**Title:** UNLization of Bangla Noun Based Compound Verbs Comprising with Base Verb for Machine Translation

**Tables:**

Table 1: Some compound verbs, base verbs their roots and inflexions

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Compound verb | Noun part | Base verb | Base verb root | Verbal inflexion |
| মাথা খাইতেছে | মাথা | খাইতেছে | খা | ইতেছে |
| ঘুষ দেয় | ঘুষ | দেয় | দে | য় |
| অনুসরণ করা | অনুসরণ | করা | কর্ | আ |
| কসম খাওয়া | কসম | খাওয়া | খা | ওয়া |

Table 2: Some roots of compound verbs, base verbs and their roots

|  |  |
| --- | --- |
| Compound verb | Universal Word (UW)/English Word |
| ঘুষ দেওয়া (ghush de) | to bribe |
| অনুসরণ করা (onushoron kora) | to follow |
| কথা বলা (kotha bola) | to speak |
| কাজ করা (kaj kora) | to work |

Table 3: Some roots of compound verbs, base verbs and their roots

|  |  |
| --- | --- |
| Compound verb | Universal Word (UW)/English Word |
| মাথা খাওয়া (matha khawa) | to pervert |
| গোল্লায় যাওয়া (gollaye jawa) | to ruin |
| আছাড় খাওয়া (achhar khawa) | to tumble |

Table 4: Dictionary entries of ‘খা’ for three different UWs

[খা]{}“drink(icl>consume>do,agt>living\_thing,obj>concrete-thing)”(ROOT,VEND,#AGT,#OBJ, VEG1, LIQ)<B,1,2>

[খা]{} “take(icl>consume>do, agt>living\_thing, obj>concrete\_thing)”(ROOT,VEND, #AGT, #OBJ, LIQT) <B,1,1>

[খা]{} “smoke(icl>consume>do,agt>living\_thing,obj>concrete\_thing)”(ROOT, VEND, #AGT, #OBJ, TOBA) <B,1,2>

Table 5: Dictionary entries of ‘পানি’, ‘চা’ and ‘সিগারেট’

[পানি]{}“water(icl>matter,equ>h2o)”(N,NCOM,LIQ,VEND,#OBJ)< B,0,0>

[চা]{}“tea(icl>beverage>thing)”(N,NCOM,LIQT,VEND,#OBJ)< B,0,0>

[সিগারেট]{}“cigarette(icl>roll\_of\_tobacco>thing)”(N,NMAT,CEND,TOBA,#OBJ,#MOD)< B,0,0>

Table 6: Dictionary entries of respective Bangla sentence

|  |
| --- |
| [সে]{} “he(icl>person)”(PRON, HPRON, P3, SG, SUBJ)  [ঘুষ] {} “bribe(icl>payment>thing)” (N, NABS, NCPND, CEND, BLK, #OBJ)  [দে] {} “ ” (ROOT, CEND,GEN,NCPND)  [য়] {} “ ” (VI, VEND, P3, PRS,IND, NCPND) |

Table 7: Analysis rules for converting the sentence into UNL expression

|  |  |
| --- | --- |
| Rule | Description |
| Rule 1: R{SHEAD:::}{PRON,SUBJ:::} | Right Shift Rule |
| Rule 2: DR{SUBJ,^blk:blk::}{BLK:::} | Right Deletion Rule |
| Rule 3: R{PRON,SUBJ:::}{N:::} | Right Shift Rule |
| Rule 4: DR{N,^blk:blk::}{BLK:::} | Right Deletion Rule |
| Rule 5: R{N, NABS:::}{ROOT,^VERB:::} | Right Shift Rule |
| Rule 6: +{ROOT:::}{INF,VI,VEND,VEG1:::} | Left Composition Rule |
| Rule 7: +{N, NABS,NCPND:@::}{V,NCPND,P3:::} | Left Composition Rule |
| Rule 8: >{PRON, SUBJ::agt:}{VERB,#AGT:::} | Right Modification Rule |
| Rule 9: R{SHEAD:::}{VERB,^&@entry:+&@entry::} | Right Shift Rule |
| Rule 10: R{VERB:::}{STAIL:::} | Right Shift Rule |

Table 8: UNL Expression of Converted Sentence

|  |
| --- |
| [S:00]  {org:en}  He bribes.  {/org}  {unl}  agt(bribe(icl>pay>do,agt>volitional\_thing,obj>volitional\_thing,gol>thing).@entry.@present,he (icl> person))  {/unl}  [/S] |

Table 9: Result comparison with [18]

|  |  |  |  |
| --- | --- | --- | --- |
| Compound Verb | Universal Word (UW)/ English Word in [18] | Universal Word (UW)/ English Word in proposed system | Correct Universal Word (UW)/ English Word |
| সে ঘুষ খায় | He eats bribe | He takes bribe | He takes bribe |
| সে পানি খায় | He eats water | He drink water | He drink water |
| সে সিগারেট খায় | She ate cigarettes | She smoke cigarettes | She smoke cigarettes |
| আমি চা খাই | I eat tea | I take tea | I take tea |