

NFR	Keywords	Part of Speech (POS)	Replacements
Usability [US]	self-explanatory, use, able, minute, page, easy, navigate, time, success, complete	$\forall (\text{easy} \ /.../ \text{VB} \ /...) \wedge \text{easy} = \text{root} \parallel \Rightarrow \text{VB} \leftarrow \text{use}$ $\forall (\text{user}(\text{nsubj}) \ /.../ \text{VB} \ /...) \wedge \text{CO}(\text{VB}) \cap \text{CO}(\text{NFR}_{us}) \neq \emptyset$ $\forall \omega \in \{ \text{intuitive}, \text{readable}, \text{self}(-)? \}$ $\text{explanatory, understandable} \}$ $\wedge \text{CO}(\omega) \cap \text{CO}(\text{NFR}_{us}) \neq \emptyset$ $\forall (\text{user}(\text{nsubj}) \ /.../ \text{Positive VP} \ /...) \wedge \text{CO}(\text{VP}) \cap \text{CO}(\text{NFR}_{us}) \neq \emptyset$	$\Rightarrow \text{VB} \leftarrow \text{easy to use}$ $\Rightarrow \omega \leftarrow \text{easy to use}$ $\Rightarrow \text{VB} \leftarrow \text{easily use}$
SC	Concurrent, simultaneous, number, increase, handle, process, capable, support	$\backslash \text{concurrent} \backslash \text{more maximum}(\text{NP}?) \backslash \text{all(of the)} \backslash \text{Regexp}_{CD} \text{user}$ $\text{if } \text{nsubj} \text{ is } \overline{CD}$ $((.../ \text{VB} \ /.../ \text{user} \ /...) \wedge \text{VB} \in \{ \text{grow, connect, include, increase, grow, add, incorporate} \}) \parallel$ $(.../ \text{VB} \ /.../ \text{simultaneous user}(s)?)$	$\Rightarrow [\text{exp}] \text{user} \leftarrow \text{simultaneous users}$ $\Rightarrow \text{nsubj} \leftarrow \text{simultaneous users}$ $\Rightarrow \text{VB} \leftarrow \text{scale}$
Security [SE]	protect, encrypt, policy, authenticate, prevent, malicious, login, logon, password, authorize, secure, ensure, access	$(\text{only} \ /.../ \text{nsubj} \ /.../ \text{root} \ /...) \parallel$ $(\text{only} \ /.../ \text{root} \ /.../ \text{nmod: agent} \ /...) \wedge (\text{root} \text{ is a } \text{VBP})$ $\forall \omega \in \{ \text{username} \ \& \ \text{password}, \text{login}, \text{logon} \}$ $\text{security, privacy, right, integrity, polict} \}$ $\wedge \text{CO}(\omega) \cap \text{CO}(\text{NFR}_{se}) \neq \emptyset$ $\forall \omega \in \{ \text{reach, enter, protect, input, interface} \}$ $\wedge \text{product is obj} \wedge \text{CO}(\omega) \cap \text{CO}(\text{NFR}_{se}) \neq \emptyset$	$\Rightarrow \begin{cases} \text{nsubj} \ \text{agent} \leftarrow \text{authorized user} \\ \text{root} \leftarrow \text{access} \end{cases}$ $\Rightarrow \omega \leftarrow \text{authorization}$ $\Rightarrow \omega \leftarrow \text{access}$
Legal & Licencing [L]	regulation, comply, standard, compliance, conform, legal, rule, meet, dispute	$(\forall (\text{conform} + \text{CO}_{\text{NFR}_l})^+)$ $\forall \omega \in \{ \text{law}, \text{standard}, \text{license}, \text{rule} \}$ $\wedge \text{CO}(\omega) \cap \text{CO}(\text{NFR}_l) \neq \emptyset$ $(\forall (\text{meet} + \text{CO}_{\text{NFR}_l})^+)$	$\Rightarrow \text{conform to} \leftarrow \text{comply with}$ $\Rightarrow \omega \leftarrow \text{regulation}$ $\Rightarrow \text{meet} \leftarrow \text{comply with}$
Performance [PE]	time, minute, response, process, longer, maximum, second, fast, every	$\langle \text{VB} \ (\text{POS} / \{ \text{VB} \})^* \text{fast} \rangle$ $\wedge \text{CO}(\text{VB}) \cap \text{CO}(\text{VB}_{pe}) \neq \emptyset$	$\Rightarrow \text{VB} \leftarrow \text{perform}$
Fault Tolerance [FT]	failure, continue, fault, malicious, problem, retain, restore, remain,	$\langle .../ \text{VB}_1 / .../ \text{if} / .../ \text{VB}_2 / ... \rangle$ $\wedge \text{CO}(\text{VB}_1) \cap \text{CO}(\text{VB}_{ft}) \neq \emptyset$ $\wedge (\forall (n + \text{CO}_{\text{NFR}_{ft}})^+)$ $n \in \{ \text{fault, crash, problem, malicious} \}$	$\Rightarrow \text{VB}_1 \leftarrow \text{continue}$ $\Rightarrow \text{Rep}(n, \text{failure}, \text{NFR}_{ft})$
Availability [A]	available, time, day, per, access, period, use, achieve	$[(\text{POS})^* \text{VB} (\text{POS} / \{ \text{VB} \})^* \text{alltimes}]$ $\wedge \text{CO}(\text{VB}) \cap \text{CO}(\text{VB}_a) \neq \emptyset$	$\Rightarrow \text{VB} \leftarrow \text{be available}$
Maintenance [MN]	new, update, change, maintain, release, continue	$\forall n \in \{ \text{new, change, release, add, upgrade} \}$ $\text{if } \text{CO}(\text{maintenance, support}) \cap \text{CO}(\text{NN}(S)_{mn}) \neq \emptyset$ $\{ \text{update}(s)?(\text{ed})?(\text{POS} / \text{VB})^+ \text{VB} \} \parallel$ $[(\text{POS} / \text{VB})^+ \text{VB} \text{ update}(s)?(\text{ed})?]$	$\Rightarrow n \leftarrow \text{update}$ $\Rightarrow \text{maintenance} \leftarrow \text{update}$ $\Rightarrow \text{VB} \leftarrow \text{support}$
Operability [O]	product, system, application, operate, interface, database, server	$\text{if } (\text{VB interface}) \wedge [\text{interface}(\text{with})?(\text{NP})]$ $\text{if } [\text{operate} \ \text{use} \ \text{work}(\text{with} \ \text{in} \ \text{on} \ \text{alongside})?(\text{NP})]$ $[\text{VBVP}] \wedge \text{CO}(\text{VB}) \cap \text{CO}(\text{VB}_o) \neq \emptyset$	$\Rightarrow (\text{NP}) \leftarrow \text{environment}$ $\Rightarrow \text{VB} \leftarrow \text{operate}$
LF	color, interface, page, website, use, user, comply, appear, look, simulate, conform, match	$\forall \omega \mid \omega \text{ contains "interface"} \wedge \omega = \text{nsubj} \parallel$ nobj $\forall \omega \in \{ \text{color, look, page, GUI, UI, website} \}$ $\wedge \text{CO}(\omega) \cap \text{CO}(\text{NFR}_{lf}) \neq \emptyset$ $\forall \omega \in \{ \text{comply, conform, incorporate, meet} \}$ $\wedge \text{CO}(\omega) \cap \text{CO}(\text{NFR}_{lf}) \neq \emptyset$	$\Rightarrow \text{interface} \leftarrow \text{appearance}$ $\Rightarrow \omega \leftarrow \text{appearance}$ $\Rightarrow \omega \leftarrow \text{match}$