MAM Course Project

Income Prediction using KNN Algorithm in Assembly

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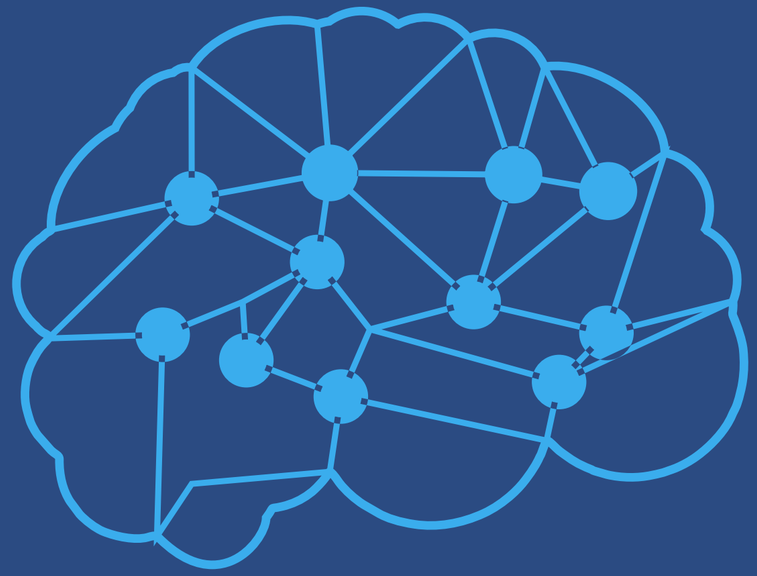
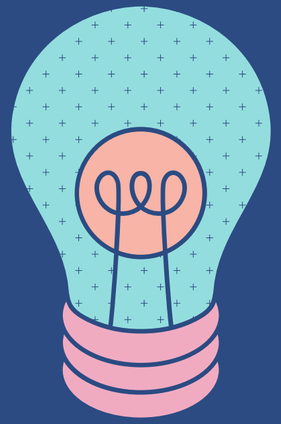
Introduction

- There is a lack of AI based algorithms in assembly language programming.
- KNN is a supervised machine learning algorithm used to make predictions on a labelled dataset.
- KNN is a beginner friendly and easy to implement algorithm due to which it is convenient to implement using ALP

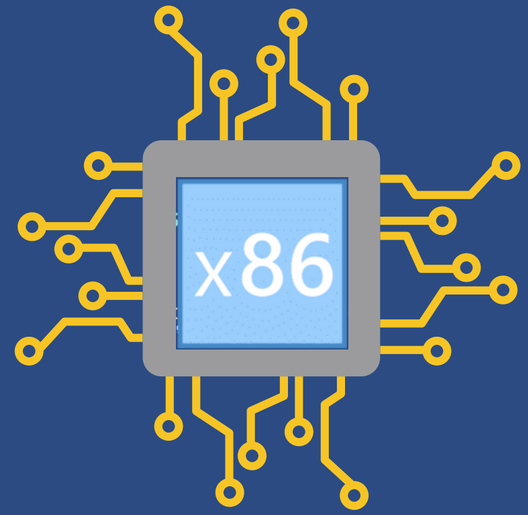


Problem Statement



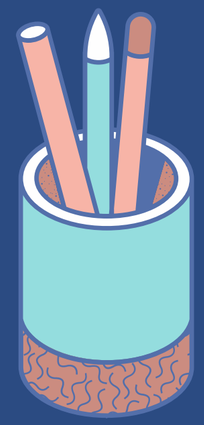
Income Prediction using KNN Algorithm in Assembly

Objectives



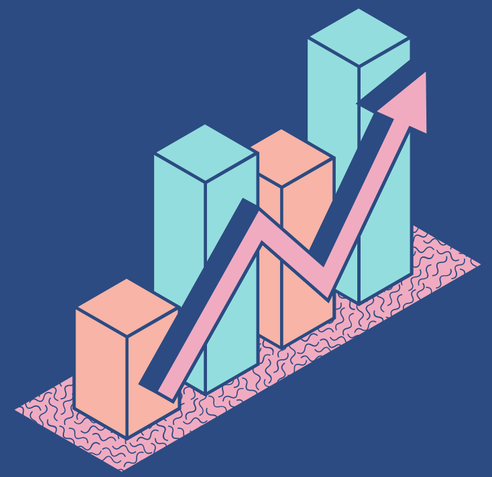
- To implement KNN (K-Nearest-Neighbors Algorithm) using x86-64 Assembly Language Programming.
- To apply the implemented algorithm to solve real world problems.

Requirement



Hardware Requirements	Software Requirements
64-bit computer	Unix-based OS
Intel Microprocessor running x86	NASM compiler

Methodology



1 STEP

Deciding the dataset

2 STEP

Pre-processing

3 STEP

Implementation in Assembly

4 STEP

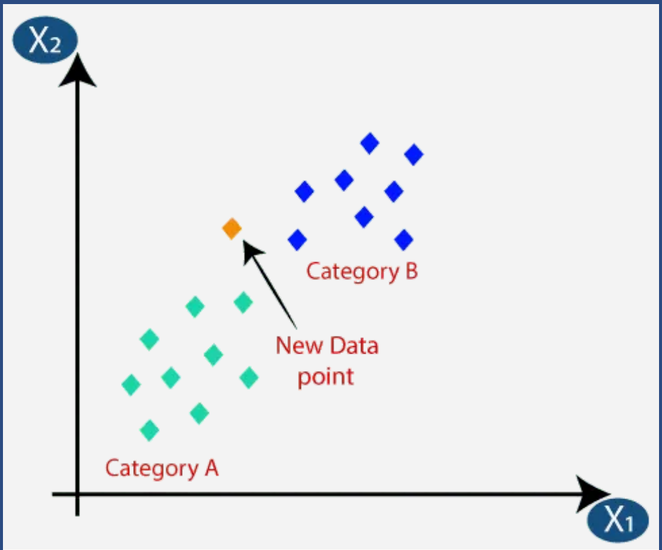
Experimentation for various values of ‘k’

5 STEP

Accuracy Compilation and Report Generation

KNN

- K NEAREST NEIGHBOURS



Distance Metric:

Manhattan Distance is used to find K nearest neighbours

Distance= |x2 - x1| + |y2 - y1| + ...

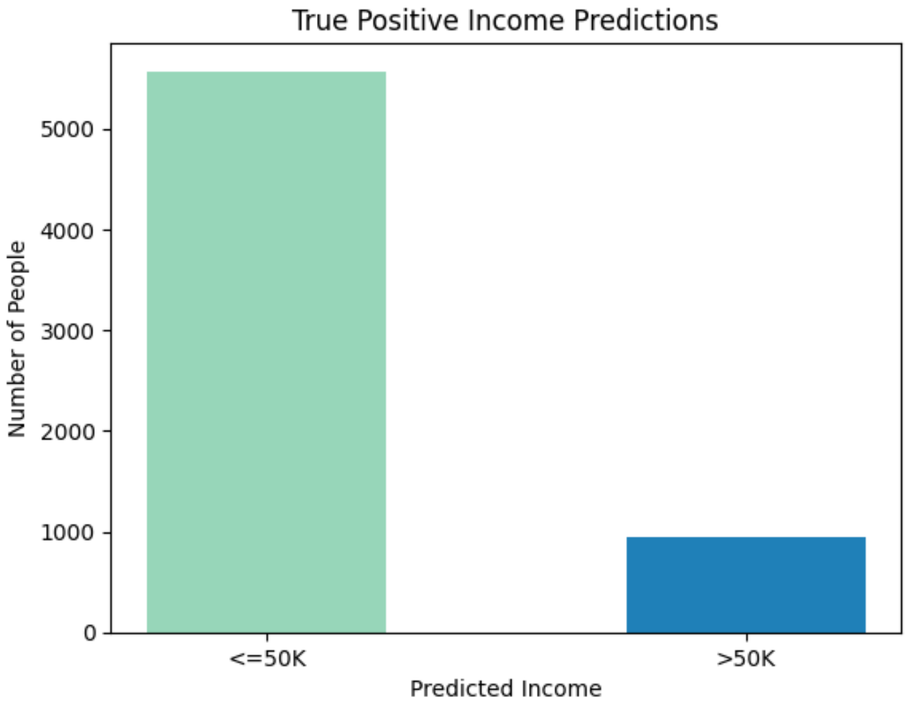
Optimal Value of k

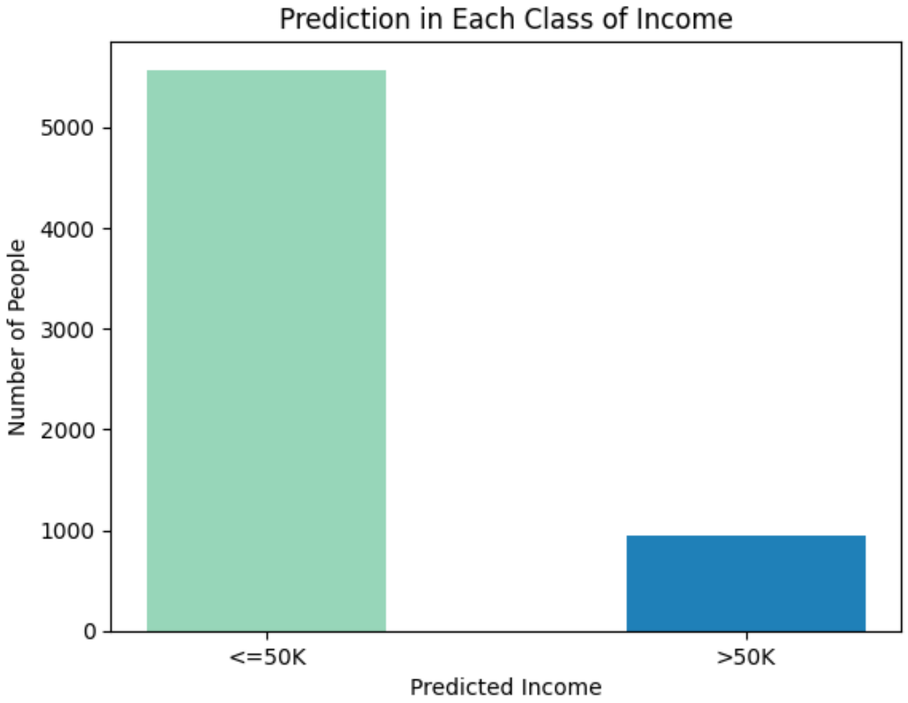
k = 5, to ensure balance between bias and variance

Dataset

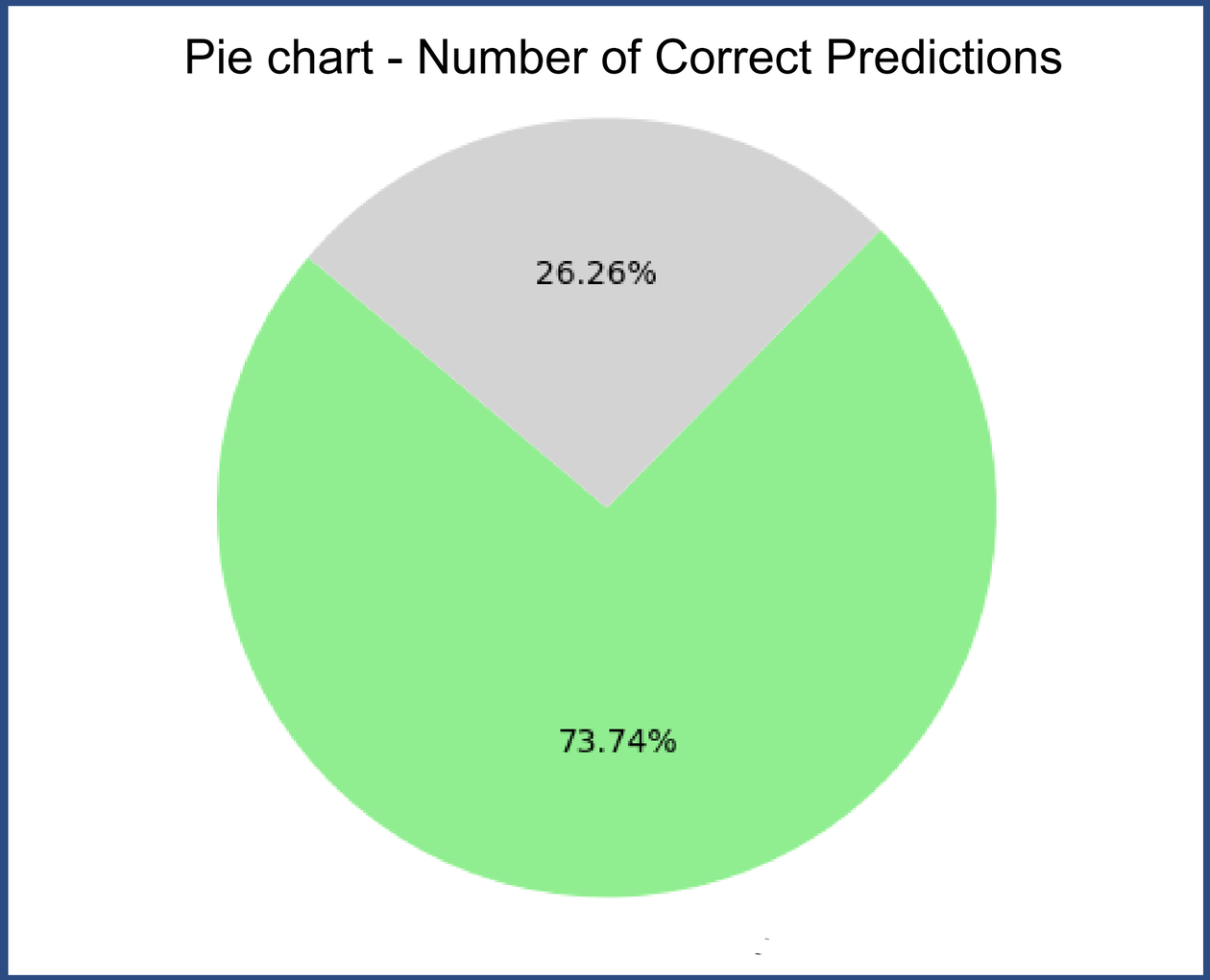
The training and testing dataset contains 26,048 and 6,513 rows of data respectively.

DEMONSTRATION


True Positive Income Predictions
Number of People
5000
4000
3000
2000
1000
0
<=50K
>50K
Predicted Income

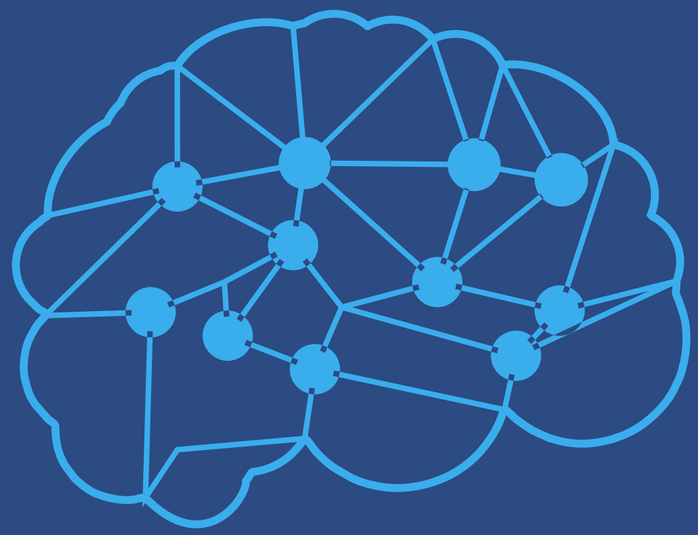

Prediction in Each Class of Income
Number of People
5000
4000
3000
2000
1000
0
<=50K
>50K
Predicted Income

Results


Pie chart - Number of Correct Predictions
26.26%
73.74%

Conclusion

- Robust
- Fast as implemented using assembly
- Can also be used for classification of labelled dataset other than the dataset we have used



Thank You