Ann exu re3b
-
Com p lete fili n g
INVE NTIO N DIS CLOS URE FORM
Details of Invention for better understanding:
1.
TITLE:
AI
-
P ower ed R e al
_
Time Languag e Tr anslation S ystem
2. INTE RNAL INVE N T OR(S)/ S T UDE NT(S):
All fields in thi s colum n are m andatory to b e

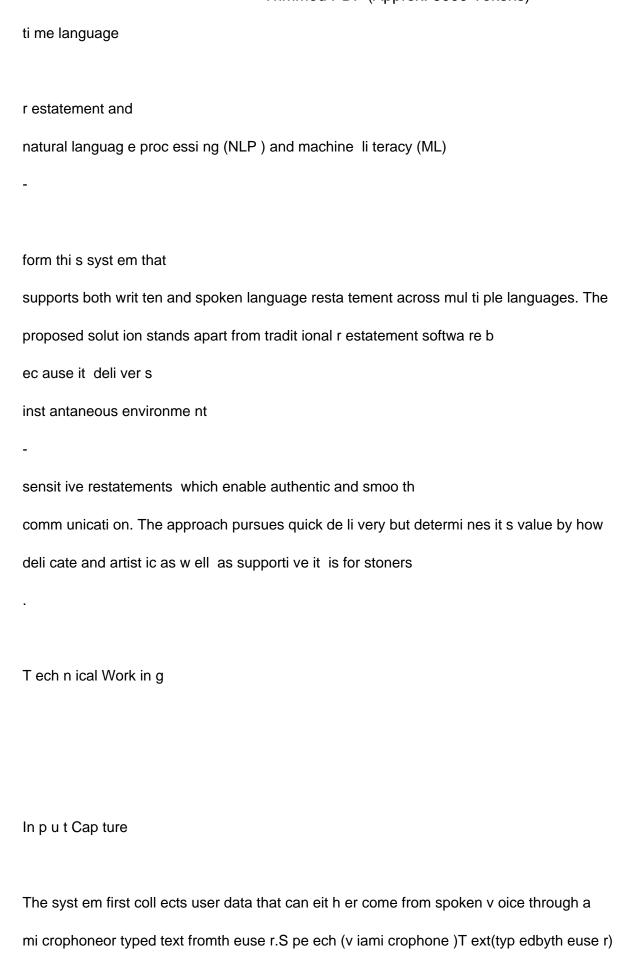
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S cience and Enginee ring

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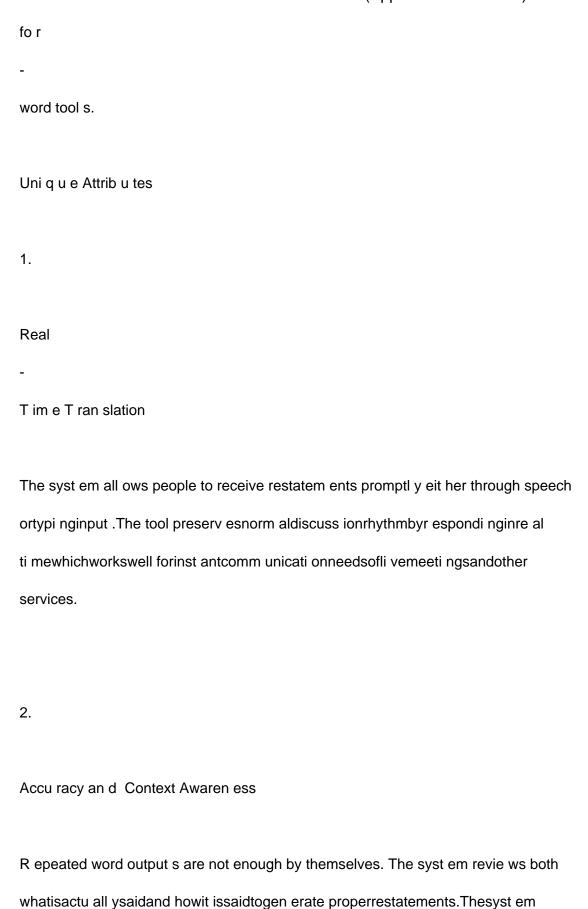
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x
3.
DES CRIPT ION O F THE INVENTION:
1.
Pu rp ose
This A I
-
pow ered syst em works to b re ak down ve rbal ba rriers that block c omm unicati on
betweenpeoplewhospea kdifferentlanguages.Itp roducesef ficientusabler esult sbetween
speakersf romdiffer entlanguageba ckgrounds.Ea syandpromptcomm unicati onstand
sas
an essential requir ement bec ause the world sho ws dec reasing globalization trends both
dail y and in all aspects from travel to learning and enterprise to conversati o nal exchange.
Three components
-
artif icial int ell igence (A I)
-
d riven real
-



The S pee ch R ecognit ion technology conv erts mi crophone audio int o text through tool
S
such as Google S pee ch
-
to
-
Text or Whispe r A I.
an int egrated language i denti ficati on model after it receives the input from users. The
autom ati clanguagedet ec ti onremovestherequire mentformanualselecti o nbyuse
rsabout
what I anguage th ey ar e u sing.
text according to their al gorithm s. The syst em evaluates the text by exami ning gramm ar
patt erns together with s e ntence structur es along w it h tone and purpose of messages.
Understandidi oms,slang,coll oquialexpressi ons, andcontextThet echnol ogythatmakes
up context
-
aw are tr anslat ion contrasts against sim ple word
-



avoids cre ati ng unre ali sti c translations that cr ea te confusion sinc e it produces

result s that p
eople can un derstand e asil y.
3.
User
-
F riend ly In terfac e
The main d ecepti ven ess in thi s syst em focuses on cre ating an
easy
-
to
-
use design
forpeoplewithout technicalknowledge.Thesyst e mworkswell onvariousdevices
such as smartphones laptops and tabl ets to provid e e asy use r a cc ess f rom p ersonal
and professi onal s ett ings.
4.
S u pp ort for Mu Itip le Lan gu ages
This syst em supports all languages despit e fo cusi ng mainly on popular languages.

This I anguage support choice enables people ev er ywhere to us e the system si nce it accomm odates their pre f erred n ati ve tongue.

2.

Conclu sion

The A I Tr anslation S ystem rep resents a vit al

dis covery that r educes worl dwide comm unicati on

chall enges. Th rough A I t echnology the syst em de li vers translated text inst antl y without harming the environment. The syst em proves successful fo r practi c al purposes bec a use it handles text and speech input whi

le ac cep ti ng all major and mi nor languages plus reprodu ce s content with proper tone and st yle

1.

PROBLEM ADDRESSED BY THE INVENTION:

Inte rnati onal conne cti vit y leads to chronic pati ent chall enges bec ause people att empt to comm unicatee ffe cti velyoverlangu agedif fer enc e s.AnA I

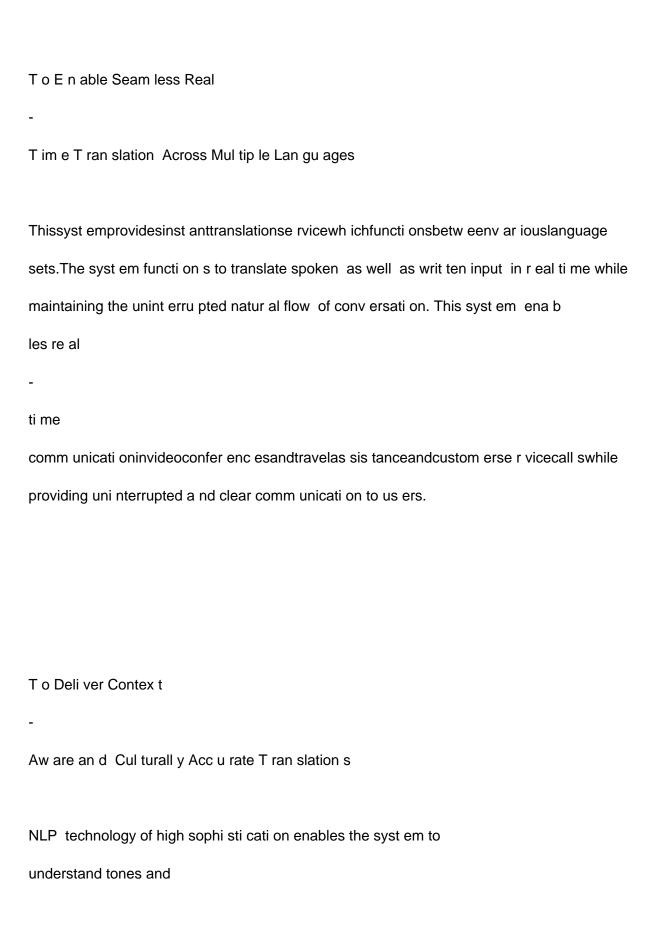
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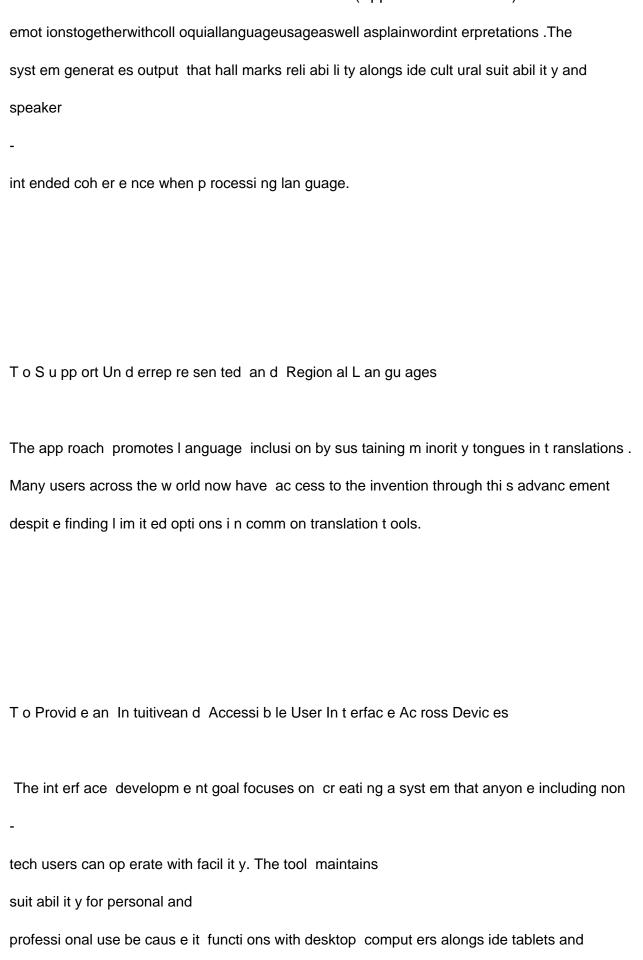
enabl edr eal
-
ti m elanguag etr anslation
syst em addresses fou r main problems while in operati on.
:
1.
Language B a rriers in R e al
-
Time Com muni cati on:
The absenc e of mutual la nguage ski ll s makes mos t i ndivi duals face comm unicati on iss ues
while traveli ng betw een nati ons and wo rking a t int ernati onal conf eren c es and during
mul ti lateralventures.Th emi xtureofmi sundersta ndings andreduc edworkspeedresult
sin
lost busi ness opportuni ti es throughout di fferent ci r cumst ances.
2.
Lack of contextual data i n tradit ional translation s oftware:
Word

-
bas ed autom ated translation does not provide accur acy since new a ppli cati ons sti ll
adopt direct word
-
to
-
w ord translation mechani sms . The translating process produc es
erroneous result s when it comes to de ali ng with idi oms along with tones o f language a
nd
slang and cult ural t erms.
3.
Limi ted Real
-
Time Capa bil it ies:
The developm ent of modern translation syst e ms has fail ed to focus on cre ati ng the
capabil it ytoini ti ateunint errupteduse rdialogues. Thesoftwa re
r equiressp eakerstop ause
temporarilyduringint erp retationthatresult sindelayedspee chalongwithint erruptedflow
of dialogue.
1

In adequat e Langu age S u pport:
Thetool sdonothavevoi cea cti vati onfe atureswhi chprev entsusersfroma c cessi ngmi nor
regional langu ages and al ternate I anguage versions . The tool s a re rend ered useless as the
are not able to p erfo rm their functi ons prope rly for many users.
5.
In accu rate and P oor Use r Experien ce:
Users lose confid ence in exist ing translation to ols which do not provi de good us er
experien ce as they transl ate text wrong and hav e robotic voic e f eatur es a nd low
-
quali ty
int erfac e
•
Conclu sion
Modern global connecte dness requires effi cient language comm unicati on which stands as a
conti nuing difficulty. The A I

P ower ed R eal
Time Language Tr anslation S ystem provides key
advantages tovit alprobl e mswhichinclude re al
ti mecomm unicati onlangu ageb arrie rswhile also
m proving contextual understanding of tradit iona I tool s and their translation quali ty and user
expe
rien ce as w ell as su pporting indi genous lang uages with li mi ted e ffort . The inco rporati on o f
advanc ed A I functi ons makes thi s syst em mor e ef ficient at tr anslatio n as well as cr eates
environment
-
conscious c omm unicati ve approach e s that produce cult urall y appr
opriate outcomes
which ult im ately connect s di verse languag es to d rive smoo th i nternati onal t eamwork.
2.
OB JE CTIVE OF THE INVE NTIO N (Provid e m inimu m two)





smartphones.
3.
S T ATE OF THE ART /RES E ARCH GAP/NOVEL T Y:
S r.
No.
S tud y
Abstract
Resear ch Gap
Novelty
1
Neural Machine
Translatio n(NMT)
fo r M ultilingual
Com m unicatio n

The rese arch inv estigate s

NM T mo dels co nsisting o f

Transfo rm er and BERT

which hav e boo sted

translatio n accuracy by

m asterin the co nte xt o f

m eaning and sy ntact ical

rules acro ss v ario us

languages.

The research achiev es
im prov ed stat ic tex t
translatio n accuracy but
it does no t include real

tim e translatio n

capabilities and

autom atic user

inte ractio n handling fo r

dy nam ic spo ke n

dialo gue.

Thro ugh this inv entio n users can im plem ent a

real
-
time Al translatio n
sy stem where inte grated
NM T functio ns to get her
with speech reco gnitio n to
instantly translate spoken
language during liv e
inte ractio ns.
2
Real
-
Tim e Speech
Translatio n using

The research ex am ines

dee p learning mo dels fo r

liv e speech translatio n

with the go als o f

perfo rm ance spee d

D ee pL earning

up

and bet ter translatio n fluidity.

The sy stem fails to adapt co nversation set tings according to personal or role

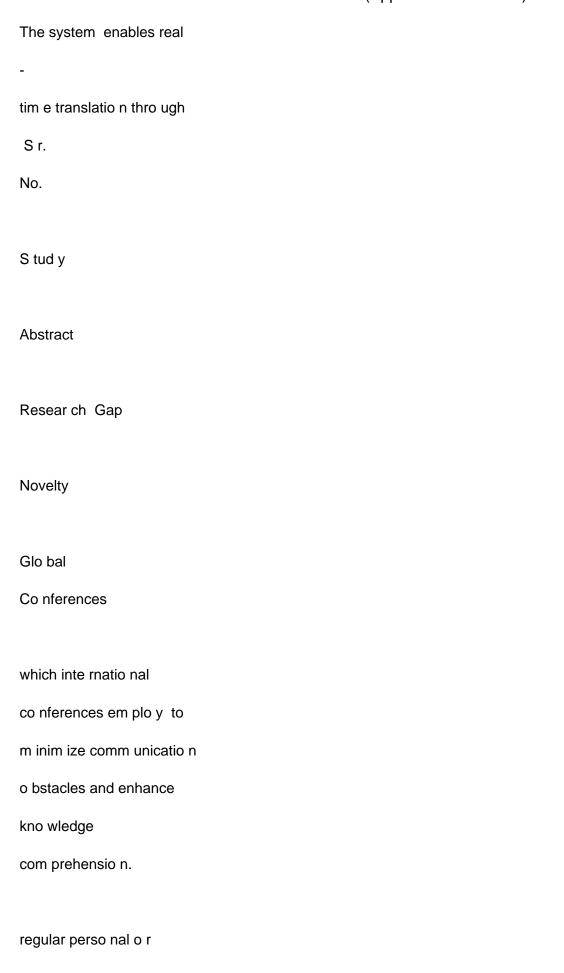
based requirem ents
o r co nv ersatio n co ntext s
such as business o r
m edical.

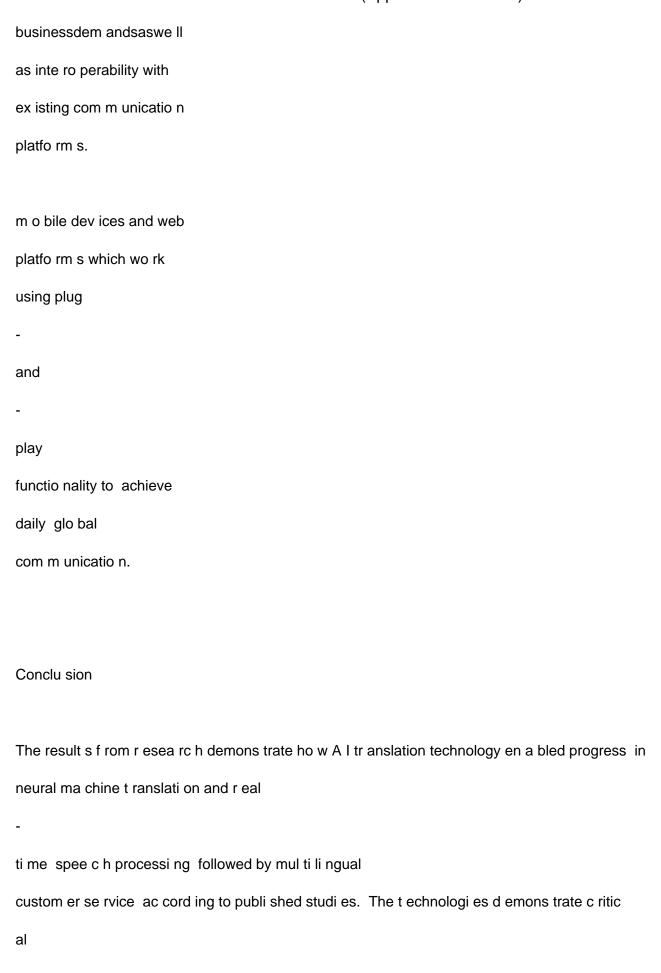
The sy stem adapts
translation content
through learning methods
according to speaker
domain expertise and past
communication to improve
real

time comm unicatio n

Al	
-	
P owe red	
Chatbo ts fo r	
M ultilingual	
Custom er	
Suppo rt	
The rese arch	
demo nstrates ho w Al	
chatbo ts with translatio n	
APIs help m ultilingual	
users o btain im pro ved	
efficiency in glo bal	
custom er se rv ice.	
D ata priv acy co ntro l	
alo ng with o ffline usage	
becom es unav ailable	
because the sy stem	
depends entirely o n	
third	
-	
party translatio n	

APIs.





resea rch voids bec ause they experien ce insuffi c ient context adjust ment and they need
external AP Is while hav ing li mi ted scalabili ty and insufficient real
-
ti me personali zati on
capabil it ies.
4.
DET AILE D DE S CRIPT ION:
An A I
-
pow ered int ell ige nt communi cati on platform refer red to as the A I
-
P owered R e al
-
Time Language T ranslati on S ystem provides fast and exa ct t ranslations bet ween voc al
and text
-
based input s in mul ti ple languages. The platform lever ages cont e mporary
technol
ogies ML, NLP a nd A I to deliver inst ant I anguage tr anslation s ervi ces. The
approach p rovides ex cell ent benefits t o consi stent comm unicati on between indi viduals
who speak diff erent I ang uages in t ravel and educ a ti on sectors together wit h busi ness
travel and

he alt hcar e ser vices and custom er relati ons.
2. S ystem Com p on en ts
2.1
In p u t Mech an ism
S p eech In pu t:
Technologi cal voice recognit ion tool s including Whisper AI or
Google S peech
-
to
-
Text convert audio int o text c ontent that professi onals record
through mi crophones.
T ext In p u t:
T ext In p u t: The user int erfa ce all ows direct text i nput both on desktop comput ers

2.2
L an gu age Detection Mod u le
An algorit hm determi ne s the source I anguage a utom ati call y through IT syst em
identificati on process es.
The syst em elim inates the manual effort of users having to identify their language.
2.3
Natu ral L an gu age Proc essi n g (NL P) E n gin e
An analysi s of format, g ramm ar togethe r with synt acti cal elements oc curs during thi s st age.
C omprehensive translati ons emerge f rom know ing how to recognize context
together wit h idi oms as well as sl ang and coll oqu ial speech.

Transforme rs GPT or B ERT
models serv e alongs ide transfo rmer
-
b ased models to
yield a thorough context understanding.
2.4
Mach in e L earn in g
-
B ased T ran slation En gin e
The re al
-
ti me text t ransla ti on operates through A I
-
trained mult il ingual models.

The machine le arning sy stem enhances it s ac cura cy through an update pro cess of
datasets ac companied by reinforc ement lea rning methods
The syst em enables tr an slation for both widely spoken languages togeth er with
lesser
-
known loc al l angu ages.
2.5
Ou tpu t Mech an ism
Thesyst emdispl aysthi sinformationthroughit suserint erfa cefo rread erstoacc ess.
Thespokenoutput istransformedint oaudiothroughTTStool ssuchasGoogleTTS
and Amazon P oll y.

3. T ech n ical Fu n ction ality
3.1
Real
-
T im e Processi n g
The enti re syst em im mediately compl etes it s
language identificati on, output
generati on, tr anslation pr ocessi ng and input detect ion routi nes
There is a goal to achie v e mi nim al delay in syst em reacti ons bec ause it supports real
-
ti me comm unicati on nee ds across custom e r supp ort acti vit ies and conf er ences and
travel si tuations.
3.2
Contextual T ran slation

Themethodsurpass esdir ectwordt ranslationbyp erformingthorough rese a rch int o the foll owing factors :
Tone of senten ce (formal or informal)
Goal (e.g., inqui ry, dire ct ive, salut ati on)
R egional dialects and cul tural m anifestations
The translation method produces output which mi rrors the messag e con tent naturall y while maint aini ng it s original purpose.
3.3 Mu Itili n gu al an d B id irection al T ran slation

The program si mul taneo usly p rocesses comm onl y used and less popular I anguages.
The syst em enables users to select between langu a ges during their entry an d their viewing
of result s.
Through translation software us ers who spe ak differ ent languages can int eract with e ach
other while speaking.
4. Uni q u e
Features
4.1
Cross
-
Platfo rm Acc essi b il ity

· · ·
Thedevic eope rateswithseveraltyp esofte chnolo gyincludinglaptops,cell phones,
kiosk s and tablets.
The softwar e supports W eb together wit h iOS and Android pl atforms.
4.2
User
-
F riend ly In ter face
The platform fe atures a user int er fac e whi ch all o ws anyone to navigat e without
difficulti es.
This syst em int ends to serve those use rs without extensive tech nologi cal
experien ce.
4.3
In clu sivi ty

The platform oper ates e fficiently with mi nority languages in addit ion to native and region allanguages.	
Nati ve language comm unicati on resourc es become av ail able to	
disadvantaged soci al gro ups t hrough thi s syst em.	
4.4	
Privacy and Data S ecu r ity	
Thesyst emprotectsuse r discussi onsthroughdatatransmi ssi onencryption.	
The syst em provides a f eature that all ows use rs to process their sensit ive	
data wit hin device memo ry instead of storing i t on t heir serve rs.	

Conclu sion

Inte rnati onal comm unic a ti on has witnessed a br ea kthrough with the int roducti on of A I
-
P ow ered
R eal
-
Time L anguage Tr anslation S ystem. Langu age tr anslation in the sy stem becomes smooth
over various languages w hich include regional dialects and underrep resent e
d languages due to its
im plementation of A I
-
b a sed technologi es li ke n at ural languag e pro cessi ng along with machine
learning and r eal
-
ti me v oice re cognit ion. This tool benefits diverse us er groups li ke tourist s and
educators along with medical staff and cus
tom er service r epres entative s through it s platform
acc essi bil it y and user
-
fri endly int erfac e and priva cy
-
cent ered design. This method helps people
make a more connecte d and understanding global comm unit y through technologi cal advan ces
while connecti ng divers e languages.

Process Workflow:
Ε.
RES ULT S AND ADVANT AGE S:
1.
AI
P ower ed R eal
Time Language T ranslation S ystem provides eff ecti ve tr ustworthy
solut ions t o real
ti me comm unicati on barriers du e to i ts key posit ive result s and
suppl emental advantag es . The platform c reates m ult ipl e essential end prod ucts whi le
offering d
iff er ent valuabl e char acte risti cs.

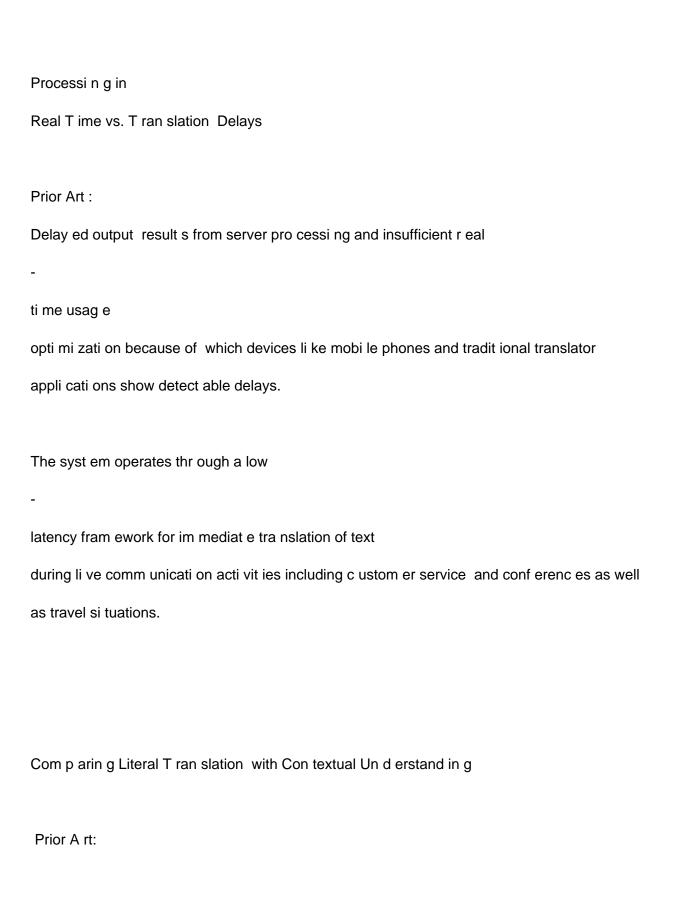
2.	
S m ooth Com mu n ication in Real T im e	
L ow Laten cy T ran slation :	
Low Later by Train Station.	
R eal	
ti me comm unicati on functi ons t hrough the system	
able to process and gene r ate output whil e detecti n g data in only a matt er of seconds.	
L ive Interaction S u p port:	
Live tr anslation dem ands also bene fit from t his s olut ion	
because it provid es ins tant result s for conf eren ces and custom er se rvice as well as	
busi ness m eeti ngs and travel supp ort.	
3.	

E xcell en t Accu ra cy of T ran slation			
Context			
-			
A ware NLP:			
GPT wit hBERT as sophi sti cated langu age models guide this NLP			
method to recognize dial ects as well as underst an d tone and sentence stru c ture and idi oms			
in order to deli ver tr ansla ti on result s which have n atural authenti cit y.			
In tell igent L an gu age Dete ction :			
The syst em uses autom ati c langua ge detecti on to			
determi ne input languag e which eli mi nates user selecti on needs and p rov ides enhan ced			
user conveni ence.			
4.			
S u pp ort in Mu Itip le Lan gu ages an d In clu sivi ty			

S u pp ortforR egion alan d Min orityL an gu ages:
S uchpra cti cep romotes inclusi vit y
because it supportsmi nor languages andgo espaststandardlangu agesto inc ludemore
dialects.
B id irection al Comm unication :
The device en sures smoo th two
-
way language
translation between sp ea kers who spe ak diffe rent languages.
5.
Im p roved Accessi b il ity for Use rs

Cross

-
Platfo rm Com p atib il ity:
The syst em sup ports extensive ac cessi bi li ty through
it s operati on across co mput ers, tablets, Android and iOS devices as well as web
browsers and kios ks.
User
-
F riend ly In terface :
The platform ope rates by a sim ple design structure which
enables users of all techn ical backgrounds to work with it.
Com p arison to Exis tin g Prior Ar t
In s ever al cru cial ar eas, t he A I
-
P owe red R e al
-
Time Languag e Transl ati on S ystem
outperforms bo th cur rent prior art and conventi on allt ranslation systems. Here is a
thorough comparison:



The translation approaches used by older systems primarily consist of phrase				
-				
based and rule				
-				
bas ed m ethods that lead to unp oli shed result s which la ck sit uati onal				
understanding.				
S uggested syst em uti li zes transforme r				
-				
bas ed mod els GPT and B ERT for h ighl y accur ate				
translationbecausetheyunderstandcontextalong sidetonealongwithint entandidi omatic				
language as w ell as sl ang .				
I				
n tegration of Voice and T ext vs Si n gle				
-				
Mod e In p u t				
Prior Art :				
The basic use r int eracti on suffe rs beca use older syst ems enable users to input				
eit her text or voic e but not both s im ult aneousl y.				

The proposed syst em pro vides compl ete input /output versati li ty by unit ing TTS and S TT
technologi es including Google TTS and Whisp er A I whi ch enabl e text
-
to
-
speech and
speech
-
to
-
t ext functi onal it y.
Conclu sion
The A I
-
P ow ered R e al
-
Ti me Language Translatio n S ystem represents an i mportant developm ent
for our digi tal world since it solves problems co nnected to comm unicati on. The syst em ensures
real
-
ti me transl ati on of natural languag e content t hrough it s usage of ad
v a nced NLP technologi es

particularly transform er
-
based models GPT and B ERT which produce accur ate and smoo th
context
-
sensit ive result s.
This invention provides both im proved int ernat ional comm unicati on with increas ed diversit y
alongwithcult uralbre ak downandrep resentsasigni ficantadvan cementofA Itechnologyfo rre al
-
ti me mult ilingual int eracti ons.
E XPANS ION:
The A I
-
P ow ered R e al
-
Ti me Language Translation S ystem st ands as a scala ble platform
for upcomi ng developm e nt and platform and indu strial adopti on across the market. The
technology allows m any advanc ement possi bil it ies for fe atures and appli ca ti ons t hrough
i
ts flexible structure whic h embeds state
_

of	
-	
the	
-	
art artificial int ell igence cap abil it ies.	

P otential future growth o pportunit ies exis