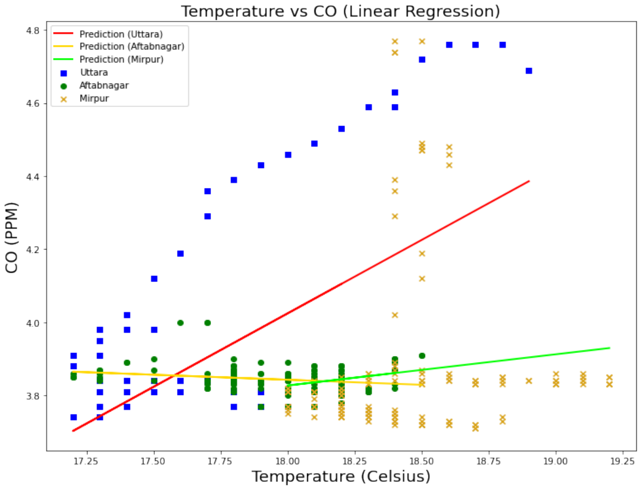


**Figure 11.** Temperature vs CO at Uttara, Aftabnagar and Mirpur.

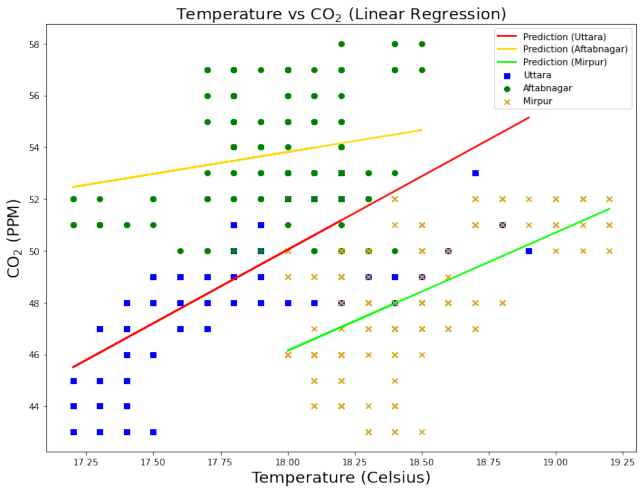


**Figure 12.** Temperature vs $CO_2$ at Uttara, Aftabnagar and Mirpur.

In Fig 9, from the graph we can observe relation between $CO_2$ and humidity. With the help of prediction lines we find out a slight changes of the values such as in Aftabnagar area the line is higher and has a slightly positive slope but in Uttara and Mirpur $CO_2$ increases with temperature and the line has positive slope as well. In all these three areas the PPM of $CO_2$ gas is 47.5427 at Uttara, 48.5 at Mirpur, 54.2865 at Aftabnagar and from here we got improvement of 11.930% and 12.4226% at humidity of 91.9952.

In Fig 10, the graph shows the relation between air quality and temperature. As the value in data of air quality increases it indicates deterioration of air quality. As a matter of fact we observe a positive slope in all three prediction lines. For example, the values for air quality are 59.2305 at Uttara, 55.7417 at Aftabnagar, 53.1914 at Mirpur when temperature is 18.028 which provides improvements of 5.89% and 10.195%. Moreover, the values for air quality are 61.964 at Uttara, 57.0067 at Mirpur, 55.7927 at Aftabnagar when altitude is 80 m that provides improvements of 8.001% and 9.9602%.

In Fig 11, the graph shows relation between CO in PPM unit and temperature. As a matter of fact if the value of CO increases it means the air quality is decreasing. With the help of prediction lines it is observed that the prediction line in Aftabnagar area follows a negative slope whereas in Mirpur and Uttara it is a positive slope. Taking PPM of CO as 4.033 at Uttara, 3.8442 at Aftabnagar, 3.829 at Mirpur and from here we got improvement as 4.68% and 5.0582% at temperature of 18.016. Again we took PPM of CO as 3.8307 at Aftabnagar, 3.8669 at Mirpur, 4.214 at Uttara where improvement drops 0.9449% and 10.006% at a fixed temperature of 18.4723.

In Fig 12, the graph shows relation between $CO_2$ in PPM unit and temperature. In all these three areas the PPM of $CO_2$ gas varies but all the three prediction lines have positive slope. Taking PPM of $CO_2$ as 53.903 at Aftabnagar, 50.287 at Uttara, 46.3726 at Mirpur and that provides improvement of 6.709% percents and 13.971% for a fixed temperature of 18.0491. After that taking PPM of $CO_2$ as 54.5843 at Aftabnagar, 52.7548 at Uttara, 48.2873 at Mirpur it provides improvement that increases 3.3516% and 11.5362% for a fixed temperature of 18.4725.

After comparing all the data-sets, it shows that the air quality of Aftabnagar is comparatively better than other two places while Uttara gets the lowest air quality. In this procedure we have performed three different functions which include altitude, temperature and humidity. The analysis includes $CO_2$, CO and air quality for the comparison. In Uttara it is observed that the relationship between $CO_2$ and altitude is linearly decreasing. Also, for the range of 80 to 90 meters we get the best fit. Again, for CO, it increases with height. In this observation we get the best fit in 90 m altitude. For air quality we can observe similar characteristics. When we compare the different functions for humidity a similar curve is observed which linearly deceases. For temperature there are discrete values obtained. In conclusion, it can be added that although there are random values in the graphs but for lower level of air around us pollution is heavy. As we move upward, we observe less pollution. All the random values from the fitted curve observed are nearly identical as a fixed function and also behaves accurately for a fixed range of the parameters.

Figs. 13, 14 and 15 are bar charts of Humidity vs CO in Mirpur, Aftabnagar and Uttara where actual vs predicted data are illustrated based on testing data samples. A regression model needs splitting of train data and test data before prediction. Here, we have used

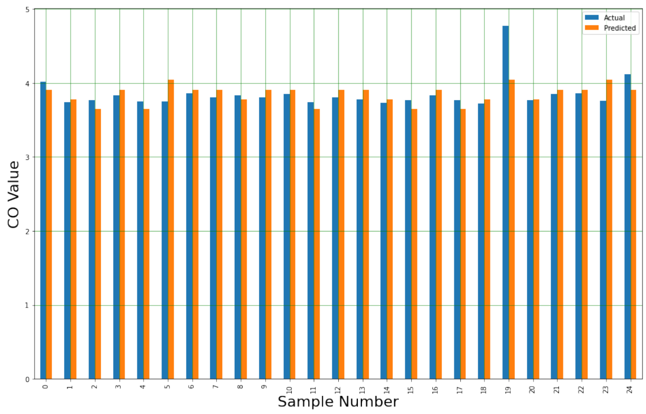


**Figure 13.** Actual vs Predicted Sample Output at Mirpur.

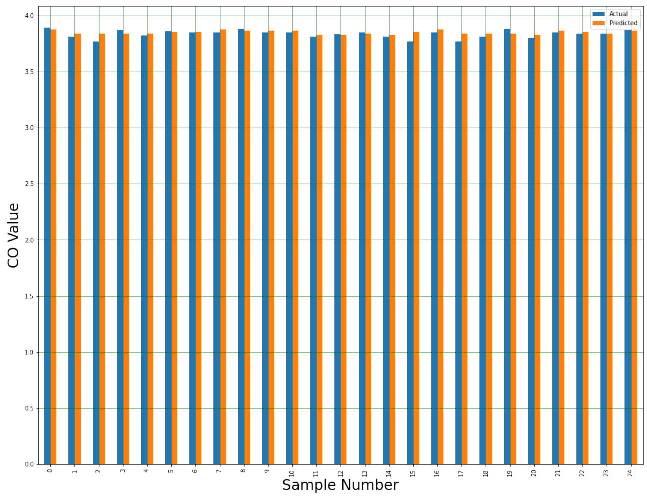


**Figure 14.** Actual vs Predicted Sample Output at Aftabnagar.

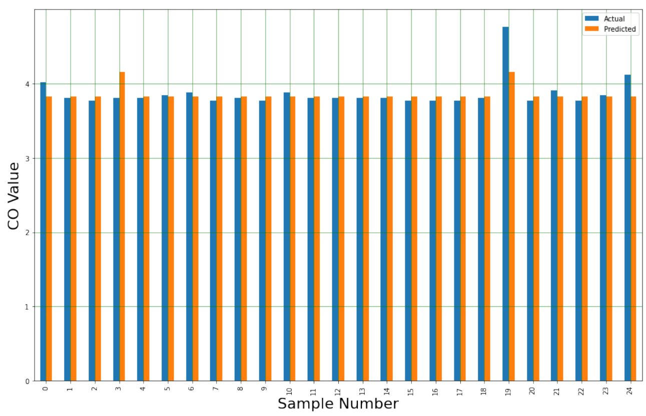


**Figure 15.** Actual vs Predicted Sample Output at Uttara.

0.2 test size which means our model used 80% data for training and 20% for testing. Observing the charts, it is clear that predicted data set is very close to the testing data. Sample 19 in both Aftabnagar and Mirpur have a significant amount of test error whereas other samples are nearly accurate. However, in Aftabnagar we observe a consistent outcome in prediction having the least amount of error.

## 8. Conclusion

This research is aimed to monitor the quality of air of a particular region at different altitudes using a UAV coupled with collective sensors. Based on the quantitative and qualities analysis of the data derived from diverse test results of the UAV in response to measure the condition of air by several parameters we can conclude that this system is effective to achieve potential remarks in the field of dealing with atmospheric changes. The test results are extracted in personal server through a wireless system. By exerting radio communication, the data were illustrated through regression model via GUI. Our proposed system is to use low-cost components but more constructive than other existing UAV monitoring systems.

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