Report Draft 1

Nayeem Mohammad-1611553642

Review of Paper 1:

Title : **A cost effective electronic braille for visually impared individuals**

Author: Md. Ehtesham Adnan ; Noor Muhammad Dastagir ; Jafrina Jabin ; Ahmed Masud Chowdhury ; Mohammad Rezaul Islam

Publisher: IEEE

Date of publication:12 February 2018

Description:

This paper proposes a prototype of affordable Braille display for the blind people to read when an input is given through a computer. It uses electromagnetic solenoids controlled by Arduino Uno to capture the vertical movementents of the dots of the braille. Bringing the cost upto $100 dollars was one of the challenges.

1. Input from computer is processed by Arduino Uno.
2. Arduino Uno controls the switching circuit which is connected to the solenoids.
3. Components: i) Microcontroller: Arduino Uno ii) MOSFET iii) Solenoid

Review of Paper 2:

Title: **A comparison of Machine Learning Algorithms applied to hand gesture recognition**

Author: Paulo Trigueiros ; Fernando Ribeiro ; Luís Paulo Reis

Publisher:IEEE

Date of Publication:31 August 2012
Description:

➢ Hand orientation was used with image intensity detection.
➢ Hand segmentation and feature extracted from the segment hand.
➢ Orientation Histogram was generated to see the shape of fit line.

Pixel intensities can be sensitivity to lighting variations, which leads to classification problem within same gesture under different light conditions.

Review Paper 3:

Title : "**Wild patterns: Ten years after the rise of adversarial machine learning**"

Author: Battista Biggio, Fabio Roli

Publisher: Pattern Recognition(2018)

Date of publication: 7 December 2018,

Description:

Learning-based pattern classifiers show a decrease in performance when they face adversarial or wild patterns. This was way back in 2008. There has been research and lot of machine learning developments which is carefully examined in this paper.

01. Security Properties of deep learning algorithm
02. Connection between computer vision and cybersecurity
03. Future challenges in Evasion attacks and Poisoning attacks

Zubayer Ahmed

Review of Paper 1:

Title: **Smart glove with gesture recognition ability for the hearing and speech impaired**

Author: Tushar Chouhani; Ankit Panse ; Anvesh Kumar Voona ; S. M. Sameer

Publisher: IEEE

Date of publication:01 December 2014

Description:

- ❖ The handtalk glove senses the movements through the flex sensors which detect different patterns of motion.
- ❖ The device can sense carefully each resistance and each movement by hand. Flex Sensors fixed with the glove pick up the gestures made by the individual and then with the help of arduino, that analog input is converted into digital for various gestures.

Circuit Operations:
1. Transmitter Section (Hand Glove)
2. Receiver section (display module)

The HearBeat module is used for heart rate monitoring of the patient. If there is any problem with the heart rate then a message is sent to a doctor or family members also.

Review of Paper 2:

Title: **Deep convolutional neural networks for sign language recognition**

Author: G. Anantha Rao ; K. Syamala ; P. V. V. Kishore ; A. S. C. S. Sastry

Publisher: IEEE

Date of publication: 4-5 Jan. 2018

Description:

This paper proposes the recognition of sign language gestures using a powerful artificial intelligence tool, convolutional neural networks (CNN). They designed multi stage CNN model.

The model is constructed with input layer, four convolutional layers, five rectified linear units (ReLu), two stochastic pooling layers, one dense and one SoftMax output layer. Figure 1 shows the proposed system architecture.
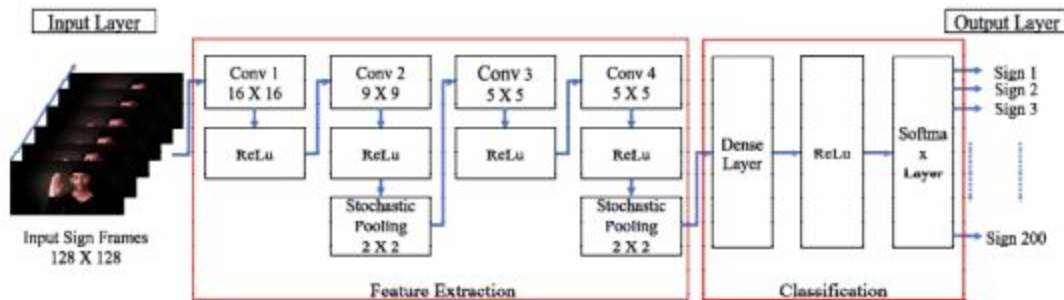

Fig.1. Proposed Deep CNN architecture

Advantage:

The CNN architecture is designed with four convolutional layers. Each

convolutional layer with different filtering window sizes is considered which improves the speed and accuracy in recognition. They achieved 92.88% recognition rate compared to other classifier

models reported on the same dataset. Their system was also a low cost model.

Comments:

The CNN algorithm is implemented on Python 3.6 platform using a high-performance computing(HPC) machine with 6 CPU-GPU combination.

Review of Paper 3:

Title: **Hand Gesture Recognition with Generalized Hough Transform and DC-CNN Using RealSense**

Author: Bo Liao ; Jing Li ; Zhaojie Ju ; Gaoxiang Ouyang

Publisher: IEEE

Date of publication: 09 August 2018

Description:

In this paper, They propose a hand gesture recognition system based on the data captured by Intel RealSense Front-Facing Camera SR300. Considering that the pixels in depth images collected by RealSense are not one-to-one to those in color images, the recognition system maps depth images to color images based on generalized Hough transform in order to segment hand from a complex background in color images using the depth information. Then, it recognizes different hand gestures by a novel double-channel convolutional neural network containing two input channels which are color images and depth images. As for the experimental hardware, They selected Intel(R) Core(TM) i7-6800K CPU, NVIDIA GeForce GTX 1080 Ti,16 GB RAM.

Comments:

 Their model is low cost. Their experimental results show that the proposed DC-CNN performs better than a single-channel network on the static hand gesture recognition task.

Rubayet Zaman-1620684642

Review of Paper 1:

Title : Sign language Recognition using 3D convolutional neural networks

Author:Jie Huang, wengang Zhoue, Houqiang Li, Weiping Li

Publisher: IEEE

Date of publication:06 August 2015

Description:

- Applying 2D CNNs in speech domain

-making local receptive field to move to next layer in each unit from prior layer.
-Gaussian Blur, Gaussian Mixture Model-Hidden Markov model(GMM-HMM)
Advantages:
1)to train dataset
2)to differentiate foreground image from background
3)to find output semantics of sign actions

Review of Paper 2:

Title : **Sign Language Recognition, Generation, and Modelling: A Research Effort with Applications in Deaf Communication**

Author: Eleni Efthimiou, Stavroula-Evita Fotinea, Christian Vogler, Thomas Hanke, John Glauert, Richard Bowden, Annelies Braffort, Christophe Collet, Petros Maragos, Jérémie Segouat

Publisher: Springer

Date of publication:02 March 2010

Description:

- Removes the restriction of using the sign language that are limited to words and phrases
- Emphasized on human-computer interaction
- Translating the sign to text in a web based platform

Review of Paper 3:

Title : **Machine learning model for sign language interpretation using webcam images**

Author: Kanchan Dabre ; Surekha Dholay

Publisher: IEEE

Date of publication:19 June 2014

Description:

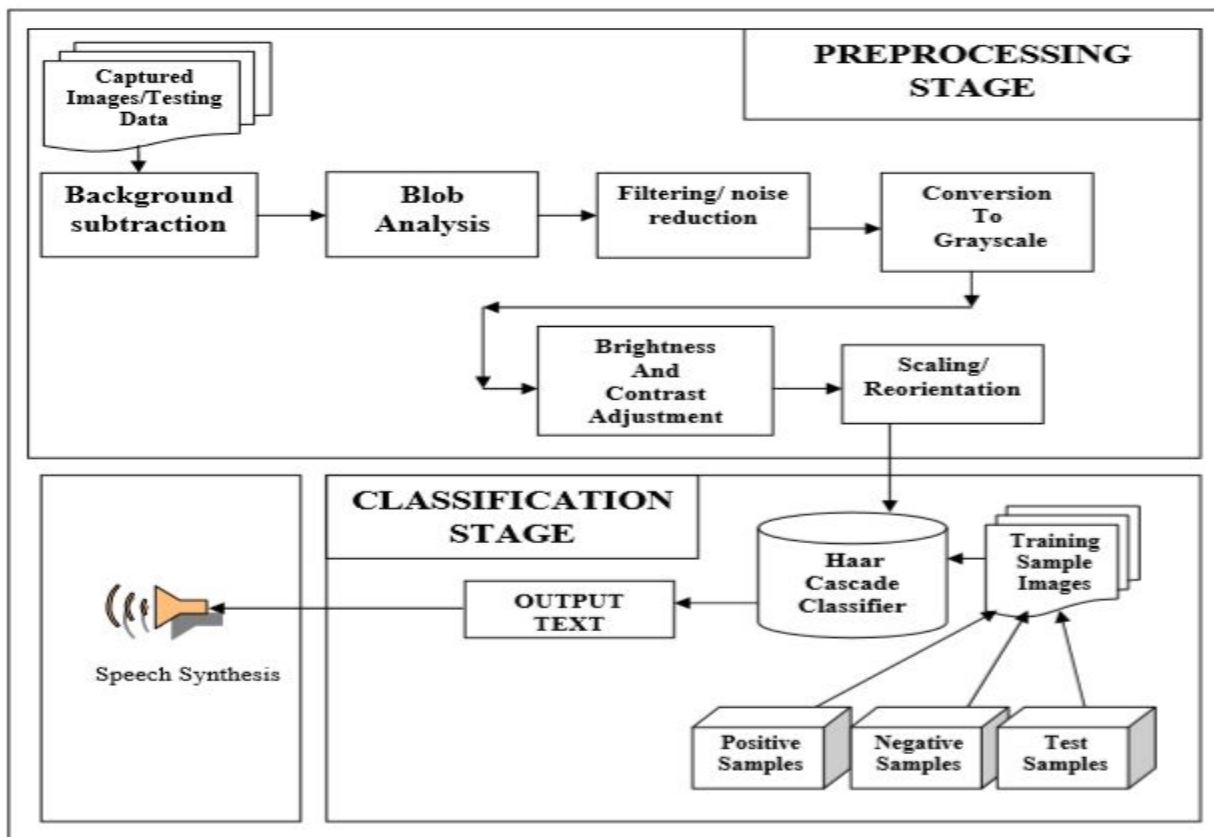-Using web camera it takes the image of the sign and then process it to make an audio output

Fig. 1. Sign Language Interpreter Architecture

Report Draft 2

Capstone Design Project

It is a large-scale design project meant to fulfill the last requirement for an undergraduate degree in engineering or technology.It must be done by a senior year student in a group or individually to get the undergraduate degree.

In North South University, Every Senior Year students take part in a project showcase in order to get assessed by the faculty panel on his/her 4 year learnings.
The instructional phase includes (not limited to): communications, report writing, visual aids, design process (requirements/specifications/objections, synthesis/analysis, design evaluation, implementation, maintainability, manufacturability, economic and social influences etc.), proposal preparation, estimating, project management and scheduling etc.;

Performance phase includes (not limited to): design team formation and organization, design proposals, implementation of design process, project scheduling and management, design reviews, design simulation and testing, preparation of documentation, drawings, specifications, etc., written and oral presentation of completed projects.

WBS:
WBS(Work Breakdown Structure) is a deliverable-oriented division of work in a project.It manages team's work into manageable sections.It is used to manage the budget, timelines,work division of each members and identifying potential risks during and after the project completion to avoid.

Here we used Gantt chart to make a WBS of our capstone design project.A Gantt chart is a bar chart that shows the progress of a project along a timeline.
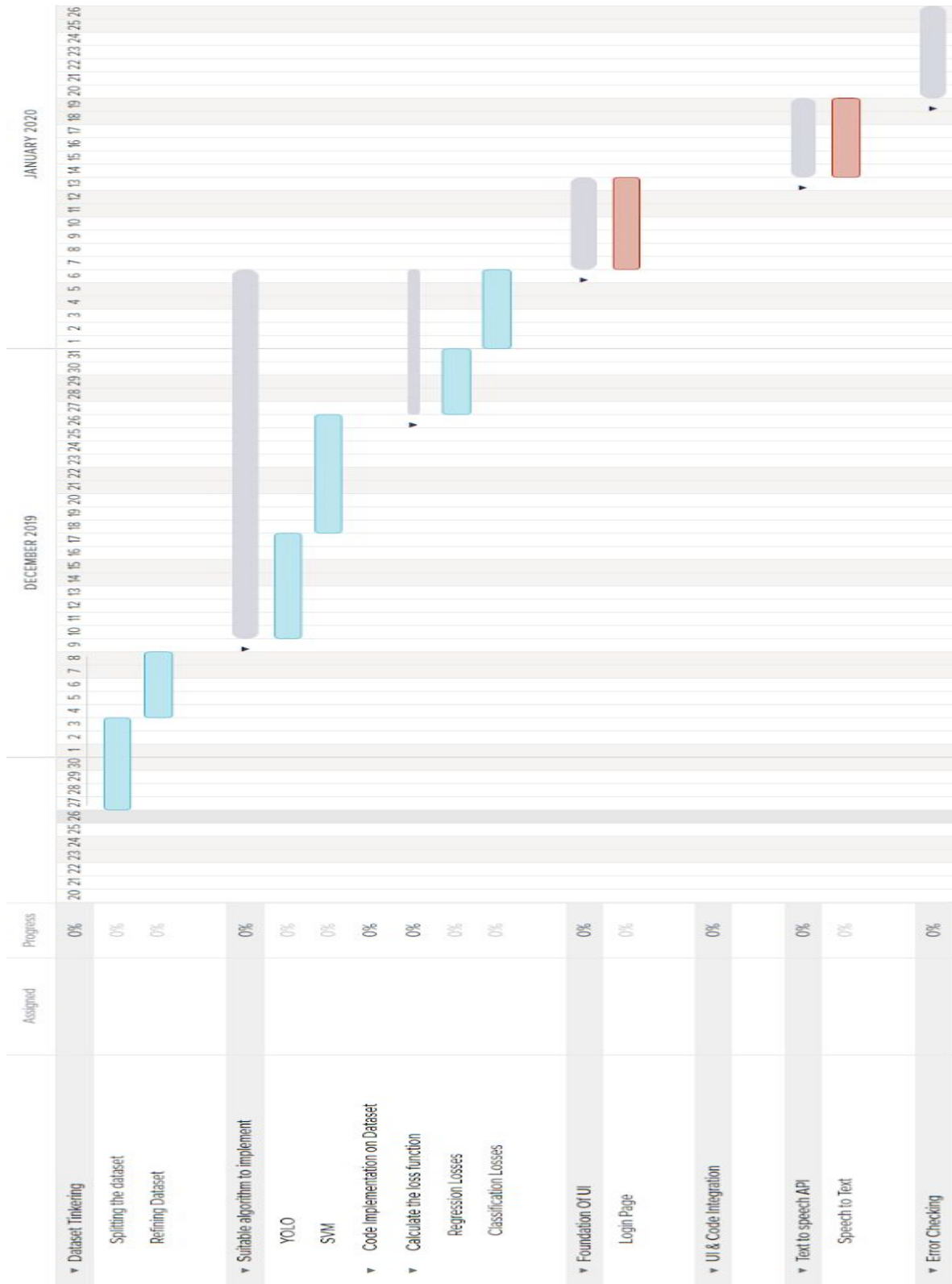
Fig: Gantt Chart of the Project

Week	Task/Activity	Members involved
1	Dataset Tinkering Splitting the dataset Refining Dataset	Nayeem Mohammad Rubayet Zaman Zubayer Ahmed
2	Suitable algorithm to implement SVM YOLO	Rubayet Zaman Nayeem Mohammad Zubayer Ahmed
3-4	Code Implementation on Dataset	Rubayet Zaman Nayeem Mohammad
5	Calculate the loss function Regression Losses Classification Losses	Nayeem Mohammad Rubyet Zaman Zubayer Ahmed
6	Foundation Of UI Login Page	Zubayer Ahmed Rubayet Zaman
7-8	UI & Code Integration	Nayeem Mohammad
8-10	Text to speech API Speech to Text	Zubayer Ahmed Nayeem Mohammad

WBS of the Project

Financial Requirements:

This is a research based project.Therefore, the financial bearing cannot be measured at this point.

Things we can look into:
1) We need a high-end PC that can run YOLO smoothly
2) We need to invite/hire a professional/expert in sign language who will communicate with the program.
3) We need to commute to various places.

Upon completing the project showcase we can come up with a necessary investment on the project.

References:

1) 'Calculating Loss Function'

Available Online:
https://machinelearningmastery.com/loss-and-loss-functions-for-training-deep-learning-neural-networks/
2)"Capstone Design Project"
Available Online:
http://ece.northsouth.edu/capstone-design/