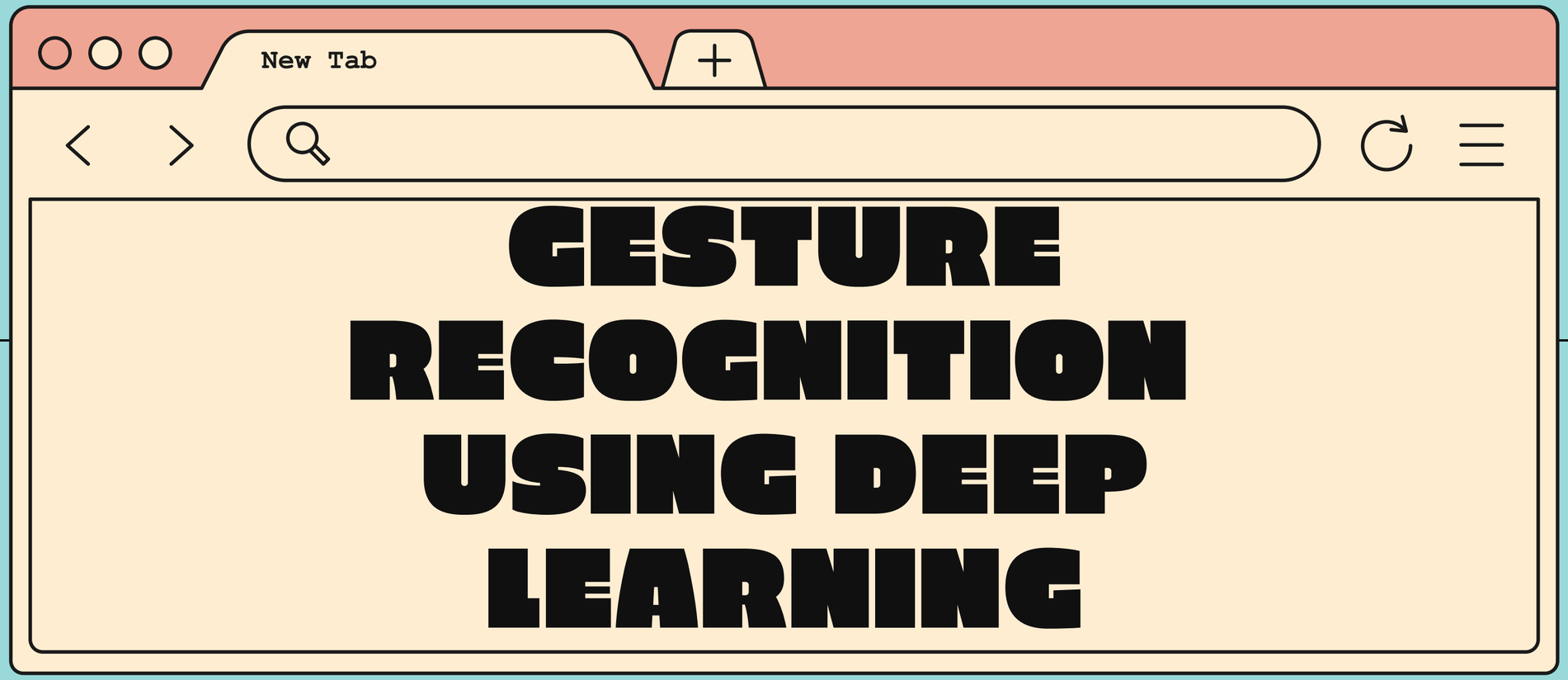
AI ND DS
PROJECT

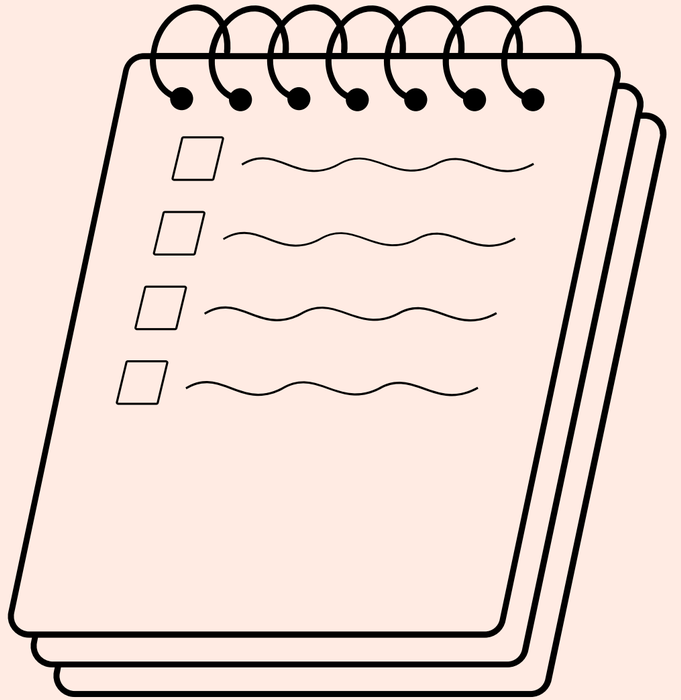


GESTURE RECOGNITION USING DEEP LEARNING

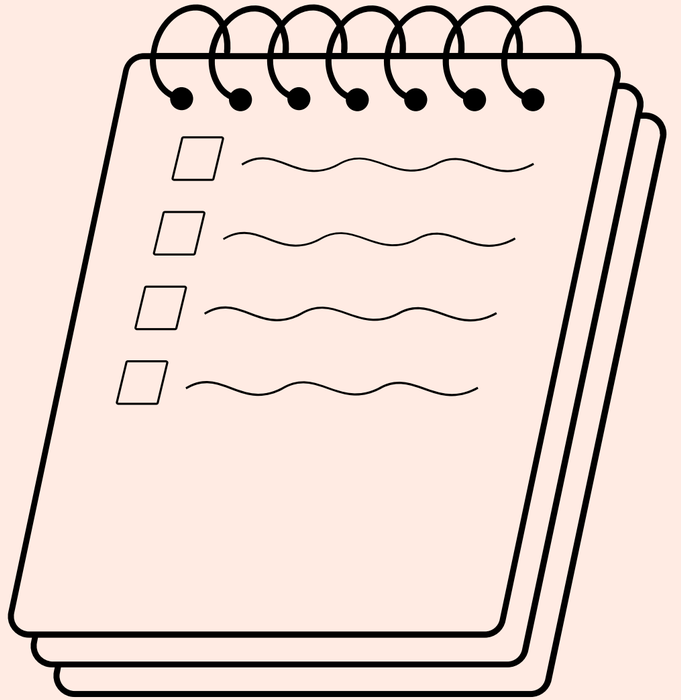
REVIEW:-1

07-03-2022

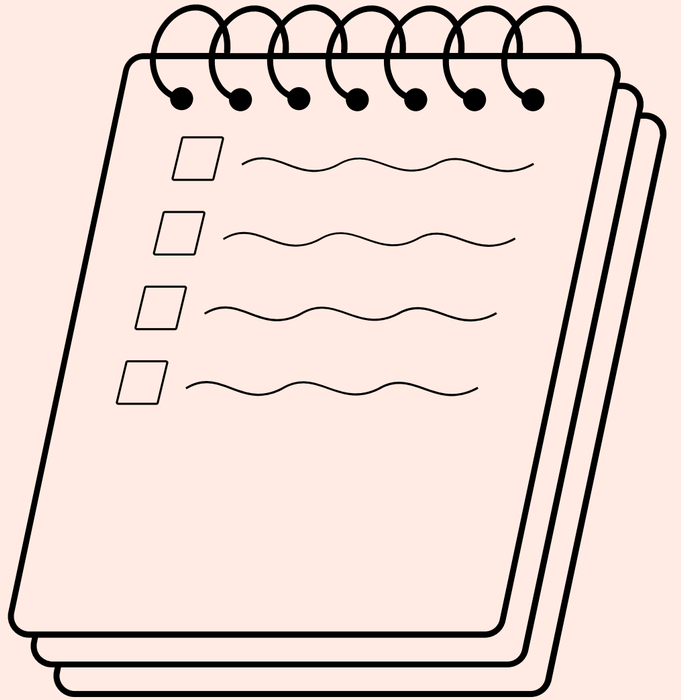
INDEX



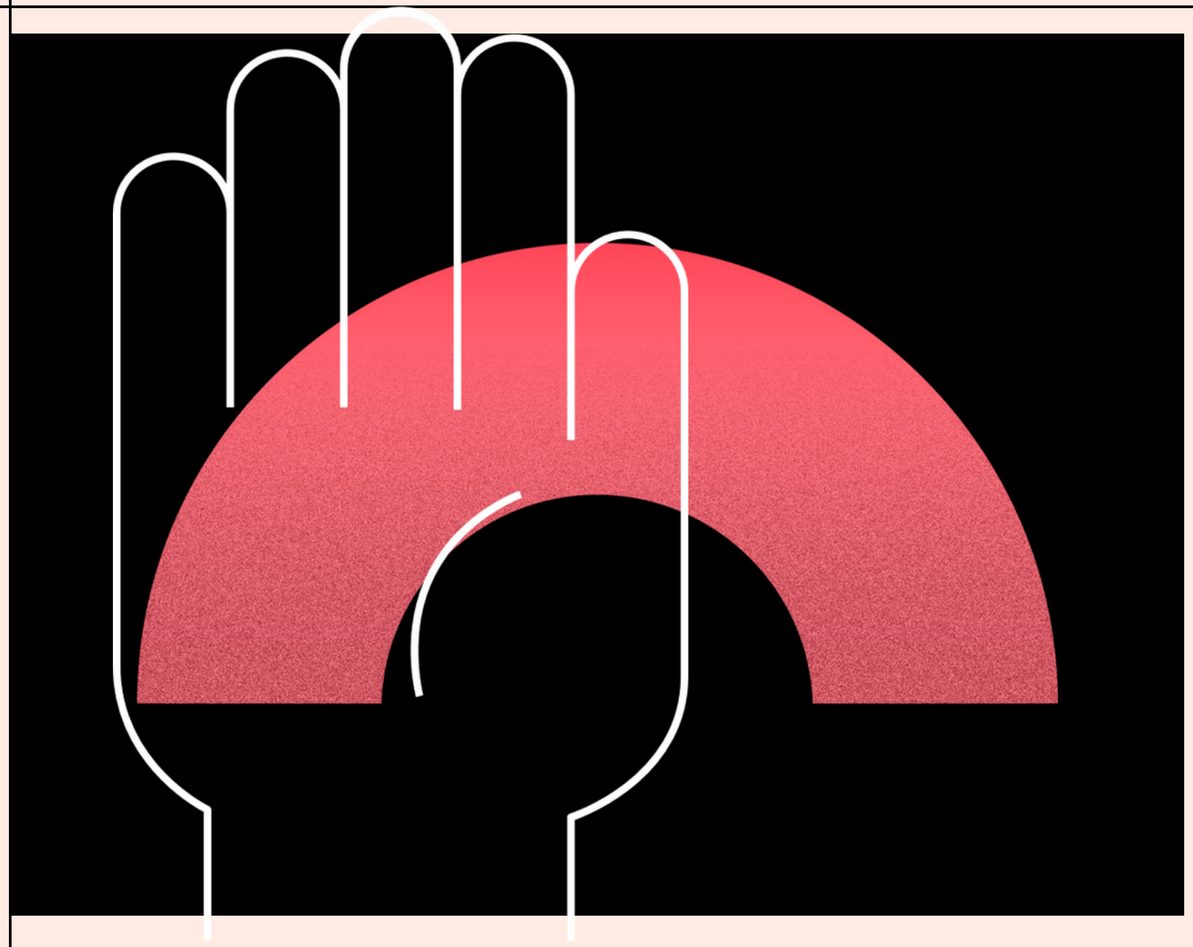
INDEX



INDEX



INTRODUCTION

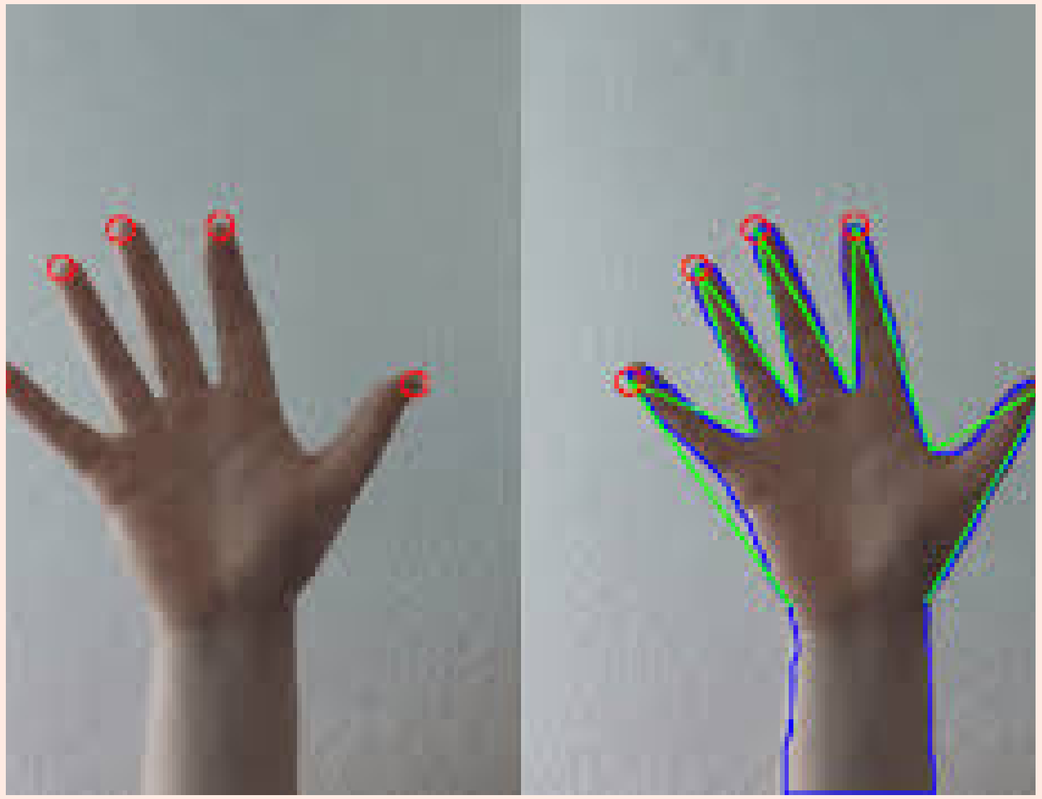


Hand gestures are a form of nonverbal communication that can be used in several fields such as communication between deaf-mute people, robot control, human-computer interaction (HCI), home automation, and medical applications. This is an area with many different possible applications, giving users a simpler and more natural way to communicate with robots/systems interfaces, without the need for extra devices. In our project gestures are continuously monitored by the webcam. Each gesture corresponds to a specific command.

FLOW CHART:-


DATA COLLECTION
DATA CLEANING AND PREPARATIO N
MODEL ANALYSIS
DATA PRE- PROCESSING
PROBLEM UNDERSTA NDING

PROBLEM STATEMENT:-



There are many applications where hand gesture can be used for interaction with systems like, videogames, controlling UAV's, medical equipment's, etc. These hand gestures can also be used by handicapped people to interact with the systems. Classical interactions tools like keyboard, mouse, touchscreen, etc. may limit the way we use the system. All these systems require physical contact, in order to interact with system. Gestures can interpret same functionality without physically interacting with the interfacing devices.

MOTIVATION:-

The Essential aim of bulding the project hand gesture reconigition system is to create a natural interaction between the human and computer where the recognition gestures can be used for controlling the robot or conveying the meaningfull information. How to form the resulted hand gestures to be understtod and well interpertued by the computer consisder as the problem of gesture interaction

OBJECTIVE:-

Our idea was to create a device which could help them control their paralysed limbs using nerve signals from their own brain. This technology can also be used to help the speechless people speak. The sign language can directly be converted to voice and thus enabling them to communicate verbally. This project is most elementary version of what the vision was. Nonetheless, every single step counts.

LITERATURE SURVEY:-

S.NO	Authors	Title	Publishing	Techniques & dataset	Pros	Cons
1 https://mantra.ai/blogs/ai-in-gesture-recognition/	Nivin Simon	How does AI recognise your hand gestures and movements	2019 MANTRA.AI	Static Gesture Recognition DataSet	1. we can look forward to gestural recognition applications moving into education, real estate, fashion design, and even law enforcement. 2. The consumer electronics market is set to lead the forecasted demand and growth for this technology, leading to an increase in the number of vendors creating ground-breaking applications in this space.	1. The biggest problem in deep learning when you want to train a good model for prediction task, is t find a large dataset.
2 https://becominghuman.ai/deep-learning-hand-gesture-recognition-b265f4e6cf02	Yacine BENAFFANE	[Deep Learning] Hand gesture recognition	Jan 14, 2020	Dataset hand gesture (https://www.kaggle.com/datamunge/sign-language-mnist), EgoGesture(http://www.nlpr.ia.ac.cn/iva/yfzhang/datasets/egog	1. Gesture recognition is a hot topic in computer vision and pattern recognition. 2. It's an interesting aspect of our society, the signs will be able to help, depending on the case, to establish and improve existing communication.	1. Real-time recognition of dynamic hand gestures from video streams is a challenging task, because there is no indication when a gesture starts and ends in the video. 2. We need a dataset that contains dynamic gestures focused on interaction.

LITERATURE SURVEY:-

3 https://arxiv.org/pdf/1901.10323v3.pdf	AhmetGunduz	Real-time Hand Gesture Detection and Classification Using Convolutional Neural Networks	29 Jan 2019	EgoGesture and NVIDIA Dynamic Hand Gesture Datasets	1. An acceptable classification accuracy 2. Fast reaction time 3. Resource efficiency 4. Single-time activation per each performed gesture.	1. Requires an extra step of hand-keypoints extraction, which brings additional time and computational cost. 2. Obligation of wearing an additional device with which lots of cables
4. https://www.ijert.org/research/hand-gesture-recognition-system-using-camera-IJERTV3IS10567.pdf	VirajShinde, TusharBacchav, JitendraPawar, MangeshSanap	Hand Gesture Recognition System Using Camera	1, January - 2014	Object detection, Object tracking, Object recognition	1. Reduce external Interface: The Advantage of System is to Reduce External Interface like Mouse And Keyboard. 2. High Portability : The proposed System reduce theworking of external interface likekeyboard and mouse so it makes it highportable	1. Due to the effect of lightin and complex background, most visual hand gesture recognition systems work only under restricted environment. 2. Common image problems contain unstable brightness, noise, poor resolution and contrast.
5. https://paperswithcode.com/paper/deep-learning-for-electromyographic-hand	Alexandre Campeau-Lecours	Deep Learning for Electromyographic Hand Gesture Signal Classification Using Transfer	10 Jan 2018	MyoArmbandDataset	1. artificial intelligence can be leveraged to increase the autonomy of people living with disabilities	1. limited amount of data from any single individual

SOFTWARE REQUIREMENTS:-

PROGRAMMING LANGUAGE:PYTHON

LIBRARIES: PANDAS,OPENCV,KERAS

INTERGRATED DEVELOPMENT ENVIRONMENT:-

VISUAL STUDIO CODE

HARDWARE REQUIREMENTS:-

Operating System: Windows7 OR ABOVE
Processor: Intel(R)Pentium(R) CPU N3710 @1.60GHz
System Type: 32 OR 64-bit operating system
Installed Ram: 8 GB
Web cam (For real-time hand Detection)

DATASETS & TECHNIQUES

DATASET	CHARACTERISTICS	TECHNIQUES
Tiny Imagenet Dataset	➔ It has 100,000 images across 200 classes. ➔ Strict subset of ILSVRC2014 ➔ Hand-labeled ➔ The average resolution of ImageNet images is 482x418 pixels	Semantic Pseudo-labeling-based Image ClustEring (SPICE) framework, deep neural network architecture
The Jester Dataset:	➔ Total number of videos 148,092, Total number of frames 5,331,312 ➔ Manually labelled ➔ 3D convolutional neural network ➔ number of classes 27.	DRX3D 96.6 , Multiscale TRN 94.78
EgoGesture Dataset	➔ The dataset contains 2,081 RGB-D videos, 24,161 gesture samples and 2,953,224 frames ➔ a file of images resized to 320 × 240 pixel ➔ Manually labelled	CNN accuracy of 94.04% and 83.82% for depth modality on EgoGesture , SURF detector and tracking techniques.

REFERENCES:

1)SPICE FrameWork

1)SPICE FrameWork

by Damskägg

Published by BrandXBooks, 2019

Damskägg, Eero-Pekka, Lauri Juxela, Etienne Thuillier, and Vesa Välimäki. "Deep learning for tube amplifier emulation." In ICASSP 2019-2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), pp. 471-475. IEEE, 2019.

REFERENCES:

2)INFOCAM

2)INFOCAM

by RAN,XUKAN

Published by BrandXBooks, 2018

Ran, Xukan. Haolianz, Chen, Xiagdan Zhu, Zheoming Liu, and Jiasi Chen. "Deepdecision: A mobile deep learning framework for edge video analytics." In IEEE INFOCOM 2018-IEEE Conference on Computer Communications, pp. 1421-1429. IEEE, 2018.

REFERENCES:

3)Multiscale TRN

3)Multiscale TRN

by WANG

Published by JOURNAL OF COMPUTATIONAL PHYSICS, 2020

Wang, Yating, Siu Wup Cheung, Eric T. Chung, Yalchin Efendiex, and Min Wang. "Deep multiscale model learning." Journal of Computational Physics 406 (2020): 109071.

CONCLUSION:-

->Gesture recognition is very challening and intersting task in tearms of accuracy and usefulness in compter vision

->Rotation, iluminatio change, backgroud variations, and pose variations of hand makes the promblem more challening

->Most important advantage is that we can efficiently interacyt with the applicatio from a distamce without any physical interaction

->We have proposed and for recongnizing the hand gestures in a constant background and goodf lighting conditions

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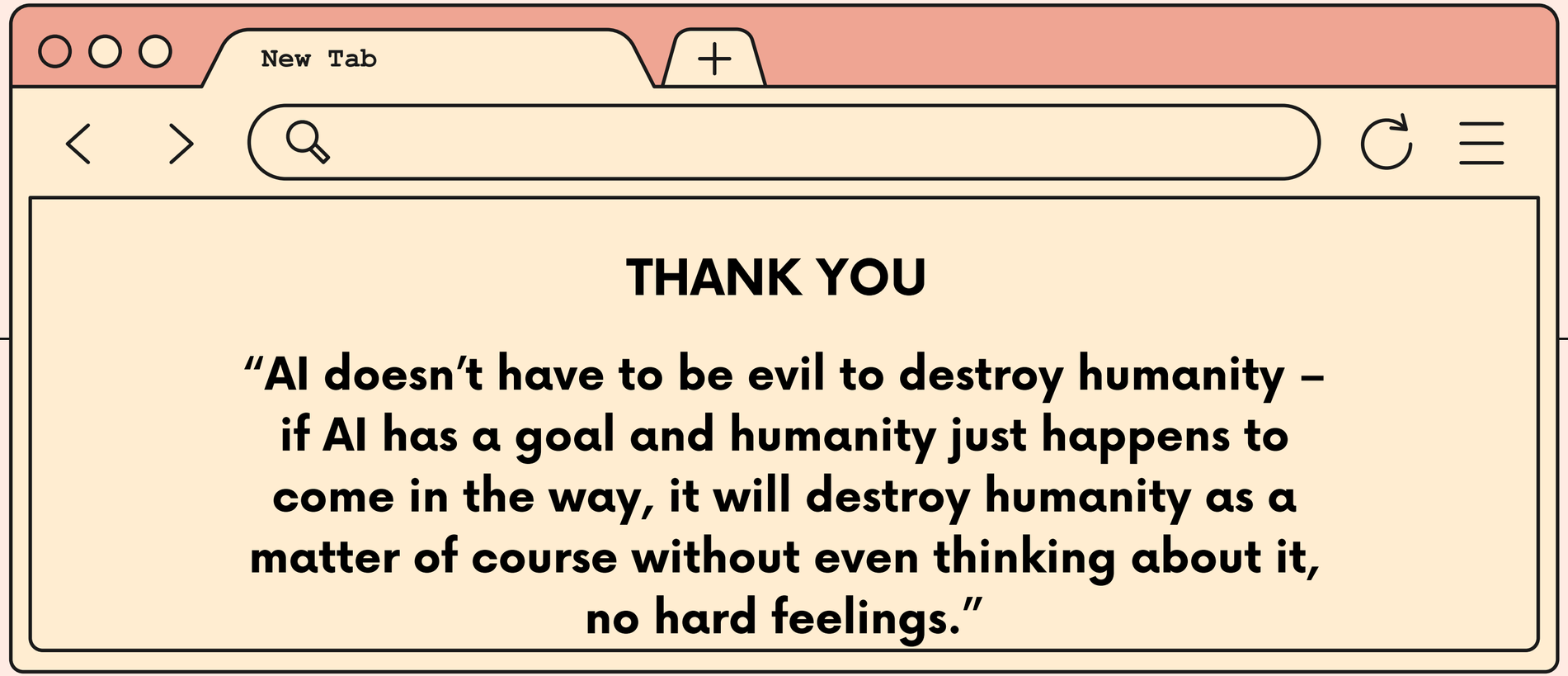

THANK YOU

“AI doesn’t have to be evil to destroy humanity – if AI has a goal and humanity just happens to come in the way, it will destroy humanity as a matter of course without even thinking about it, no hard feelings.”