





Figure 2: Concepts of Syntax Analyzer

- *2I*: A type of formal grammar, which should be a probabilistic/stochastic context-free grammar that is context free grammar with weight for automatic generation of unique social media profiles using Facebook as a test case. The grammar should describe a language to have a valid (semantically relatable) social media profiles using a subset of Facebook (FB) fields [3].
- *2R*: To specify the interesting paths, context-free grammars can be used while querying vertex- and edge-labeled graphs.[4].
- *3I*: Finite State Machine can be used to execute sequence of tests for a flow measurement testing. This solution can be applied to automate other serial and batch processes [?].
- *3R*: The most part of a network test research is devoted to methods based on graph theory, namely, on the theory of finite state machines (FSM). The network

protocol, such as IPv6, provokes a necessity to carry out the software testing [5]. The FSM can be used to test it.

- *4I*: In limited network bandwidth environment or resource-constrained computing devices, the overhead caused by Simple Object Access Protocol (SOAP) is disadvantageous. Even though binary representations of XML data were used, due to the special characteristics of SOAP communication most of these approaches are not applicable for web services. A custom pushdown automaton can be generated not only for parsing but also as a compressor [6].
- *4R*: Pushdown Automata in Statistical Machine Translation using context-free grammar [7]
- *5I*: Make a parse tree for the SQL injection query "select \* from students where name = 'Alice' or 1 > 0" considering the relational algebra.
- *5I*: The industry have a valuable business information in the database and this highly motivate attackers. Hence special care needs to be taken to prevent any malicious access. An approach for modeling SQL statements to apply machine learning techniques, such as clustering or outlier detection can be designed, in order to detect malicious behaviour at the database transaction [8]. The approach needs to use parse tree structure of SQL queries as characteristic E.g. for correlating SQL queries with applications and distinguishing benign and malicious queries.
- *6I*: The professional applications need to have error handling concept to trap unexpected errors. A consistent error handler can make sure that when crashes occur, the user is informed and program exits properly [9].
- *6R*: Soft errors known as transient faults may lead to application crashes or silent

data corruption (SDC) that could result in incorrect program outputs. A compiler-directed error recovery scheme can provide fine-grained and guaranteed recovery without excessive performance and hardware overhead [10].

**Like above, for all concepts in the syntax analyzer, your team has to prepare the assignments considering the recent research and industry requirement**

## References

- [1] HireAbility - Smart Parsing Solutions, URL: <https://www.hireability.com/products/>, [Last Accessed on 14/02/2020].
- [2] D. Qiu, S. Liao, C. Jia and D. Xu, Intrusion detection technology based on data parsing and finite automaton, *Proceedings of the 5th International Conference on Electronics Information and Emergency Communication*, pp.67-70, 2015.
- [3] A. Ade-Ibijola, Synthesis of Social Media Proles Using a Probabilistic Context-Free Grammar, *Proceedings of the International Conference on Pattern Recognition Association of South Africa and Robotics and Mechatronics*, pp. 104-109, 2017.
- [4] P. Sevón and L. Eronen, Subgraph Queries by Context-free Grammars, *Journal of Integrative Bioinformatics*, Vol.5, No.2, 2008.
- [5] A. Abdel-Karim Helal Abu-Ein, Hazem (Moh'd Said) Abdel Majid Hatamleh and Ahmed A.M. Sharadqeh, Using Finite State Machine at the Testing of Network Protocols, *Australian Journal of Basic and Applied Sciences*, Vol. 5, No. 10, pp. 956-960, 2011.
- [6] C. Werner, C. Buschmann, Y. Brandt and S. Fischer, Compressing SOAP Messages by using Pushdown Automata, *Proceedings of the International Conference on Web Services*, 2006.
- [7] C. Allauzen, B. Byrne, A. d. Gispert, G. Iglesia and M. Riley, Pushdown Automata in Statistical Machine Translation, *Association for Computational Linguistics*, Vol.20, No.3, pp.687-723, 2014.
- [8] C. Bockermann, M. Apel and M. Meier, Learning SQL for Database Intrusion Detection using Context-Sensitive Modelling, *Proceedings of the 6th International Conference on Detection of Intrusions and Malware, and Vulnerability Assessment*, pp.196-205, 2009.
- [9] L. Chung, Error Handling and Debugging Tips and Techniques for Microsoft Access, VBA, and Visual Basic 6 (VB6), URL: <https://www.fmsinc.com/tpapers/vbocode/Debug.asp> [Last accessed on 13/02/2020]
- [10] Q. Liu, C. Jung, D. Lee and D.h Tiwari, Compiler-Directed Lightweight Checkpointing for Fine-Grained Guaranteed Soft Error Recovery, *Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis*, pp.228-239, 2016.