

# **Preliminaries for Digitizing the Subjective Personal Pronouns in English into Tamil (Distribution -Sensitive Machine Translation Aid - DSMTA) - A Demo Paper**

**Dr. S. Kamakshi**

Dept. of Tamil Language, University of Madras, Chennai

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## **Introduction:**

The aim of this paper is to prepare a Distribution - Sensitive Machine Translation Aid (DSMTA) to translate the Subjective Personal Pronouns (SPP) in English into Tamil.

Linguistic Tools mentioned as **Preliminaries** in the title such as Micro Planner (MP), Modules etc, are being supported by various arbitrarily reordered dictionaries. They are named as ARDSPP, ARDBV, ARDMV, ARDLV and GR. These have been carefully compiled for this Machine Translation purpose. The tools and the relevant information are necessary to digitize the theoretical strings into numerical strings.

## **Transfer Mechanisms adopted for this task:**

1. The following Physical Structured input sentences in English have rudimentarily been taken on par with the distribution of Subjective Personal Pronouns:

Structure 1.

SPP. + 'be' auxiliaries + V4\*

e.g. She is paying.

Structure 2.

SPP. + 'be' auxiliaries + V3\*

e.g. She is paid.

Structure 3.

SPP. + Modal +V1\*

e.g a) She can pay. ('can /able to' type sentences in English – *muTi / iyalum* type sentences in Tamil)

b) She will pay (other than 'can /able to' type sentences i.e. other modal types in English)

2. Micro Planner (MP) - a Linguistic Module has been developed to parse the input sentences in Source Language, which is being assisted by six sub - modules developed and named as:

- i) ARDSPP- Arbitrarily Reordered Dictionary of Subjective Personal Pronouns in English and Tamil (see appendix No 1.)
- ii) ARDBV – Arbitrarily Reordered Dictionary of 'Be' auxiliaries in English and its equivalents in Tamil. (see appendix No.2)
- iii) ARDMV- Arbitrarily Reordered Dictionary of 'Modal' auxiliaries in English and its Equivalents in Tamil (see appendix No.3)

- iv) ARDLV - Arbitrarily Reordered Dictionary of Lexical Verbs\* in English and its inflected forms (V1\*, V1s\*, V2\*, V3\*, V4\*) with Tamil meaning. ( see appendix No 4.)
- v) GR-Grammar rules given in this program have been prepared specifically for both English and Tamil, as English Personal Pronouns are less in number compared to Tamil.

For instance the Subjective Personal Pronoun (SPP) 'He' has twenty four different translation equivalents in Tamil (see appendix 1), as per its distribution with other grammatical units.

e.g. a). He is giving (his computer to X).

*avan / ivan koTuttukkoNTu irukkiRaan/irukkinRaan.*

*avar / ivar koTuttukkoNTu / irukkiRaar/irukkinRaar*

*avarkaL / ivarkaL koTuttukkoNTu irukkiRaarkaL/irukkinRaarkaL.*

Here 'He' = ` *avan / ivan / avar / ivar / avarkaL / ivarkaL* '

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V1\* – Lexical Verb or Root verb : V2\* – Past tense verb : V3\* – Past Participle Verb :  
V4\* – Present Participle verb.

\* About thousand five hundred Lexical Verbs in English have been analysed into Intransitive, Transitive and Di-transitive verbs.

'koTu' (give) type verbs which are di – transitive, take two objects.

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b). He is given (a Computer).

*avanukku / ivanukku koTukkap paTukiRatu/paTukinRatu.*

*avarukku / ivarukku koTukkap paTukiRatu/ paTukinRatu.*

*avarkaLuku / ivarkaLukku koTukkap paTukiRatu / paTukinRatu.*

Here 'He' = ` *avanukku / ivanukku / avarukku / ivarukku / avarkaLukku / ivarkaLukku* '

c). He is known to me

*avanai / ivanai enakkut teriyum*

*avarai/ivarai enakkut teriyum*

*avarkaLai/ivarkaLai enakkut teriyum*

Here 'He' = *avanai / ivanai /avarai /ivarai /avarkaLai /ivarkaLai*

d). He can/could give (him a computer) /He is able to give (him a computer)

*avanaal / ivanaal koTukka iyalum / muTiyum.*

*avaraal/ ivaraal koTukka iyalum / muTiyum.*

*avarkaLaal / ivarkaLaal koTukka iyalum / muTiyum.*

Here 'He'=` *avanaal / ivanaal/ avaraal/ivaraal/avarkaLaal/ivarkaLaal*

vi) MP- Morphological Parser for Tamil is also incorporated to achieve this aim of Translation of Subjective Personal Pronouns at simple sentence level.

### **Language tools to be provided to equip the Modules**

English Subjective Personal Pronouns are seven in number whereas Tamil is populated in nature. So the knowledge about these optional entries (e.g. 'He' takes twenty four options- (see appendix 1)) is being given to the computer according to the distribution of the same.

For example, in the sentence 'She is reigning England' the inference that the Subjective Personal Pronoun 'She' is a superior female demands the selection of *avar / ivar or avarkaL / ivarkaL instead of avaL / ivaL.*

The argument structure of English verbs and their equivalents in Tamil have to be provided.

Collection of English sentences with modal auxiliary verbs and their counterparts in Tamil has been given completely. (see appendix 3)

Objective, Possessive, and Reflexive Pronouns and their distribution are also being analyzed as the present author aims at the Machine translation of Said - Pronouns in English into Tamil.

### **Intricacies involved in translating the personal pronouns in English into Tamil**

There are some inescapable solutions in providing language tools, as this program is highly linguistic tool dependent. They are:

1. Proximity and Distance:

This cannot be differentiated through Distribution Sensitive Machine Translation.

2. Honorific and Non-honorific sense:

The personal pronouns inferring honorific or non-honorific sense in Tamil can possibly be translated at the Post - Editing Stage of Machine translation through human interference.

3. The Transitive and Intransitive Verbs in English:

Verbs acting as both Transitive and Intransitive are translated into Tamil with semantic ambiguity, and this also can possibly be rectified at the Post - Editing Stage of Machine Translation through human assistance.

### **Conclusion:**

Finding equivalents in the socio-cultural context is really a challenge for the computational linguist. The problem will multiply if we take into account the anaphoric reference into consideration.

### Appendix 1:

**ARDSPP** (Arbitrarily Reordered Dictionary of Subjective Personal Pronouns)

e.g He - 3<sup>rd</sup> Person SPP in English has the following Tamil forms:  
avan,ivan,avar,ivar,avarkaL,ivarkaL.  
avanukku,ivanukku,avarukku,ivaruku,avarkaLukku,ivarkaLukku.  
avanaal,ivanaal,avaraal,ivaraal,avarkaLaal,ivarkaLaal.  
avanai,ivanai,avarai,ivarai,avarkaLai,ivarkaLai.

### Appendix 2 :

**ARDBV** – A sample of Arbitrarily Reordered Dictionary of ‘Be’ auxiliaries in English and their equivalents in Tamil. (here present participle marker is -ing)

e.g -ing + am + I = koNTiru+ kkiR/kkinR +een

PNG Markers for `I` – Reen; we- Room.

### Appendix 3 :

**ARDMV**- Arbitrarily Reordered Dictionary of ‘Modal’ auxiliaries in English and their Equivalents in Tamil (appendix No.3 )

The auxiliaries such as *aam*, *aakaatu*, *kuuTu*, *TTum*, *maaTTu*, *muTi*, and *veeNTu* express mood in Tamil.

### Transfer of complex verbal forms denoting Tense, Aspect and Mood (TAM).

Both English and Tamil employ the complex process of combining both inflection and compounding in denoting Tense, Aspect, and Mood (TAM). We can find correspondences between English and Tamil for the purpose of translating one from the other. However, the correspondences are not always perfect. There are proper, improper and defective equivalents. The Tense, Aspect, and Mood systems of English and Tamil operate differently and finding equivalents is a tough task. But for the purpose of MT, we compromise with certain peripheral differences between them and try to capture the core of their systems with the view in mind that what is conveyed in English can be transferred to Tamil without much distortions as our idea is to translate linguistic text in English into Tamil. The emotive and attitudinal senses conveyed by the auxiliary system will not play a vital part in expressing linguistic concepts. So we ignore the emotive and attitudinal sense and try to capture the core aspectual and modal system. That is why we have ignored certain auxiliaries, which are used in Tamil to denote certain attitudinal and non-attitudinal senses. With this aim in mind, the aspectual and modal systems in both languages have been correlated for the purpose of preparing MTA (Machine Translation Aid). The following table correlates TAM (Tense, Aspect, Mood) system of English with that of Tamil.

| TAM forms in English with examples  | Meaning   | Equivalent TAM forms in Tamil with examples  |
|---|---|--|
| Sub+V + past tense<br>e.g. He wrote.  | Past tense  | Sub+V + past tense + PNG<br>e.g. avan ezhutinaan.  |
| Sub+V+present tense<br>e.g.He writes.   | Present Tense   | Sub+V + present tense + PNG<br>e.g. avan ezhutukiraan.   |
| Sub+has / have + V3<br><br>e.g. He has written.<br>I have written.  | Present perfect aspect  | Sub+V + past participle +ru + present + PNG<br>e.g. avan ezhutyirukkiRaan<br>ndaan ezhutyirukkiReen.                 |
| Sub+had + V3<br><br>e.g. He had written.  | Past perfect aspect   | Sub+V + past participle +iru + past + PNG<br>e.g. avan ezhutyirundtaan.  |
| Sub+'Be'verb+ present tense + V-ing<br><br>e.g. He is writing.  | Present progressive aspect  | Sub+V + past participle +koNTiru + present + PNG<br>e.g. avan ezhutik koNTiukkiRaan                                  |
| Sub+'Be' verb + past tense + V-ing<br>eg. He was writing.   | Past progressive aspect   | Sub+V + past participle +koNTiru+ past + PNG<br>e.g. avan ezhutik koNTirundtaan                                      |
| Sub+will be/shall be verb +future tense + V-ing<br>e.g. He will be writing a letter.                      | Future progressive aspect   | Sub+V + past participle +koNTiru + future + PNG<br>e.g. avan kaTitam ezhutik koNTiruppaan                            |
| Sub+ can + V1<br><br>eg. He can speak English but he can't write it very well.                            | Ability<br>= be able to<br>= be capable of<br>= know how to   | Sub+V + infinitive +muTiyum/ iyalum<br>e.g. avanaal aangkalam peeca muTiyum,<br>aanaal ezhuta muTiyaatu.             |
| Sub+ Can + V1<br>e.g.Can I smoke here ('Am I allowed to smoke here?').                                    | I Permission<br>= be allowed to<br>= be permitted to<br>(‘can’ is less formal than ‘may’ in this sense) | 1.Sub+ V-al + aam + aa<br>ndaan pukai piTikkalaamaa?   |
| 1. Sub+can + V1<br>e.g. He can make mistakes.<br><br>2. Sub+can + be + V3<br>e.g.The road can be blocked. | I.Possibility<br>= it is possible but / to theoretical possibility<br>may = factual possibility         | 1.Sub+ V-al + aam<br>e.g. avan tavaRu ceyyalaam<br><br>2. Sub+V + infinitive +paTal+ aam<br>caalai aTaikkappaTalaam. |
| Sub+Could + V1<br>e.g.<br>I could play the chess.   | Ability   | Sub+V + infinitive +muTiyum/ iyalum<br>e.g. enaal caturangkam aaTa muTiyum.  |
| Sub+Could + V1  | II. Permission  | Sub+V-al + aam + aa  |

| TAM forms in English with examples   | Meaning  | Equivalent TAM forms in Tamil with examples  |
|--|--|--|
| e.g. Could I smoke here?   |  | e.g. ndaan pukai piTikkalaamaa?  |
| 1.Sub+ could be + C<br>eg. That could be my train.<br><br>2.Sub+ could be + V3<br>e.g.The road could be blocked.   | II. Possibility (theoretical or factual, cf might)<br><br>”  | 1.Sub+irukkka+ aam<br>e.g. atu ennuTaiya toTarvaNTiyaay irukkalaam.<br><br>2a.Sub+V+infinitive paTTu + irukkka+ aam<br>e.g caalai aTaikkap paTTu irukkalaam<br><br>2b.Sub+ V + infinitive paTTu + irukka+ kuuTum<br>e.g.caalai aTaikkap paTTirukkakkuTum |
| Sub+may + V1<br>e.g.He might leave tomorrow.   | Future time with modal auxiliaries. In many contexts, modal auxiliaries have inherent future reference, both in their present and past tense form.   | Sub+V-al+aam<br>e.g.avan ndaalai pookalaam   |
| 1. Sub+may + V1<br>e.g.You may borrow my car if you like.<br><br>2. Sub+may not + V1<br><br>e.g. You may not borrow my car. (=You are not allowed to borrow my car.)                                 | III. Permission<br>= be allowed to<br>= be permitted to<br><br>In this sense may is more formal than can. Instead of may not or mayn't, mustn'ts often used in the negative to express prohibition | 1.Sub+V-al + aam<br>e.g. ndii ennuTaiya kaarai kaTanaakap peRalaam.<br><br>2 Sub+.V + infinitive maTTu+ PNG<br>e.g.. ndii ennuTaiya kaarai kaTanaakap peRamaaTTaay.  |
| 1.Sub+ may + V1<br>e.g.He may never succeed ('It is possible that he will never succeed')<br><br>2. Sub+may + be + V3<br>e.g. The road may be blocked 'It is possible that the road may be blocked'. | III. Possibility<br>= it is possible that /to<br>may = factual possibility (cf: can = theoretical possibility)   | 1a.Sub+V-al + aam (for positive meaning)<br>1b.Sub+ V + infinitive maTTu + PNG<br>e.g. avan veRRi peRamaaTTaan<br><br>2 Sub+V + infinitive paTal + aam<br>e.g. caalai aTaikkappaTalaam   |
| Sub+might + V1<br>e.g.He might leave tomorrow.   | Future time with modal auxiliaries. In many contexts, modal auxiliaries have inherent  | Sub+V-al + aam<br>e.g.avan ndaaLai pookalaam   |

| TAM forms in English with examples   | Meaning  | Equivalent TAM forms in Tamil with examples   |
|--|--|---|
|  | future reference, both in their present and past tense form.   |   |
| Might +sub+V1<br>e.g..might I smoke here?  | IV. Permission   | Sub+V-al + aam + aa<br>e.g ndaan pukai piTikkalaamaa?   |
| Sub+might + V1<br>e.g.He might succeed.  | IV. Possibility  | Sub+V-al + aam<br>e.g. avan veRRi peRalaam.   |
| Sub+Shall + V1<br>e.g..1.He shall get the money.<br>2.You shall do exactly as you wish.  | II. Willingness on the part of the speaker in 2 <sup>d</sup> person and 3 <sup>d</sup> person ('weak volition') restricted use.                      | Sub+ V-al + aam<br>e.g.1.avan paNam peRalaam.<br>2.ndii virumpuvatu pool ceyyalaam.   |
| 1a.Sub +Shall + V1<br>e.g. We shall let you know our decision.<br>We shall overcome.<br><br>1b. Sub+shan't + V1<br>e.g. It shan't be long for me to meet the minister. | I. Intention on the part of the speaker only in 1 <sup>st</sup> person ('intermediate volition').  | 1a. Sub+V + future tense + PNG<br>e.g. ndaangkaL unkaLiTam engkaL tiirmaanattait terivippoom<br><br>1b. aakaatu<br>e.g. enakku mandtiriyai paarkka ndiiNTa ndeeram aakaatu. |
| Sub+Shall + V1<br>e.g.1.You shall do as I say.<br>2.He shall be punished.<br><br>3.The vendor shall maintain the equipment in good repair.                             | I.a. Insistence ('strong volition'). Restricted use.<br><br>b. Legal and quasi-legal.  | Sub+V-al+aam<br>e.g 1.ndaan collukiRa paTi ndii ceyyalaam.<br>2.avan taNTikkappaTalaam.<br>s<br>3.teru viyaapaari tannuTaiya karuviyai ceppam ceytu vaittirukkalaam.        |
| Sub+should + V1<br>e.g 1.You should do as he says.<br>2.They should be home by now.  | I. Obligation and logical necessity (= ought to)   | Sub+V + infinitive +veeNTum<br>e.g 1.ndii avan colvatu pool ceyya veeNTum.<br>2.avarkaL ippootu viiTtil irukka veeNTum.   |
| Sub+will/shall + V1<br>e.g. 1.He will write.<br>2.I shall write.   | Future Tense   | Sub+V + future + PNG<br>e.g.1. avan ezhutuvaan.<br>2.ndaan ezhutuveen   |
| Sub+will + V1<br>e.g.1.I'll write as soon as I can.<br>2.Will you have another cup of tea?   | I. Willingness ('weak volition') unstressed, especially 2 <sup>d</sup> person. 'Down toners' like please may be used to soften the tone in requests. | Sub+V + future tense + PNG<br>1.epootu muTikiRatoo apootu ndaan ezhutuveen.<br>2.innoru kooppai teeniir kuTikkiRaayaa?  |
| Sub+will + V1<br>e.g.1.I'll write as soon as I can.<br>2.We won't stay longer than two hours.  | II. Intention (intermediate volition). Usually contracted; mainly 1 <sup>st</sup> person.  | Sub+V+future tense+PNG<br>1.muTiyumpootu uTanee ezhutuveen.<br>2.ndaangkaL iraNTu maNi ndeerattiRku meel tangka maaTToom.   |

| TAM forms in English with examples   | Meaning   | Equivalent TAM forms in Tamil with examples   |
|--|---|---|
| Sub+will + V1<br>1.He 'will' do it, whatever you say ('He insists on doing it...')<br>(cf He 'shall' do it, whatever you say = 'I insist on his doing it')   | II. Insistence ('strong volition' = insist on). Stressed, hence on 'I' contraction. An uncommon meaning.  | Sub+V + future tense + PNG<br>e.g. ndiingkaL colvatai avan ceyvaan.   |
| Would.+Sub+V1<br>e.g. Would you excuse me?   | III. Willingness ('weak volition')  | Sub+V + future tense + PNG <del>ta</del> ?<br>e.g. ndii ennai mannippaayaa?   |
| Sub+would have+ V3<br>eg. It's your own fault, you would have taken the baby with you.   | III. Insistence ('strong volition')   | Sub+V + past participle form + iru + infinitive + veeNTum.<br>e.g. atu un tavaRu. ndii kuzhandtaiyai unnuTan eTuttuc cenRirukka veeNTum.  |
| 1. Sub+must +V1<br>e.g. You must be back by 10 o'clock.<br>2. Sub+had to +V1<br>e.g.1.Yesterday you had to be back by 10 o'clock.<br>2.Yesterday you said you had to / must be back by 10 o'clock. | II. Obligation or compulsion in the present tense (= be obliged to, have to); except in reported speech. Only had to (not must) is used in the past. In the negative sentence needn't, don't have to, not be obliged to are used (but not must not, mustn't which = 'not be allowed to'). | 1.Sub+V+infinitive+veeNTum<br>e.g. ndii pattu maNikku tirumpa veeNTum.<br>2.Sub+V+pastParticiple +iru+infinitive+veeNTum+enRu<br>e.g..1.ndeeRRu pattu maNikku ndaan tirumpiyirukka veeNTum enRu ndii connaay. |
| Sub+will, must, should + V1<br>e.g. The game will/must/should be finished by now.  | [Prediction of the similar meanings of other expressions for logical necessity and habitual present. The contracted form <del>ll</del> is common]. Specific prediction.   | Sub+V + infinitive <del>vee</del> NTum<br>e.g. viLaiyaaTTu indndeeram muTindtirukka veeNTum   |
| Sub+will + V1, V1<br>e.g. Oil will float / floats on water.  | Timeless Prediction   | Sub+V + future + PNG<br>e.g. eNNai taNNiiril mitakkum   |
| Sub+will, 'll +V1<br>e.g.He'll (always) talk for hours if you give him the chance.   | Habitual prediction   | Sub+V + future +PNG<br>e.g. avanukkuc candtarppam koTuttaal avan (epozhutum) maNikkaNakkaakap peecuvaan.  |
| 1.Sub+ must, has to +V1  | Logical necessity   | 1. Sub+irundtirukka <del>vee</del> NTum   |



| TAM forms in English with examples   | Meaning  | Equivalent TAM forms in Tamil with examples   |
|--|--|---|
| e.g. There must / has to be a mistake.<br>(must is not used in sentences with negative or interrogative meanings, can is being used instead.<br>2.Sub+ cannot +V1<br>e.g. There cannot be a mistake. |  | e.g. tavaRu irundtirukka veeNTum.<br><br>2.Sub+irundtirukka muTiyaatu<br>e.g<br>tavaRu irundtirukka muTiyaatu.  |
| Sub+ought to + V1<br>e.g 1.You ought to start at once.<br>2.They ought to be here by now.  | Obligation and logical necessity   | Sub+V + infinitive veeNTum<br>e.g 1.ndii uTanee puRappaTa veeNTum<br>2.avarkaL ipootu ingkee irukka veeNTum.  |
| Sub + used to + V1<br>e.g<br>1.He used to fish for hours.<br>2.He used to be an excellent cricketer.   | A state of habit that existed in the past but has ceased. (cf:would and formerly or once + past) | Sub+V-atu + vazhakkam + aay + iru + past + PNG<br>e.g 1.maNikkaNakkil miin piTippatu avan vazhakkamaay irundtatu.<br>2.avan oru arumaiyaana kirikketaaTTaakaranaaka irundtaan |

## Appendix 4

ARDLV – A sample of Arbitrarily Reordered Dictionary of Lexical Verbs in English and its inflected forms (V1\*, V1s\*, V2\*, V3\*, V4\*) with Tamil meaning (DT-Ditransitive; T-Transitive; IT-intransitive)

| Present tense verb (V1) | 3 <sup>rd</sup> person singular present tense verb(V1s) | Past tense Verb (V2) | Past participle Verb (V3) | Present participle (V4) | Tamil Meaning for the present tense verb |
|-------------------------|---|----------------------|---------------------------|-------------------------|--|
| Pay (DT*)               | Pays  | Paid                 | Paid                      | Paying                  | Celuthu                                  |
| Invite (T*)             | Invites   | Invited              | Invited                   | Inviting                | Azai                                     |
| Go (IT*)                | Goes  | Went                 | Gone                      | Going                   | poo                                      |

The following points have to be noted while transferring TAM system of English into Tamil.

1. Both English and Tamil make use of inflection as well as compounding (i.e. combining main verbs with the auxiliary verbs) to express TAM.
2. The important point to be noted from the point of view of word order is that auxiliary verbs in English precede the main verb in English, whereas in Tamil they follow the main verb.
3. In English auxiliary verbs are inflected for Tense, Person and Number; whereas in Tamil they are inflected for Tense, Person, Number and Gender.
4. Both English and Tamil undergo auxiliary reduction.
5. Identical auxiliary verbs in complex constructions get deleted both in English and Tamil.
6. Auxiliary verbs occur in a sequence to denote tense, mood, aspect, voice etc. in both English and Tamil. The modal auxiliary verb in English never occurs after a primary auxiliary verb in English, whereas, in Tamil primary auxiliary verb never occurs after a modal auxiliary verb (with the exception of few modal auxiliary verbs).
7. Both Tamil and English express perfective and progressive sense by auxiliary verbs. But Tamil makes use of this device to express the completive and reflexive sense too.
8. In English, 'Yes or No' interrogative sentences are derived from their respective affirmative sentences by shifting the relevant auxiliary verbs to the initial position and a question mark at the end of it. In Tamil, 'Yes or No' interrogative sentences are derived from their respective affirmative sentences by adding interrogative clitic 'aa' with question mark.
9. This may be true with other Dravidian languages

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**TRANSCRIPTION FOR TAMIL ALPHABETS HAVE BEEN USED.**

| <b>Roman</b> | <b>Tamil</b> | <b>Roman</b> | <b>Tamil</b> |
|--------------|--------------|--------------|--------------|
| a            | அ            | nj           | ஞ            |
| aa           | ஆ            | T            | ட            |
| i            | இ            | N            | ண            |
| ii           | ஈ            | t            | த            |
| u            | உ            | nd           | ந்           |
| uu           | ஊ            | p            | ப            |
| e            | எ            | m            | ம            |
| ee           | ஏ            | y            | ய            |
| ai           | ஐ            | r            | ர            |
| o            | ஓ            | l            | ல            |
| oo           | ஔ            | v            | வ            |
| au           | ஔ            | zh           | ழ            |
| k            | க            | L            | ள            |
| ng           | ங்           | R            | ற            |
| c            | ச            | n            | ன்           |

**Acknowledgements :**

Miss. Kamakshi Shanmuganantham gratefully acknowledges her deep indebtedness to her doctoral guide Prof S.Rajendran , Dept.of Linguistics, Tamil University , Thanjavur for his constant encouragement, and Computer Programmer Mr. T. Ronald of Linguistics Studies Unit, University of Madras for his patient and adept listening in understanding the intricacies involved in Natural Languages while comparing them with artificial languages like Visual Basic etc., for digitizing my concept of this work..