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ProjectName	Project-Real- TimeCommunicationSystemPoweredbyAIforSpeciallyAbled

1.BasedRealTimeCommunicationforPhysicallyandSpeechDisabledPeople(OngChin Ann,MarleneValeriuLu–2019)

Communicationisasocialprocessofexchanginginformationfromoneentitytoanotherinverbalandnon-

verbalform.Itdefinesourexistenceanditisanimportantinstrumentthatconnectspeopletogether.Itcomesnaturally asarawskillembeddedinmostpeopleatbirthandweacquiredthe

waysofcommunicationthroughcognitivelearning.Communicationisthebasis,whichdrivestheprocessofdevelo pmentinallthefields(Manohar,2008)anditistheverycoreofourcivilisation.Theabilitytocommunicateallowsusto expressemotion,feelings,conveyourthoughtsandideasaswellastorelateourexperiences.Itplaysanimportantrol einthedis-

seminationofinformationandsharingofknowledgeespeciallyintheacademicarena.Researchhasfoundthathumans tartedtolearnhowtocommunicatewitheachothersincetheyarebornnotonlythroughspokenand

writtenlanguagesbutalsobodygesture,posture,facialexpressionandeyecontacts(Busso,etal.,2004;Cohen,Grag& Huang,2000).

Communicationskillmightcomeasanaturalabilityinmajorityofpeople.However,therearesomepeopleinfli ctedwithsomeformofphysicaldefectswhichaffecttheirabilityto

communicate.Oneofthemoreseveredisabilitiesisknownas“cerebralpalsy”,acongenitaldisorderatbirth whichcausesabnormalityintheirMotorsystem.Itaffectstheirmuscle

movementandcoordination,learningandSpeechabilities.Theirmalfunctionedmotorsystemcausesanuncon trollableandinvoluntarymovement.Theyareunabletocontroltheiroralfacialmuscles,thusaffectstheirability toperformfacialexpressionappropriately.

FromthelimitationoftheexistingtoolsreviewedNovita,2006;Macsolvers,2009;Standup,2006;UniversiteitvanA msterdam,2008;Crestwood,2009;Sci-

enceDaily,2008),thereisstillapressingneedformoreeffectiveandefficienttoolstoalleviatethisproblem.Onethepos

siblemethodsaretoimplementafacialexpres-

sionrecognitionsystemtopredictordeterminetheemotionalstateofadisabledpersonthroughhisexpressionprojectedonhisface.biometricsinformationsystemcanbeemployedasameanstodetectandclassifythephysiologicalaspectofapersoninrealtime.FrancoandTreves(2001)furthersupportthenotionthatfacialexpressioncanbeusedforhumancomputerinteractionandusabilityenhancement.

Basedontheproblemstatementsdeliberatedabove,weproposeanimprovedreal-time communicationsystemusingmachinelearningandcomputervision.Theaimistocreatea communicationchannelbetweenthespeciallyabledandthesociety,sotheycanexpressthere feelings,thoughtsandunderstandotherpeople'sfeelingsandthoughtsthroughrealtimecommunicati onandfacialexpressions.

2.Systematicreviewofcomputervisionsemanticanalysisinmedical(AntonioVictor

AlencarLundgren,ByronLeiteDantasBezzerra–2021)

Medicaldiagnosingtechniqueshavefascinatedusforalongtime.Ithasbeencommonforustousetheminour dailylifeandimplementthesetechnologies.Machinelearningandespecially

computervisioncontributealotinmedicalscience,whichmakedifferentdifficulttaskseasyfordoctorsand moretolerableforpatients.Theyarewidelyusefulinearlydetectionofdisease,andhenceareavaluabletooltos avehumanlife.Cardiographictechniquesareamustforoldageandinfantsafety.

Theseinclude:

.**Retinoscopy-**

Theyalthoughprimitiveinapproachareamustonceinalifetimeandretinoscopyhavemadeyet successfultomeasureactivitiesofrodandconereceptorsinoureyes.Retinahasthreedistinctare asforcolors-erythrolabe,chlorolabeand

cyanolabe…whichareanalogicaltopixelfixationandidentificationalgorithmsonmachin elearning.

.**Tumordetection-**

Cancerisspreadingintheworldaffectingbillionsoflivesbothintermsoflifeandmoney…machi nelearningdiagnosingsystemsapplytheir

identificationsystemstofurtherdevelopaccuratedetectionintermsofsize,location,qualityofs uchtissueswhicharesuspectedtobecomemalignantuncontrolledgroupoffastdividingcells.

.**CTscan-CTscan–**Averycommontermforcancerpatientswhichuses

electromagneticradiationsundermanuallyoperatedcontrolledcomputervision

gratingswhicharesoaccuratethatitcanmeasureapigmentcalledc-125inblood.

3.AsurveyonFacialEmotionRecognitionTechniques(FelipeZagoCanal,TobiasRossiMuller,GustavoGinoScotton–2022)

Facialexpressionsrecognitionisanabilitytorecognizepeoplebytheirfacialcharacteristicanddifferentiateitwithoneanother.Humanisbornwiththeabilitytorecognizeotherpeopleeasilybyidentifyingtheirfacialfeaturessuchasshape,appearance,skintextureandskincomplexion.Otherthanthat,humansalsohavetheabilitytoexpress,interpretanddifferentiatefacialexpressions.Theregularrecur-

ringonesarehappiness,anger,disgust,fear,surpriseandsad(Ekman&Friesen,1978).Thesixfacialemotionsstatedaboveareimportantandplayamajorroleinexpressingemotionaswellasrecognisingfacialexpression(Busso,etal,2004).

Inreallife,interpersonalhumaninteractionareperformednotonlyusingspeechorspokenlanguage,butalsononverbalcuesforexamplehandgesture,bodygesture,facialexpressionandtoneofthevoice.Allthesecuesaresometimesbeingusedforexpressingfeelingandgivefeedback(Busso,etal,2004;Cohen,etAl.,2000).Wecanseehowhumaninteractwitheachotherusingnon-

verbalcueseveryday.Forexampleachildcriesinfrontofhismotherbecauseheisnothappyordissatisfiedwithsomething.Otherpeoplemightinterpretitdifferentlythinkingthatthechildmightbeinpain.

Facialexpressioninteractionisrelevantmainlyforcommunitysociallife,teacherandstudentinteraction,credibilityindifferencecontexts,medicineandsoon.Besides,facialexpressionrecognitionisusefulfordesigningnewinteractivedeviceswhichoffersthepossibilityofnewwaysforhumancomputerinteraction-

HCI(Franco&Treves,2001).Cohen,etal.(2000)conductedsurveyontheirusersandnoticedthattheyhavebeenthroughtraditionallyHCIconsistsofthekeyboard,mouse,joystick,trackballs,dataglovesandtouchscreenmonitors.

FacialExpressionRecognitionSystem(FER)hasbeenatopicforresearchsinceEkmanandFriesen(1978)whopioneeredthisresearchandworkedfromthepsychologyperspective.Inthepast20years,manyresearchershavetriedtoadopttheirideaandmakeimprovement,innovationandmodificationonfacialexpressionrecognitionbyintroducingdifferenttechniques,mainlyconcentratedontheimprovementintermofaccuracy,efficiency,mobility,andspeed(Kotsia&Pitas,2007).Withalltheenhancementsontechniquesforfacialdetectionandrecognition,thedevelopmentofthefacialexpressionrecognitionhasalsoimproved(Zhan&Zhou,2007).Themostactiveresearchesincomputervisionandpatternrecognitionisfacerecognitioninforensicidentification,accesscontrol,userinterfacedesign(Wang,Plataniotis&Venetsanopoulos,2005),emotionanalysis,interactivevideo,indexingandretrievalofimageandvideodatabase,imageunderstandingandsyntheticfaceanimation(Zhan&Zhou,2007).

Humancaninterpretandgeneratemajorfacialexpressionsbutacomputerisnotbuiltwithanyfacialrecognitionabilityunlessthroughtheuseofsomesoftware.Itisevenmorecomplicatedforthecomputertointerpretirregularfacialexpression,especiallyfromthosesufferingfromcerebralpalsy.Duetotheirdisorder,theydonothavetheabilitytoreflecttheiremotionslikeanormaltypicalperson.Thus,amorenaturalandnaivemethodhastobeemployedforthesystemtoworkbyamanuallabellingoftheimagecapturedwiththeemotionoftheuser.

4.MachineLearningbasedtechniquesindataanalysis(LavanyaVemulapalli,

Dr.P.ChandraSekhar–2018)

Alotmoreapplicationsavailableforusinplaystore,appstore,amazon,etc.,whichare

dependentmachinelearning.Therearesignificantnumberoforganizationsandstartupswhichturntowar dsoptimummachinelearning,andhaveprovedthatinvestinginmachinelearningisthebestintoday'swo rld.

GoogleStreetView-Itisapervasivecityimagerydatasetsapplication.

Itisanapplicationfromwhichwecanvirtuallyexplorestreetsofcities.Itusesadense

geosamplingtooltoshowsthestreetsofcities.Streetsarecapturedthroughafleetofvehiclesequippedwit haspecializedcamera.

Aftercollectionofphotos,theyaredigitallyprocessedandcombinedtogetherandlookslikeasingleimage.Fr omfilesreportedforprivacy,Googlepixelatedfacesofpedestrianandlicenseplatewhichiscaptured.Webm appingtechnologieshavebeenembracedbydisciplinesuchasgeography,archeologyandecology,butalsoby severalsocialscientificdisciplines.Researchersworkinginthedisciplineofgeography,archeology,andecolo gyquicklyincorporatedwebbasedmappingtechnologiesintotheirresearchdesigns.Therearevariousappli

cationsofgooglestreetviewinresearchfield,althoughthenumberstillremainslimited.Itisalsousedforbett
er

estimationoffishcatching,estimationofforestrybiomassinIndia,estimationofareaofdifferentregionsorl
akes,etc.

Googlealsohelpsinthecriminologicalstudiesthathaveimplementedinthegooglemapsand

streetsviewintheirresearchdesign.Publicandsomelawenforcementagenciesandoffendersarefamiliarwitht
hepowerofonlinemappingtechnologythroughtheirday-to-

daylifeandwork.Thesocialsciencehavealsoembracedweb-

mappingtechnologies.Buttogooglemapsstillremainlimitedinsocialscience.Wecanseegooglemapsanditsstree

tviewcanbeusedinvariousfields.Itcanbeusedinmappingordevelopingormaintainingcities'streets.Wecanus eGoogle'sstreetviewtomakeaninfrastructureofbuildingorapartment,park,bridges,water

reservoir,etc.GooglemapsandGooglestreetviewcanbeusedinsomeresearchfieldofdetectingthep opulationorurbanizationinsomeareasorthroughouttheglobe.

Uber-

Uberisoneoftheexamplesofusingmachinelearning.Itusesanalgorithmwhichprovidesestimatedtimeandre al-timelocationonmap,whichisveryusefulandhelpfulforbothdrivers

andriders.Thecompanyisalsodealingwithfraudulentbehaviorlikefacedetectionandinvalidstolencredit cards.

GoogleKeyboard-Almostallandroidhandsetusesgooglekeyboard.Gboardusestheneural

spatialmodeltodeterminethepixelstouchedonthescreenandmakingrelevantwordsandemoji

inhandwritingmode.Itpredictsthenextwordbymatchingthecurrentlytypedwordwithitsdictionar yset,whichhelpsusertotypefastandaccurate.

Snapchat-

Snapchatusesmachinelearningtoidentifyorfacedetectiontechnologyforapplyingfiltersonit.Onemaywon derabouthowSnapchatfilterworks?Itfirstdetectsaface.Thenlocatefacialfeatures,andthencreateameshof3 Dmask(pyramidalshape)overface.Snapchatnotonlyapplyfiltersbutalsoalistofthingstheyaredoinglike,lang uagedetectionforveryshorttexts,

namesentityrecognitionanddisambiguationusingmultimodalNER(sound,text,etc.),

normalizingtextmisspellings(phonetic,orthographic,semanticrepresentations),emotionanalysis(fromem ojitoactualpictures),speech,musicrecognition(keywordspotting),personalizedneural

conversationalmodels.Wecanusethistechnologyfordetectionofculprit'sfaceifheor/shemadesomef acialchanges.

VirtualVoiceAssistant-

Theworldmovesinthepathofautomation.Peoplewanttheirliveseasyandcomfortablelikethishandfreese rviceprovidedbyvoiceassistants.Therearelotsofvirtualassistantsavailablelikegoogleassistant,Apple'sSiri ,CortanabyMicrosoft,AlexabyAmazon,Samsung'sSvoice,etc.Astheremoreadvancesinmachinelearningvoi ceassistantsbecome

moreemotionallyattachedtohumanbeings.Voiceassistantsremindusontimesothatwedonotskipsomeim portantstuff.Voiceassistantsalongwithcomputervisioncandomanythingsthatweevencan'texpect.Itcan doalm

ost70%ofourdailywork,frommorningteatoevening

supper.

Evernote-

Evernoteusesmachinelearningwhichautomaticallyidentifiesthedocumentfilefromdevicestorageanda
ppliesfilteronit,suchthatitappearsclearandtidy.

5.SurveyonMachineLearningAlgorithm's

(RekhaNagar,Dr.YudhvirSingh–2022)

Thesubfieldofartificialintelligence,machinelearninghasgainedmuchpopularityinlastfewcoupleofyea rs.Manytechgiantsusemachinelearningalgorithms,likeNetflix'salgorithmstomakemovieprediction fr omyourpreviouswatchedmovies.Inthissection,wewouldliketopresentsomeofthefamousalgorithms whichus

efrequently.

Theyare:

.**Naïve-Bayes'algorithm-**

Thisisthealgorithmmostlyusedinmachinesandhardware.ItsimplyappliesBayes'theoremalongw ithstrongindependenceassumptions.Let'stakeanexample,tomarkanemailasspam,usedforfaced etectionsoftware,etc.

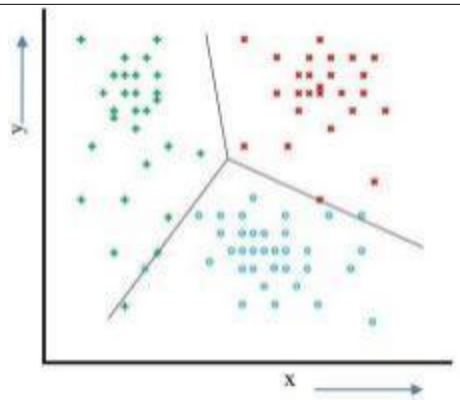
.**K-meansclusteringalgorithm-**Thisisatypeofunsupervisedlearningwhichhas

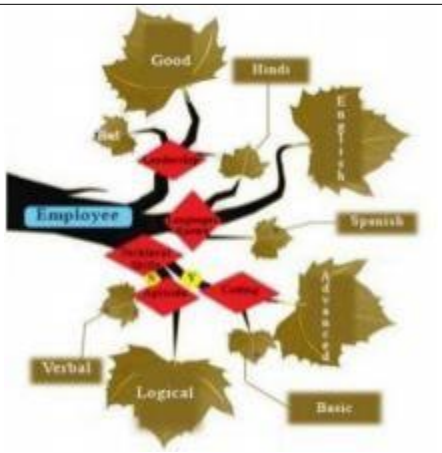
varioususesincludingbusinessandmanagement.Thisalgorithmalsoletsusknowprofitateachstage oftheproduct.ItisalsoreferredasLloyd'salgorithm.Thisalgorithmisalsousedingroupingoffeatures intodifferentlabels.

DecisionTrees-

Thesearetreesinwhichdecisionsaremadebythecomputerateachstagebaseduponrecurrencerelati

ons.


y
x



.**NeuralNetwork-**

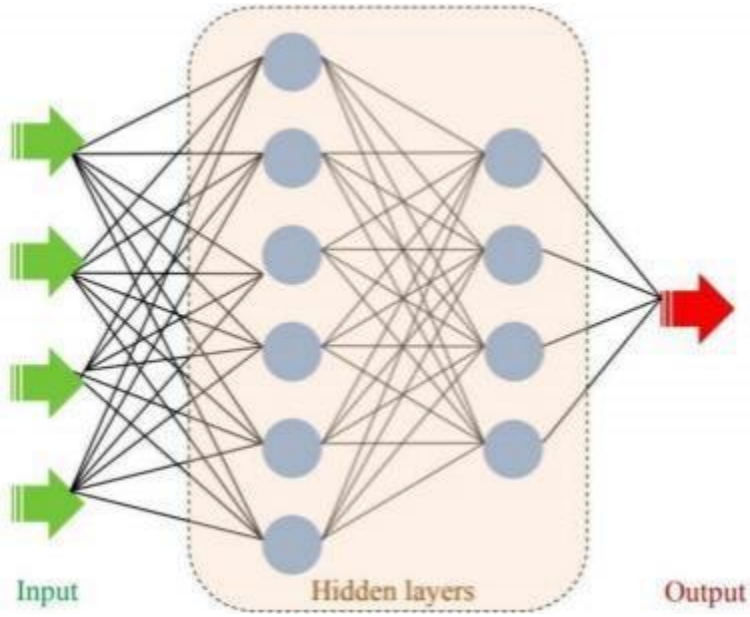
Ourneuronsinbodyplayamajorroleindeterminingthestepstoprocessasingletask.Similarly, artificialneuronsarethosewhichhelpthenervous

systemoftransistorsinanysequentialorcombinationalcircuittotakeupadecisionandexecuteitconditionally.Thisagaindependsonactivityoftheneurons.Anartificial

neuronisanactualpieceofhardwaremachinerywhichhelpsthesystemtotakeupa

decisionbasedonthereceptors,assuchseveraloptoelectronicdeviceshavealreadybeen

developed.Thisalgorithmhelpsustobuildanymachinefunctioningexactlyashumanreflexarcs.



Algorithmsusedinmachineshaveseveralimportantimplementations.Wealsohave

regressionofvalueaswellasregressiontrees,whichhelpustododifferentusefulkindofjob.Thealgorithmsarealsousefulinhealthcareindustries,forexample,random

forestdistributionalgorithm,thisalgorithmismostlyderivedfromstatisticalstudies…theyareusefulincalculatingpeopledensitiesandmassorchunkdensity.Themost

importantistheartificialneuralnetworksalgorithm.Thisalgorithmisrelatedtoartificialintelligenc
eandneuralnetworking.Thoughformassapplicationwemusthavemachine

learning.Throughcomputervisionthesealgorithmjudgesystemsonbasisoftheirreactan
cetoexternalstimuli.

6.SurveyonapplicationofArtificialIntelligenceinCyberSecurity(ShidawaBabaAtiku,

AchiUnimkeAaron,FatimaShittu–2020)

Cybersecurityreferstoprotectingyourpersonalcomputerfrommalicioussoftware.Machine

learninghasalotmanyalgorithmsandsystemswhichprotectusersfromthreats.SuchasthePaypalappwhichwasdevelopedinDecember1998,usesmachinelearningalgorithmstoprotectitsusersfromdifferentthreatsandonlinespoofing.Itusesthreetypesofmachinelearningalgorithmsthat

arelinear,neuralnetwork,anddeeplearningalgorithm.

Theyare:

.**Waterhole-**Itislikeapitsurroundedbygreenery.Hackersaccessotherpeople's

informationbyusingsiteswhicharemoreaccessibletothepublicmorethananythingelse….forexample,networksinacoffeeshopisaccessedbysomanyuserssuchthattheseusersloadtheirpc'swithwhatsoeverdataisprovidedtothem.Likethisthereaesomanysitestoputonvirusesandworms.Machinelearninghasalgorithmsthatdetectpathofthesemalwareblockingthemwithafirewallthereafter.

.**Webshell-**

Thesearepieceofcodewhichisloadedintoaworkingdevicewhichprovokestheusertomisjudgeandthentakingadvantage,entryisgainedintothefulldatabase.

.**Ransomware-**

Similartowebshell,butheretheuserisvulnerablythreatenedexternallybyagroupofsoftwarebrokerswhohavecorruptedtheusers'personalfiles.Such

scenarioscanbetotallyavoidedbyusingmachinelevellanguagewhichwasearlydetection.