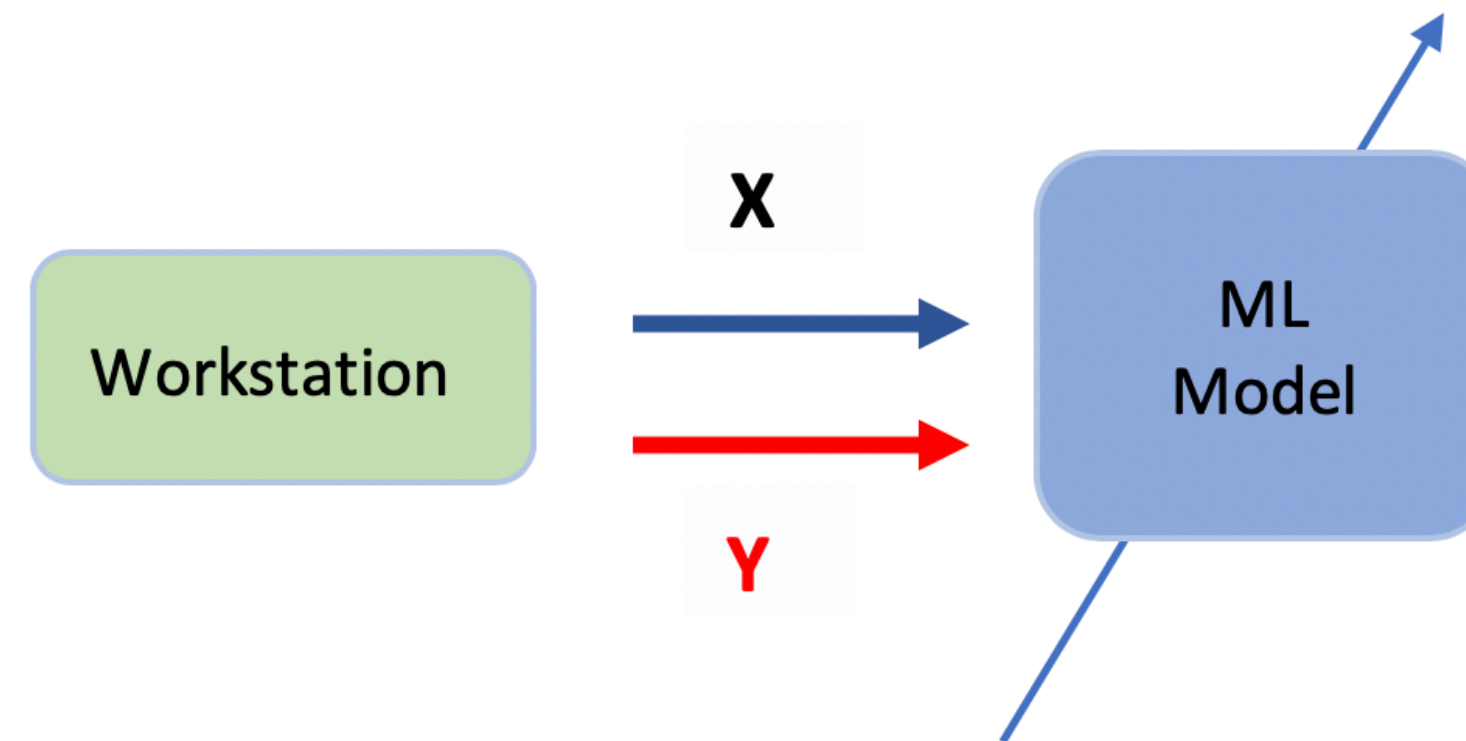
## Testbench Data Acquisition



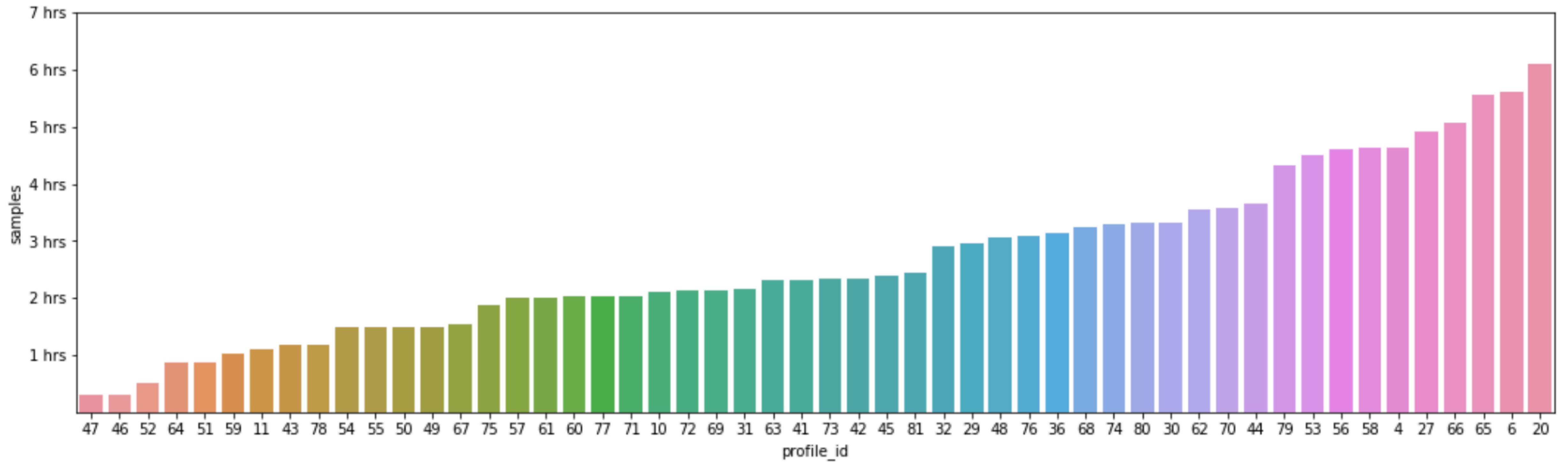
## Field Application



## Model Training



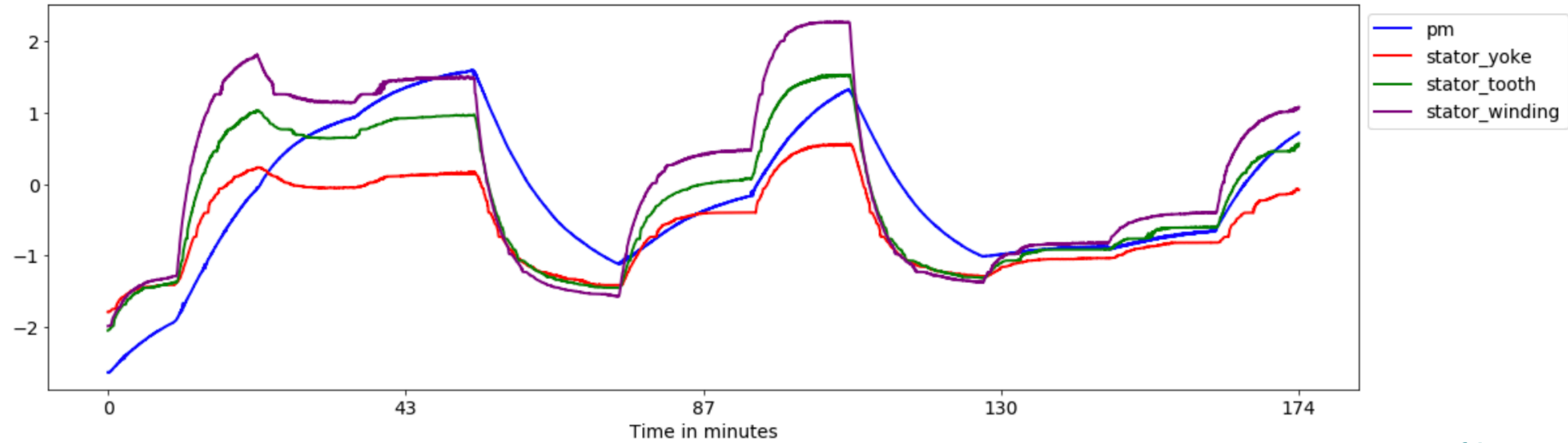




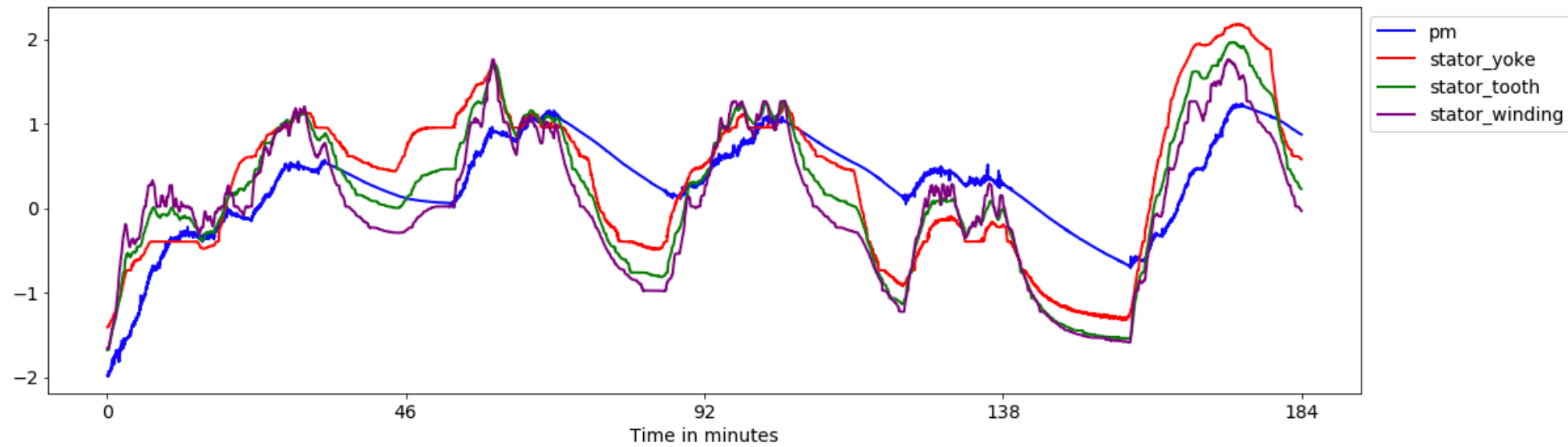
- ✓ Data is collected from sensors at each session twice per second
- ✓ Some recording sessions last for more than 5 hours

# Motor Temperatures

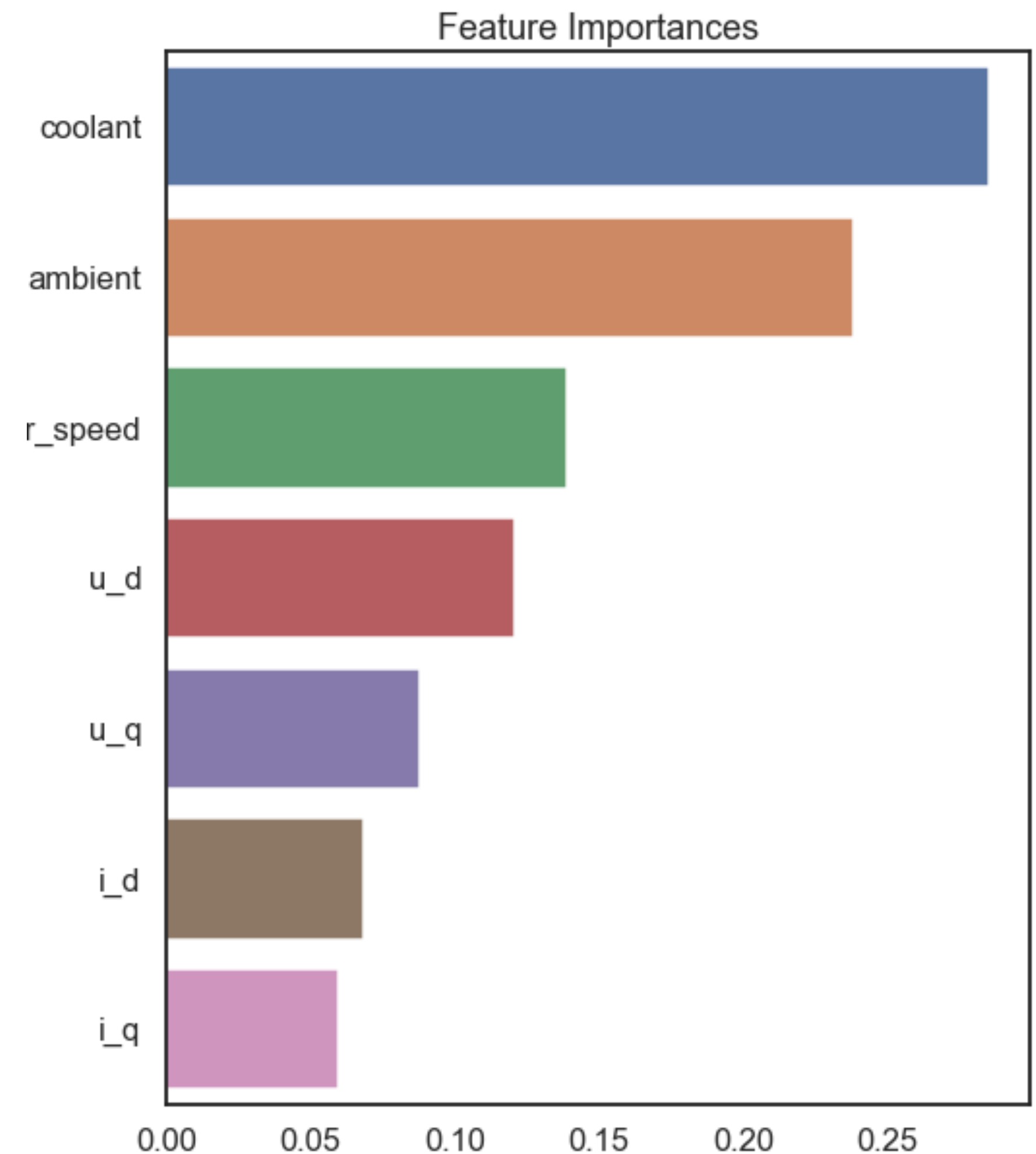
Profile 32



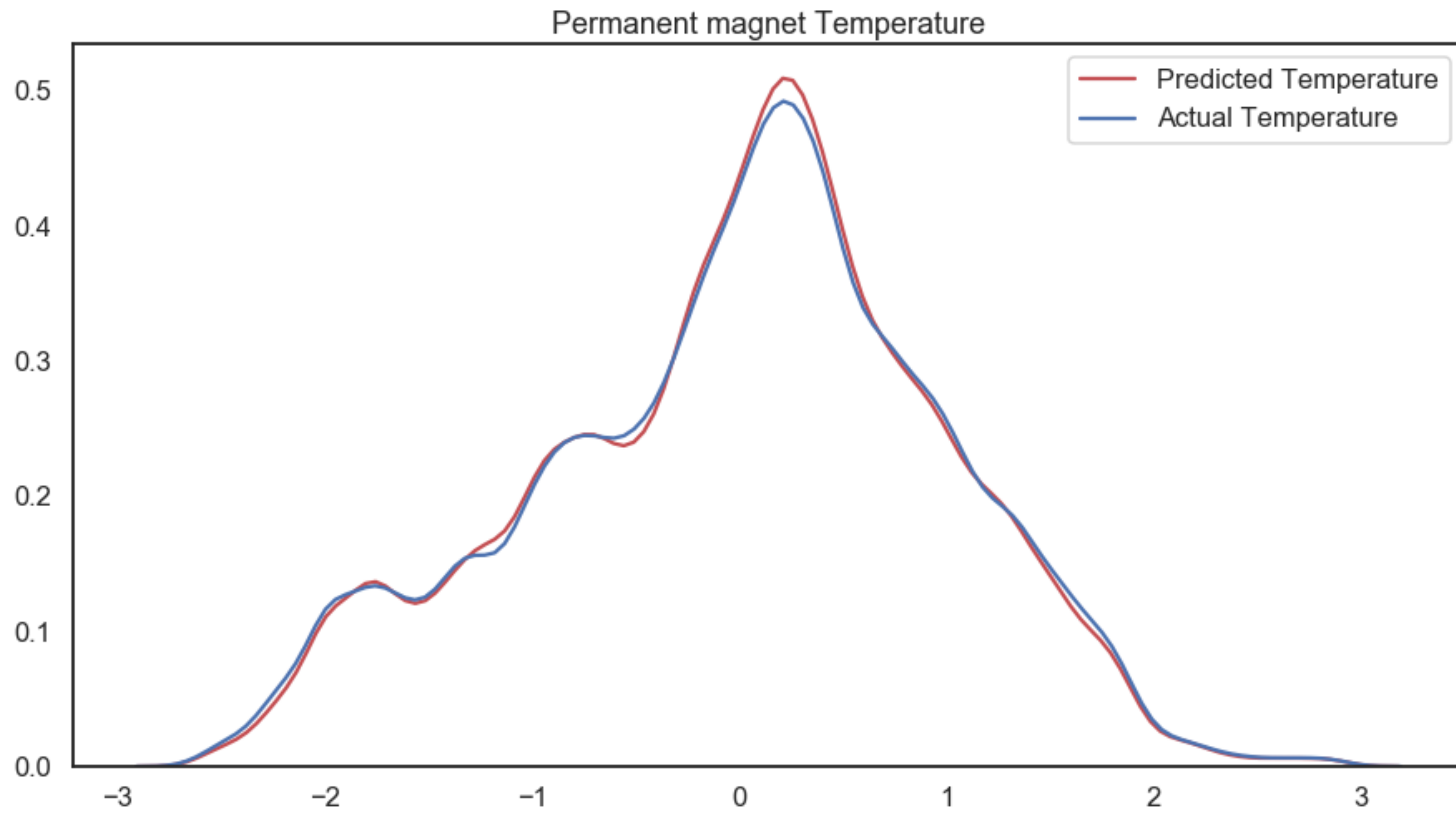
Profile 76



- ✓ The final model with the best performance to predict the temperature of the magnet is Random Forest Regressor
- ✓  $MRE = 0.01336$
- ✓ The feature importances of the final regressor model are shown on the following graph



# Final Model Results



# FUTURE IMPROVEMENTS

- ✓ It would be interesting to explore some deep machine learning models like residual convolutional (CNNs) and recurrent neural networks (RNNs) and compare the results with linear regression
- ✓ There are some issues on the notebook with saving the final model (file too large) that need attention.



Thank you !!

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