Chapter 7

Results and Conclusion

7.1 Machine Learning Results

We noticed that the old dataset using machine learning produced higher accuracies, due to the finding the preprocessing that helped achieving that.

Table 1. Train Accuracies of ML

	Old Data	New Data
SVM	97.3%	97.5%
Logistic Regression	99%	96.5%
Random Forest	99.9%	98.8%
Naïve bayes	85.4%	73%

Table 2. Test Accuracies of ML

	Old Data	New Data
SVM	92%	71.6%
Logistic Regression	86%	69.5%
Random Forest	92.8%	73.3%
Naïve bayes	83.6%	61%

Table 3 Types Accuracies Old Data Machine Learning

	ALL	AML	CLL	CML	Normal
SVM	100%	90.1%	15%	67.2%	92.6%
Logistic Regression	99.6%	80.1%	22.5%	55.19%	73.5%
Random Forest	99.9%	91.8%	4%	60.9%	93.9%
Naïve bayes	100%	65.4%	2%	60.5%	93.2%

Table 4 Types Accuracies New Data Machine Learning

	ALL	AML	CLL	CML	Normal
SVM	91.7%	8.8%	7.3%	59.3%	99.7%
Logistic Regression	82.2%	11.5%	7.85%	60.6%	99.7%
Random Forest	98.4%	7.9%	8.1%	68.8%	99.7%
Naïve bayes	13%	54%	8.1%	2%	99.7%

7.2 Deep Learning Results

We noticed that the old dataset using deep learning produced higher accuracies.

Table 5. Train Accuracies of DL

	Old Data	New Data
CNN (32, 3x3)	99%	96%
CNN (64, 2x2)	99.8%	94.5%
AlexNet	99.8%	99.7%
MobileNet	99.9%	96.8%
ResNet50	91%	99%
VGG16	91%	88%

Table 6. Test Accuracies of DL

	Old Data	New Data
CNN (32, 3x3)	96%	82%
CNN (64, 2x2)	98.5%	90%
AlexNet	97%	83%
MobileNet	72.5%	70%
ResNet50	79%	89%
VGG16	80%	71%

Table 7 Types Accuracies Old Data Deep Learning

	ALL	AML	CLL	CML	Normal
CNN (64, 2x2)	99.8%	100%	6.8%	84.2%	98.5%
CNN (32, 3x3)	99.9%	99.7%	68.4%	21.8%	98.5%
AlexNet	100%	96%	9.4%	98.3%	99.6%

Table 8 Types Accuracies New Data Deep Learning

	ALL	AML	CLL	CML	Normal
CNN (64, 2x2)	48.2%	57.5%	0%	49.2%	99.7%
CNN (32, 3x3)	100%	12.3%	0%	58.4%	99.7%
AlexNet	100%	11.2%	7.1%	29.7%	99.7%

7.3 Best Architectures

The following graphs show the Bar Charts of the 3 best accuracies for train and test of each of the architectures and algorithms for Machine Learning (SVM, RFC, LR) and Deep Learning (CNN, AlexNet, ResNet50).

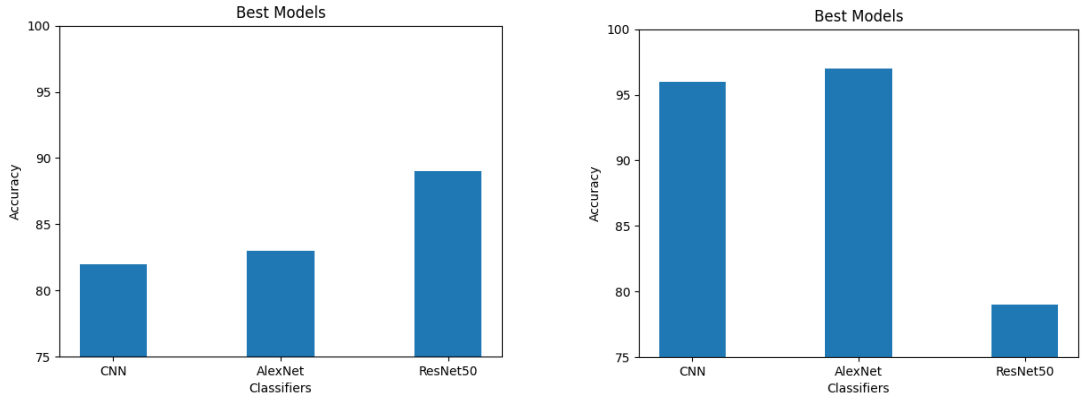

Figure 1 new and old data for deep learning

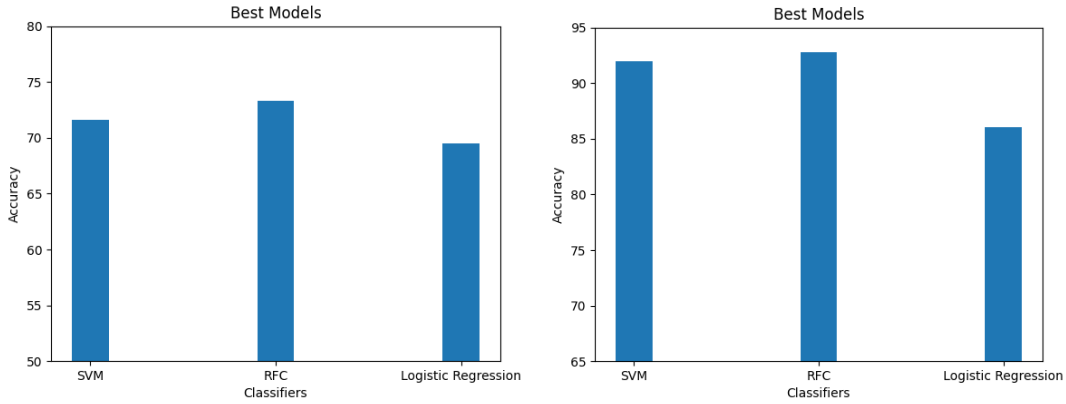

Figure 2 New and old data for Machine Learning

7.4 Conclusion

Leukemia is cancer of the body's blood-forming tissues. It can be fatal; thus, its early detection is important. Traditional Leukemia diagnosis and classifying takes more time, during which the patient's situation could get worse. Machine learning and deep learning algorithms can be applied to microscopic blood images to detect leukemia, which will save time. In this project, we have trained, tested and evaluated several SVM and CNN models that aim at detecting and classifying leukemia.