Using deep learning models for drug discovery is one of the areas that ~~has~~ received a lot of attention in past years. Shen *et al.* [5] have proposed a quantitative structure−property relationship (QSPR) model based on k-nearest-neighbor for drug discovery purposes. Houssein et al. [6] have ~~proposed~~ developed a feature selection-based classification method by combining a novel metaheuristic algorithm called Harris hawks Optimization (HHO) with Support Vector Machines (SVM) and the k-Nearest Neighbors (k-NN). The developed HHO-SVM and HHO-kNN classification approaches have been used for drug design and discovery. ~~The results of this study shows show that the HHO-SVM model.~~ The empirical results of this study ~~show~~ indicate that the HHO-SVM model outperforms several well-known metaheuristic algorithms. Yusof et al. [20] have proposed a time-varying modified sigmoid transfer function, and applied it with standard swarm intelligence (SI) for Amphetamine-type stimulants drug classification. The ~~main goal~~ purpose of their study ~~is~~ was  ~~improving~~ to improve the ~~speed~~ rate of convergence and classification accuracy. The proposed approach has been performed on chemical datasets and ~~has~~ achieved a desired accuracy. Singh *et al*. [42] ~~have~~ introduced a ~~newly~~ developed classification ~~approach~~ method, called discriminative weight updated tuned deep multi-Layer perceptron (DWUT-MLP) to classify anticancer drugs. Their results ~~show~~ ~~that the proposed approach~~ the prediction accuracy of anticancer ~~drug~~ drugs was improved by their technique.

Water quality and food classification with deep learning ~~approaches~~ technique is another important field ~~which~~ that has attracted a great deal of attention in the literature. Riyantoko et al. [7] ~~have proposed~~ conducted a Feyn-QLattice automation modeling (F.Q.A.M) for water potability classification. Feyn is a Python module for running the QLattice~~, and the QLattice~~ which is a supervised technique inspired by Richard Feynman's path integral formulation. Andrade *et al*. [16] ~~have~~ applied chemometrics and different methods including Artificial neural network, K-nearest neighbor (KNN), Random Forest (RF), SVM, and Learning Vector Quantization (LVQ) to classify Brazilian artisanal cheese. Dilmi and Ladjal [45] ~~have proposed~~ developed a combined method of long short-term memory recurrent neural networks (LSTM RNNs) and independent component analysis (ICA) techniques for water quality classification. Passos and Mishra *et al.* [47] ~~has~~ have introduced an automated deeplearning pipeline based on advanced ~~optimizations~~ optimization ~~for~~ of leveraging spectral classification modeling. Cancilla *et al.* ~~have~~ used machine learning models to study of water quality. They ~~have~~ ~~used~~ applied artificial neural networks to estimate the relationships between spectroscopic data and sample concentration of two aromatic volatile organic compounds (VOCs).

~~As well as the above mentioned~~ In addition to applications of deep learning and intelligent models, various the models have ~~have~~ also been used ~~for wider~~ to further develop the applications such as analyzing and classification of chemical reactions, waste classification, categorizing molecular structures, peptides and ~~so on~~, etc. Ghiandoni et al. [8] ~~have used~~ utilized machine learning models to classify chemical reactions. They have presented a model ~~which has the~~ with the capability of predicting over 300 organic reaction classes. The problem is This issue was considered as a multi-task classification problem and ~~is~~ trained using reactions obtained from U.S patents. The results ~~show~~ indicated that the random forests (RF) model outperforms other classification models. Hao et al. [9] ~~have~~ applied quantitative structure activity relationship (QSAR), genetic algorithm (GA) and multiple linear regression (MLR) to classify the high mutagenic nitroaromatics. Chin et al. [10] ~~have~~ employed a data-driven approach based on decision tree random forest for the recyclability organization of plastic waste. Their research ~~shows~~ demonstrated the application of Machine Learning for automated classification of the plastic waste data and ~~determine~~ determines the parameters for plastic waste recyclability. Decision Tree Model and Random Forest which produce interpretable

if-then rules have been used for plastic waste classification. Zhang *et al*. [11] ~~have~~ presented ~~a~~ an analytic hierarchy process (AHP) method and fuzzy evaluation for chemical waste classification. López-García *et al*. [14] ~~have~~ combined un-supervised and semi-supervised machine learning methods and chemometrics for provenance analysis of archaeological materials. Puthongkham *~~et al.~~* and co-workers[17] ~~have applied~~ conducted a research using combined model of experimental designs, linear and logistic regressions, neural network, SVM and chemometrics for electrochemical sensors in the analytical chemistry field. Kanwal *et al.* [18] ~~have~~ applied a hybrid classification method based on partial least squares and kernel to classify of high-dimensional spectrum data. Omer and Deshmukh [21] ~~have~~ applied continuous wavelet analysis(CWA), regularized random forest (RRF), and guided regularized random forest (GRRF) models to classify invasive plant species [2]. Leary *et al*. [24] ~~have~~ ~~used~~ performed deep learning method for the classification of the chemical composition of particle defects on semiconductor wafers. Galdames *et al*. [25] ~~used~~ applied dimensionality reduction and deep learning models for rock lithological instance classification by hyperspectral images. Zhang and Li [26] ~~have~~ developed a deep learning model called Pep-CNN to accurately predict therapeutic peptides. Du *et al*. [27] ~~have~~ applied deep learning methods to decipher urban traffic impacts on air quality. Alshehri and You [28] ~~have~~ used deep learning methods to catalyze inverse molecular design. Debus *et al*. [29] ~~have~~ investigated deep learning applications and potential in analytical chemistry and reviewed recent analytical applications of existing powerful algorithms. Fey *et al*. [31] ~~have~~ presented a Spline-based Convolutional Neural Networks (Spline CNN) for mage graph classification, shape correspondence and graph node classification. Ghulam *et al*. [32] ~~have~~ presented a deep learning method based on convolutional neural network (CNN) and anticancer peptides (ACPs) to improve the prediction of anticancer peptides.